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VOL. XIV. PAS——PLA

INDOCTI DISCANT, ET AMENT MEMINISSE PERITI.

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BRITISH MUSEUM

ENCYCLOPÆDIA.

PASSIFLORA, or Passion-flower: A genus of the pentandria order belonging to the gynandria claſs of plants; and in the natural method ranking under the 34th order, *Cucurbitaceæ*. The calyx is pentaphyllous: there are five petals; the nectarium a crown; the berry is pedicillated. There are near 30 different ſpecies; all of them natives of warm foreign countries, only one of which is ſufficiently hardy to ſucceed well in the open ground in England; all the others requiring the ſhelter of a green-houſe or ſtove, but chiefly the latter. The moſt remarkable are,

1. The cærulea, or blue-rayed common palmated paſſion-flower, hath long, ſlender, ſhrubby, purpliſh-green ſtalks, branchy, and aſcending upon ſupport by their claſpers 30 or 40 feet high; with one large palmated leaf at each joint, and at the axillas large ſpreading flowers, with whitiſh-green petals, and a blue radiated nectarium; ſucceeded by a large, oval, yellowiſh fruit. It flowers from July until October; the flowers are very large, conſpicuous, and their compoſition is exceedingly curious and beautiful. The general ſtructure of the ſingular flowers of this plant is, they come out at the axillas on pedunculi about three inches long, which they terminate, each flower having juſt cloſe under the calyx, a three-lobed involucrum-like appendage; a five-loabed calyx, and a five-petalous corolla, the ſize, figure, and colour of the calyx, &c. the petals arranging alternately with the calcinal lobes; the whole, including the involucrum, calyx, and corolla, make juſt 13 lobes and petals, all expanded flat: and within the corolla is the nectarium, compoſed of a multitude of thread-like fibres, of a blue and purple colour, diſpoſed in circular rays round the column of the fructification; the outer ray is the longeſt, flat, and ſpreading on the petals; the inner is ſhort, erect, and narrows towards the centre: in the middle is an erect cylindric club ſhaped column or pillar, crowned with the roundiſh germen, having at its baſe five horizontal ſpreading filaments, crowned with incumbent yellow antheræ, that move about every way; and from the ſide of the germen ariſe three ſlender ſpreading ſtyles, terminated by headed ſtigmas: the germen afterwards gradually becomes a large oval fleſhy fruit, ripening to a yellowiſh colour.—Theſe wonderful flowers are only of one day's duration, generally opening about 11 or 12 o'clock, and frequently in hot ſunny weather burſt open with elaſticity, and continue fully expanded all that day: and the next they gradually cloſe, aſſuming a decayed-like appearance, and never open any more; the evening puts a period to their exiſtence, but they are ſucceeded by new ones daily on the ſame plant.—This plant and flowers are held in great veneration in ſome foreign Catholic countries, where the religious make the leaves, tendrils, and different parts of the flower, to repreſent the inſtruments of our bleſſed Saviour's paſſion; hence the name *paſſiflora*.

2. The incarnata, incarnated, or fleſh coloured Italian paſſion-flower, hath a ſtrong perennial root; ſlender, herbaceous ſtalks, riſing upon ſupport four or five feet high; leaves compoſed of three ſawed lobes, each leaf attended by a twining tendril; and at the axillas long ſlender pedunculi, terminated each by one whitiſh flower, having a greeniſh calyx, and a reddiſh or purple radiated nectarium, ſurrounding the column of the fructification, which ſucceed to a large, round, fleſhy fruit, ripening to a beautiful orange colour. The flowers of this ſpecies are alſo very beautiful though of ſhort duration, opening in the morning, and night puts a period to their beauty; but they are ſucceeded by a daily ſupply of new ones. The fruit of this ſort is alſo very ornamental, as ripening to a fine reddiſh orange colour; but theſe rarely attain perfection here, unleſs the plants are placed in the ſtove; therefore when there is ſuch accommodation, it highly merits that indulgence, where it will exhibit both flowers and green and ripe fruit, all at the ſame time, in a beautiful manner.

3. The veſpertilio, or bat's wing paſſion-flower, hath ſlender, ſtriated, branchy ſtalks; large, bilobate, or two-lobed leaves, the baſe roundiſh and glandular, the lobes acute, widely divaricated like a bat's wing, and dotted underneath; and axillary flowers, having white petals and rays. The leaves of theſe ſpecies have a ſingular appearance, the two lobes being expanded ſix or ſeven inches wide, reſembling the wings of a bat upon flight: hence the name *veſpertilio*.

As all the ſpecies are natives of warm climates, in this country they are moſtly of a tender quality, except the firſt ſort, which ſucceeds very well in the full ground, in a warm ſituation; only their young branches are ſometimes killed in very ſevere winters; but plenty of new ones generally riſe again in ſpring following: the other, denominated *ſtove kinds*, muſt always be retained in that repoſitory.

PASSION, is a word of which, as Dr Reid obſerves, the meaning is not preciſely aſcertained either in common diſcourſe or in the writings of philoſophers. In its original import, it denotes every *feeling* of the mind occaſioned by an extrinſic cauſe; but it is generally uſed to ſignify ſome *agitation* of mind, oppoſed to that ſtate of tranquillity in which a man is moſt maſter of himſelf. That it was thus uſed by the Greeks and Romans, is evident from Cicero's rendering παθος, the word by which the philoſophers of Greece expreſſed it; by *perturbatio* in Latin. In this ſenſe of the word, paſſion cannot be itſelf a *diſtinct* and *independent* principle of action; but only an occaſional degree of vehemence given to thoſe diſpoſitions, deſires, and affections, which are at all times preſent to the mind of man; and that this is its proper ſenſe, we need no other proof than that paſſion has always been conceived to bear analogy to a ſtorm at ſea or to a tempeſt in the air.

With reſpect to the number of paſſions of which the mind is ſuſceptible, different opinions have been held by different authors. Le Brun, a French writer on painting, juſtly conſidering the expreſſion of the paſſions as a very important as well as difficult branch of his art, has enumerated no fewer than twenty, of which the ſigns may be expreſſed by the pencil on canvaſs. That there are ſo many different ſtates of mind producing different effects which are viſible on the features and the geſtures, and that thoſe features and geſtures ought to be diligently ſtudied by the artiſt, are truths which cannot be denied; but it is abſurd to conſider all theſe different ſtates of mind as *paſſions*, ſince tranquillity is one of them, which is the reverſe of paſſion.

The common diviſion of the paſſions into *deſire* and *averſion*, *hope* and *fear*, *joy* and *grief*, *love* and *hatred*, has been mentioned by every author who has treated of them, and needs no explication; but it is a queſtion of ſome importance in the philoſophy of the human mind, whether theſe different paſſions be each a degree of an original and innate diſpoſition, diſtinct from the diſpoſitions, which are reſpectively the foundations of the other paſſions, or only different modifications of one or two general diſpoſitions common to the whole race.

The former opinion is held by all who build their ſyſtem of metaphyſics upon a number of diſtinct internal ſenſes; and the latter is the opinion of thoſe who, with Locke and Hartley, reſolve what is commonly called inſtinct into an early aſſociation of ideas. (See INSTINCT.) That without deliberation mankind inſtantly feel the paſſion of fear upon the apprehenſion of danger, and the paſſion of anger or reſentment upon the reception of an injury, are truths which cannot be denied: and hence it is inferred, that the ſeeds of theſe paſſions are innate in the mind, and that they are not generated, but only ſwell to magnitude on the proſpect of their reſpective objects. In ſupport of this argument, it has been obſerved that children, without any knowledge of their danger, are inſtinctively afraid on being placed on the brink of a precipice; and that this paſſion contributes to their ſafety long before they acquire, in any degree equal to their neceſſities, the exerciſe of their rational powers. Deliberate anger, cauſed by a voluntary injury, is acknowledged to be in part founded on reaſon and reflection; but where anger impels one ſuddenly to return a blow, even without thinking of doing miſchief, the paſſion is inſtinctive. In proof of this, it is obſerved that inſtinctive anger is frequently raiſed by bodily pain, occaſioned even by a ſtock or a ſtone, which inſtantly becomes an object of reſentment, that we are violently incited to cruſh to atoms. Such conduct is certainly not rational, and therefore it is ſuppoſed to be neceſſarily inſtinctive.

With reſpect to other paſſions, ſuch as the luſt of power, of fame, or of knowledge, innumerable inſtances, ſays Dr Reid, occur in life, of men who ſacrifice to them their eaſe, their pleaſure, and their health. But it is abſurd to ſuppoſe that men ſhould ſacrifice the end to what they deſire only as means of promoting that end; and therefore he ſeems to think that theſe paſſions muſt be innate. To add ſtrength to this reaſoning, he obſerves, that we may perceive ſome degree of theſe principles even in brute animals of the more ſagacious kind, who are not thought to deſire means for the ſake of ends which they have in view.

But it is in accounting for the paſſions which are diſintereſted that the advocates for innate principles ſeem moſt completely to triumph. As it is impoſſible not to feel the paſſion of pity upon the proſpect of a fellow-creature in diſtreſs, they argue, that the baſis of that paſſion muſt be innate; becauſe pity, being at all times more or leſs painful to the perſon by whom it is felt, and frequently of no uſe to the perſon who is its object, it cannot in ſuch inſtances be the reſult of deliberation, but merely the exertion of an original inſtinct. The ſame kind of reaſoning is employed to prove that gratitude is the exerciſe of an innate principle. That good offices are, by the very conſtitution of our nature, apt to produce good will towards the benefactor, in good and bad men, in the ſavage and in the civilized, cannot ſurely be denied by any one in the leaſt acquainted with human nature. We are grateful not only to the benefactors of ourſelves as individuals, but alſo to the benefactors of our country; and *that*, too, when we are conſcious that from our gratitude neither they nor we can reap any advantage. Nay, we are impelled to be grateful even when we have reaſon to believe that the objects of our gratitude know not our exiſtence. This paſſion cannot be the effect of reaſoning, or of aſſociation founded on reaſoning; for, in ſuch caſes as thoſe mentioned, there are no principles from which reaſon can infer the propriety or uſefulneſs of the feeling. That *public ſpirit*, or the affection which we bear to our country, or to any ſubordinate community of which we are members, is founded on inſtinct, is deemed ſo certain, that the man deſtitute of this affection, if there be any ſuch, has been pronounced as great a monſter as he who has two heads.

All the diſintereſted paſſions are founded on what philoſophers have termed *benevolent affection*. Inſtead therefore of enquiring into the origin of each paſſion ſeparately, which would ſwell this article to no purpoſe, let us liſten to one of the fineſt writers as well as ableſt reaſoners of the age, treating of the origin of benevolent affection, "We may lay it down as a principle (ſays Dr Reid †), that all benevolent affections are in their nature agreeable: that it is eſſential to them to deſire the good and happineſs of their objects; and that their objects muſt therefore be beings capable of happineſs. A thing may be deſired either on its own account, or as the means in order to ſomething elſe. That only can properly be called an object of deſire which is deſired upon its own account;

† Eſſays on the active Powers of Man.

and therefore I conſider as benevolent thoſe affections only which deſire the good of their object ultimately, and not as means in order to ſomething elſe. To ſay that we deſire the good of others, only to procure ſome pleaſure or good to ourſelves, is to ſay that there is no benevolent affection in human nature. This indeed has been the opinion of ſome philoſophers both in ancient and in later times. But it appears as unreaſonable to reſolve all benevolent affections into ſelf-love, as it would be to reſolve hunger and thirſt into ſelf-love. Theſe appetites are neceſſary for the preſervation of the individual. Benevolent affections are no leſs neceſſary for the preſervation of ſociety among men; without which men would become an eaſy prey to the beaſts of the field. The benevolent affections planted in human nature, appear therefore no leſs neceſſary for the preſervation of the human ſpecies than the appetites of hunger and thirſt." In a word, pity, gratitude, friendſhip, love, and patriotiſm, are founded on different benevolent affections; which our learned author holds to be original parts of the human conſtitution.

This reaſoning has certainly great force: and if authority could have any weight in ſettling a queſtion of this nature, we know not that name to which greater deference is due than the name of him from whom it is taken. Yet it muſt be confeſſed that the philoſophers, who conſider the affections and paſſions as early and deep-rooted aſſociations, ſupport their opinion with very plauſible arguments. On their principles we have endeavoured elſewhere to account for the paſſions of fear and love, (ſee Instinct and Love); and we may here ſafely deny the truth of what has been ſtated reſpecting fear, which ſeems to militate againſt that account. We have attended with much ſolicitude to the actions of children; and have no reaſon to think that they feel terror on the brink of a precipice till they have been repeatedly warned of their danger in ſuch ſituations by their parents or their keepers. Every perſon knows not only that they have no original or inſtinctive dread of fire, which is as dangerous to them as any precipice; but that it is extremely difficult to keep them from that deſtructive element till they are either capable of weighing the force of arguments, or have repeatedly experienced the pain of being burnt by it. With reſpect to ſudden reſentment, we cannot help conſidering the argument, which is brought in proof of its being inſtinctive, as proving the contrary in a very forcible manner. Inſtinct is ſome myſterious influence of God upon the mind exciting to actions of beneficial tendency: but can any benefit ariſe from wrecking our impotent vengeance on a ſtock or a ſtone? or is it ſuppoſable that a Being of infinite wiſdom would excite us to actions ſo extravagantly fooliſh? We learn from experience to defend ourſelves againſt rational or ſenſible enemies by retaliating the injuries which they inflict upon us; and if we have been often injured in any particular manner, the idea of that injury becomes in time ſo cloſely aſſociated with the means by which it has been conſtantly repelled, that we never receive ſuch an injury—a blow for inſtance—without being prompted to make the uſual retaliation, without reflecting whether the object be ſenſible or inſenſible. So far from being inſtinctive does reſentment appear to us, that we think an attentive obſerver may eaſily perceive how the ſeeds of it are gradually inſuſed into the youthful mind; when the child, from being at firſt a timid creature ſhrinking from every pain, learns by degrees to return blow for blow and threat for threat.

But inſtead of urging what appears to ourſelves of moſt weight againſt the inſtinctive ſyſtem, we ſhall lay before our readers a few extracts from a diſſertation on the Origin of the Paſſions by a writer whoſe elegance of language and ingenuity of inveſtigation do honour to the ſchool of Hartley.

"When an infant is born (ſays Dr Sayers*), there is every reaſon to ſuppoſe that he is born without ideas. Theſe are rapidly communicated through the medium of the ſenſes. The ſame ſenſes are alſo the means of conveying to him pleaſure and pain. Theſe are the hinges on which the paſſions turn: and till the child is acquainted with theſe ſenſations, it would appear that no paſſion could be formed in his mind; for till he has felt pleaſure and pain, how can he deſire any object, or wiſh for its removal? How can he either love or hate? Let us obſerve then the manner in which love and hatred are formed; for on theſe paſſions depend all the reſt. When a child endures pain, and is able to detect the cauſe of it, the idea of pain is connected in his mind with that of the thing which produced it; and if the object which occaſioned pain be again preſented to the child, the idea of pain aſſociated with it ariſes alſo. This idea conſequently urges the child to avoid or to remove the object; and thus ariſes the paſſion of diſlike or hatred. In the ſame manner, the paſſion of liking or love is readily formed in the mind of a child from the aſſociation of pleaſant ideas with certain objects which produced them.

"The paſſions of hope and fear are ſtates of the mind depending upon the good or bad proſpects of gratifying love or hatred; and joy or ſorrow ariſes from the final ſucceſs or diſappointment which attends the exertions produced by love or by hatred. Out of theſe paſſions, which have all a perceptible relation to our own good, and are univerſally acknowledged to be ſelfiſh, all our other paſſions are formed."

To account for the paſſions called *diſintereſted*, he obſerves, that in the hiſtory of the human mind we find many inſtances of our dropping an intermediate idea, which has been the means of our connecting two other ideas together; and that the aſſociation of theſe two remains after the link which originally united them has vaniſhed. Of this fact the reader will find ſufficient evidence in different articles of this work (See Instinct, n° 19, and Metaphysics, n° 101): and, to apply it to the diſintereſted paſſions, let us ſuppoſe, with Dr Sayers, that any individual has done to us many offices of kindneſs, and has conſequently much contributed to our happineſs; it is natural for us to ſeek with ſome anxiety for the continuance of thoſe pleaſures which he is able to communicate. But we ſoon diſcern, that the ſureſt way of obtaining the continuance of his friendly offices is to make them, as much as poſſible, a ſource of pleaſure to himſelf. We therefore do every thing in our power to promote his happineſs in return for the good he has conferred upon us, that thus we may attach him to us as much as we are able. Hitherto all is plainly ſelfiſh. We have been evidently endeavouring, for the ſake of our own future gratification, to promote the happineſs of this perſon: but obſerve the conſequence. We have thus, by contemplating the advantage to be derived to ourſelves from promoting the proſperity of our friend, learned to aſſociate a ſet of pleaſant ideas with his happineſs; but the link which has united them gradually eſcapes us, while the union itſelf remains. Continuing to aſſociate pleaſure with the well-being of our friend, we endeavour to promote it for the ſake of his *immediate* gratification, without looking farther; and in this way his happineſs, which was firſt attended to only as a means of future enjoyment, finally becomes an end. Thus then the paſſion which was originally ſelfiſh, is at length *diſintereſted;* its gratification being completed merely by its ſucceſs in promoting the happineſs of another."

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* Diſquiſitions Metaphyſical and Literary.

In this way does our author account for the origin of gratitude; which at laſt becomes a habit, and flows ſpontaneouſly towards every man who has either been or intended to be our benefactor. According to him, it is eaſy to obſerve alſo, that from aſſociating pleaſure with the happineſs of an individual when we procure it ourſelves, it muſt of courſe ſoon follow, that we ſhould experience pleaſure from a view of his happineſs any way produced; ſuch happineſs raiſing at all times pleaſant ideas when it is preſented to our minds. This is another feature of a diſintereſted affection, to feel delight from the mere increaſe of happineſs in the object whom we love.

"It may be objected, perhaps, that parents ſeem to have an *inſtinctive* diſintereſted love of their offspring: but ſurely the love of a parent (A) for a new-born infant is not uſually equal to that for a child of four or five years old. When a child is firſt born, the proſpect and hopes of future pleaſure from it are ſufficient to make a parent anxious for its preſervation. As the child grows up, the hope of future enjoyment from it muſt increaſe: hence would pleaſure be aſſociated with the well-being of the child, the love of which would of courſe become in due time diſintereſted."

Our author does not analyſe *pity*, and trace it to its ſource in ſelfiſhneſs; but he might eaſily have done it, and it has been ably done by his maſter. Pity or compaſſion is the uneaſineſs which a man feels at the miſery of another. It is generated in every mind during the years of childhood; and there are many circumſtances in the conſtitution of children, and in the mode of their education, which make them particularly ſuſceptible of this paſſion. The very appearance of any kind of miſery which they have experienced, or of any ſigns of diſtreſs which they underſtand, excite in their minds painful feelings from the remembrance of what they have ſuffered, and the apprehenſion of their ſuffering it again. We have ſeen a child a year old highly entertained with the noiſe and ſtruggles made by its elder brother when plunged naked into a veſſel filled with cold water. This continued to be the caſe for many days, till it was thought proper to plunge the younger as well as the elder; after which the daily entertainment was ſoon at an end. The little creature had not been itſelf plunged above twice till it ceaſed to find diverſion in its brother's ſufferings.—On the third day it cried with all the ſymptoms of the bittereſt anguiſh upon ſeeing its brother plunged, though no preparation was then made for plunging itſelf: but ſurely this was not diſintereſted ſympathy, but a feeling wholly ſelfiſh, excited by the remembrance of what it had ſuffered itſelf, and was apprehenſive of ſuffering again. In a ſhort time, however, the painful feelings accompanying the ſight of its brother's ſtruggles, and the ſound of his cries, were doubtleſs ſo aſſociated with that ſight and that ſound, that the appearance of the latter would have brought the former along with them, even though the child might have been no longer under apprehenſion of a plunging itſelf. This aſſociation, too, would ſoon be transferred to every boy in the ſame circumſtances, and to ſimilar ſounds and ſtruggles, from whatever cauſe they might proceed.

Thus, as Dr Hartley obſerves §, "when ſeveral children are educated together, the pains, the denials of pleaſure, and the ſorrows which affect one, generally extend to all in ſome degree, often in an equal one. When their parents, companions, or attendants are ſick or afflicted, it is uſual to raiſe in their minds the naſcent ideas of pains and miſeries by ſuch words and ſigns as are ſuited to their capacities. They alſo find themſelves laid under many reſtraints, on account of the ſickneſs or affliction of others; and when theſe and ſuch like circumſtances have raiſed in their minds deſires to remove the cauſes of their own internal feelings, *i. e.* to eaſe the miſeries of others, a variety of internal feelings and deſires become ſo blended and aſſociated together, as that no part can be diſtinguiſhed ſeparately from the reſt, and the child may properly be ſaid to have compaſſion. The ſame ſources of compaſſion remain, though with ſome alteration, during our whole progreſs through life. This is ſo evident, that a reflecting perſon may plainly diſcern the conſtituent parts of his compaſſion while they are yet the mere internal, and, as one may ſay, ſelfiſh feelings abovementioned; and before they have put on the nature of com-

§ Obſervations on Man.

(A) That this is true of the father is certain; but it may be queſtioned whether it be equally true of the mother. A woman is no ſooner delivered of her infant, than ſhe careſſes it with the utmoſt poſſible fondneſs. We believe, that if ſhe were under the neceſſity of making a choice between her child of four years, and her infant an hour old, ſhe would rather be deprived of the latter than of the former; but we are not convinced that this would proceed from a leſs degree of affection to the infant than to the child. She knows that the child has before its fourth year eſcaped many dangers which the infant muſt encounter, and may not eſcape; and it is therefore probable that her choice would be the reſult of prudent reflection. Though we are not admirers of that philoſophy which ſuppoſes the human mind a bundle of inſtincts, we can as little approve of the oppoſite ſcheme, which allows it no inſtincts at all. The ϛοργη of a mother to her new-born infant is undoubtedly inſtinctive, as the only thing which at that moment can be aſſociated with it in her mind is the pain ſhe has ſuffered in bringing it to the world.

compaſſion, by coaleſcence with the reſt. Agreeably to this method of reaſoning, it may be obſerved, that perſons whoſe nerves are eaſily irritable, and thoſe who have experienced great trials and afflictions, are in general more diſpoſed to compaſſion than others; and that we are moſt apt to pity others in thoſe diſeaſes and calamities which we either have felt or of which we apprehend ourſelves to be in danger."

The origin of patriotiſm and public ſpirit is thus traced by Dr Sayers: "The pleaſures which our country affords are numerous and great. The wiſh to perpetuate the enjoyment of thoſe pleaſures includes, the wiſh to promote the ſafety and welfare of our country, without which many of them would be loſt. All this is evidently ſelfiſh; but, as in the progreſs of gratitude, it finally becomes diſintereſted. Pleaſant ideas are thus ſtrongly connected with the welfare of our country, after the tie which firſt bound them together has eſcaped our notice. The proſperity which was at firſt deſirable as the means of future enjoyment, becomes itſelf an end: we feel delight in ſuch proſperity, however produced; and we look not beyond this immediate delight. It is thus not difficult to obſerve in what manner a general and diſintereſted benevolence takes place in a mind which has already received pleaſure from the happineſs of a few; the tranſition is eaſy towards aſſociating it with *happineſs in general*, with the happineſs of any being, whether produced by ourſelves or by any other cauſe whatever."

From this reaſoning, our author concludes, that all our paſſions may be traced up to original feelings of regard for ourſelves. "Thus (in the forcible language of a learned writer ‡ of the ſame ſchool) does ſelf-love, under the varying appearance of natural affection, domeſtic relation, and the connections of ſocial habitude, at firſt work blindly on, obſcure and deep, in dirt: But as it makes its way, it continues riſing till it emerges into light; and then ſuddenly expiring, leaves behind it the faireſt iſſue,"—benevolent affection.

Self-love forſook the path it firſt purſu'd,
And found the private in the public good.

Thus have we ſtated the two oppoſite theories reſpecting the origin of paſſions in the mind, and given our readers a ſhort ſpecimen of the reaſonings by which they are ſupported by their reſpective patrons. Were we called upon to decide between them, we ſhould be tempted to ſay, that they have both been carried to extremes by ſome of their advocates, and that the truth lies in the middle between them. "It is impoſſible* but that creatures capable of pleaſant and painful ſenſations, ſhould love and chooſe the one, and diſlike and avoid the other. No being who knows what happineſs and miſery are, can be ſuppoſed indifferent to them, without a plain contradiction. Pain is not a *poſſible* object of deſire, nor happineſs of *averſion*." To prefer a greater good though diſtant, to a leſs good that is preſent; or to chooſe a preſent evil, in order to avoid a greater future evil—is indeed wiſe and rational conduct; but to chooſe evil ultimately, is abſolutely impoſſible. Thus far then muſt be admitted that every being poſſeſſed of ſenſe and intellect, neceſſarily deſires his own good as ſoon as he knows what it is; but if this knowledge be not innate, neither can the deſire. Every human being comes into the world with a capability of knowledge, and of courſe with a capability of affections, deſires, and paſſions; but it ſeems not to be conceivable how he can actually love, or hate, or dread any thing, till he know whether it be good, or ill, or dangerous. If, therefore, we have no innate ideas, we cannot poſſibly have innate deſires or averſions. Thoſe who contend that we have, ſeem to think, that without them reaſon would be inſufficient, either for the preſervation of the individual or the continuation of the ſpecies; and ſome writers have alleged, that if our affections and paſſions were the mere reſult of early aſſociations, they would neceſſarily be more capricious than we ever find them. But this objection ſeems to ariſe from their not rightly underſtanding the theory of their antagoniſts. The diſciples of Locke and Hartley do not ſuppoſe it poſſible for any man in ſociety to prevent ſuch aſſociations from being formed in his mind as ſhall neceſſarily produce deſires and averſions; far leſs do they think it poſſible to form aſſociations of ideas utterly repugnant, ſo as to deſire that as good which his ſenſes and intellect have experienced to be evil. Aſſociations are formed by the very ſame means, and at the very ſame time, the ideas and notions are impreſſed upon the mind; but as pain is never miſtaken for pleaſure by the ſenſes, ſo an object which has given us only pain is never aſſociated with any thing that makes it deſirable. We ſay an object that has given us only pain becauſe it is poſſible to form ſuch an aſſociation between life and the loſs of a limb, as to make us grateful to the ſurgeon by whom it was amputated. Aſſociations being formed according to the ſame laws by which knowledge is acquired, it by no means follows that paſſions reſulting from them ſhould be more capricious than they are found to be; and they certainly are ſufficiently capricious to make us ſuſpect that the greater part of them has this origin, rather than that they are all infuſed into the mind by the immediate agency of the Creator. If man be a being formed with no innate ideas, and with no other inſtinctive principles of action than what are abſolutely neceſſary to preſerve his exiſtence and perpetuate the ſpecies, it is eaſy to perceive why he is placed in this world as in a ſtate of probation, where he may acquire habits of virtue to fit him for a better. It is likewiſe eaſy to perceive why ſome men are better than others, and why ſome are the ſlaves of the moſt criminal paſſions. But all this is unintelligible, upon the ſuppoſition that the ſeeds of every paſſion are innate, and that man is a compound of reaſon and of inſtincts ſo numerous and various as to ſuit every circumſtance in which he can be placed.

If paſſions, whatever be their origin, operate inſtantaneouſly, and if they be formed according to fixed laws, it may be thought a queſtion of very little importance whether they be inſtinctive or acquired.—This was long our own opinion; but we think, that upon maturer reflection, we have ſeen reaſon to change it. If paſſions be the reſult of early aſſociations, it is of the utmoſt conſequence that no improper aſſociations be formed in the minds of children, and that none of their unreaſonable deſires be gratified. Upon this theory it ſeems indeed to depend almoſt wholly upon education, whether a child ſhall become a calm, benevolent, ſteady, and upright man; or a paſſionate, capricious,

‡ Warburton.

* Dr Price's Review, &c.

pricious, ſelfiſh, miſcreant. By teaching him to reſent every petty injury, the ſeeds of irraſcibility are ſown in his mind, and take ſuch root, that before the age of manhood he becomes intolerable to all with whom he muſt converſe. By exciting numberleſs deſires in his youthful mind, and inſtantly gratifying them, you make him capricious, and impatient of diſappointment; and by repreſenting other children as in any degree inferior to him, you inſpire him with the hateful paſſion of pride. According to the inſtinctive theory, education can only augment or diminiſh the ſtrength of paſſions; according to the other theory, it is the ſource of by far the greater part of them. On either ſuppoſition, parents ſhould watch with ſolicitude over the actions of their children; but they will ſurely think themſelves obliged to be doubly watchful, if they believe, that through their neglect their children may acquire hateful paſſions, to which, if properly educated, they might have remained ſtrangers thro' their whole lives. And let it be remembered, that this ſolicitude ſhould begin at an early period: becauſe the mind is ſuſceptible of deep aſſociations much ſooner than is ſometimes imagined. Without this ſuſceptibility no language could be learned; and therefore a child by the time he learns to ſpeak, may have planted in his mind the ſeeds of paſſions, on the juſt regulation and ſubordination of which depends in a great meaſure the happineſs of mankind. See *Moral Philoſophy*, Part I. Chap. 1 & 2. Part III, n° 216.

Passions and Emotions, difference between them. See *Emotion and Paſſions*.

External Signs of Emotions and Passion. So intimately connected are the ſoul and body, that every agitation in the former produces a viſible effect upon the latter. There is, at the ſame time, a wonderful uniformity in that operation; each claſs of emotions and paſſions being invariably attended with an external appearance peculiar to itſelf. Theſe external appearances, or ſigns, may not improperly be conſidered as a natural language, expreſſing to all beholders emotions and paſſions as they ariſe in the heart. Hope, fear, joy, grief, are diſplayed externally: the character of a man can be read in his face; and beauty, which makes ſo deep an impreſſion, is known to reſult, not ſo much from regular features and a fine complexion, as from good-nature, good-ſenſe, ſprightlineſs, ſweetneſs, or other mental quality, expreſſed upon the countenance. Though perfect ſkill in that language be rare, yet what is generally known is ſufficient for the ordinary purpoſes of life. But by what means we come to underſtand the language, is a point of ſome intricacy. It cannot be by ſight merely; for upon the moſt attentive inſpection of the human viſage, all that can be diſcerned are, figure, colour, and motion, which, ſingly or combined, never can repreſent a paſſion nor a ſentiment: the external ſign is indeed viſible; but to underſtand its meaning, we muſt be able to connect it with the paſſion that cauſes it; an operation far beyond the reach of eye-ſight. Where then is the inſtructor to be found that can unveil this ſecret connection? If we apply to experience, it is yielded, that from long and diligent obſervation, we may gather, in ſome meaſure, in what manner thoſe we are acquainted with expreſs their paſſions externally; but with reſpect to ſtrangers, we are left in the dark; and yet are not puzzled about the meaning of theſe external expreſſions in a ſtranger, more than in a boſom companion. Further, had we no other means but experience for underſtanding the external ſigns of paſſion, we could not expect any uniformity, nor any degree of ſkill, in the bulk of individuals: yet matters are ſo much better ordered, that the external expreſſions of paſſion form a language underſtood by all, by the young as well as the old, by the ignorant as well as the learned. We talk of the plain and legible characters of that language; for undoubtedly we are much indebted to experience, in deciphering the dark and more delicate expreſſions. Where then ſhall we apply for a ſolution of this intricate problem, which ſeems to penetrate deep into human nature? Undoubtedly if the meaning of external ſigns be not derived to us from ſight, nor from experience, there is no remaining ſource whence it can be derived but from nature.

Elements of Criticiſm.

We may then venture to pronounce, with ſome degree of confidence, that man is provided by nature with a ſenſe or faculty that lays open to him every paſſion by means of its external expreſſions. And we cannot entertain any reaſonable doubt of this, when we reflect, that the meaning of external ſigns is not hid even from infants: an infant is remarkably affected with the paſſions of its nurſe expreſſed on her countenance; a ſmile cheers it; a frown makes it afraid; but fear cannot be without apprehending danger; and what danger can the infant apprehend, unleſs it be ſenſible that its nurſe is angry? We muſt therefore admit, that a child can read anger in its nurſe's face; of which it muſt be ſenſible intuitively, for it has no other mean of knowledge. We do not affirm, that theſe particulars are clearly apprehended by the child; for to produce clear and diſtinct perceptions, reflection and experience are requiſite; but that even an infant, when afraid, muſt have ſome notion of its being in danger, is evident.

That we ſhould be conſcious intuitively of a paſſion from its external expreſſions, is conformable to the analogy of nature; the knowledge of that language is of too great importance to be left upon experience; becauſe a foundation ſo uncertain and precarious, would prove a great obſtacle to the formation of ſocieties. Wiſely therefore is it ordered, and agreeably to the ſyſtem of providence, that we ſhould have nature for our inſtructor.

Such is the philoſophy of Lord Kames, to which objections unanſwerable may be made. It is part of the inſtinctive ſyſtem of metaphyſics, which his Lordſhip has carried farther than all who wrote before him, and perhaps farther than all who have ſucceeded him in this department of ſcience. That a child intuitively reads anger in its nurſe's face, is ſo far from being true, that for ſome ſhort time after birth it is not terrified by the moſt menacing geſtures. It is indeed abſolutely incapable of fear till it has ſuffered pain, (ſee Instinct); and could we conſtantly careſs it with what is called an *angry look*, it would be cheered by that look, and frightened at a ſmile. It feels, however, the *effects* of anger, and is ſoon capable of obſerving the peculiarity of feature with which that paſſion is uſually accompanied; and theſe two become in a ſhort time ſo linked together in its tender mind, that the appearance of the one neceſſarily ſuggeſts to it the reality of the other.

Should it be ſaid that a loud and ſudden noiſe ſtartles a child immediately after birth, and that, therefore the infant muſt be inſtinctively afraid, the fact may be admitted, without any neceſſity of admiting the inference. The nerves of an infant are commonly very irritable, and the ſtrong impulſe on the *auditory* nerves may agitate its whole frame, without inſpiring it with the paſſion of fear. The loud noiſe is, in all probability not the ſign of approaching danger, but the immediate cauſe of real pain, from which the infant ſhrinks, as it would from the prick of a pin, or the ſcorching of a candle. But we have ſaid enough in the article immediately preceeding, and in others which are there quoted, to ſhow how the paſſions may be formed by aſſociations even in early infancy, and yet operate as if they were inſtinctive. This being the caſe, we ſhall through the remainder of this article ſuffer his Lordſhip to ſpeak his own language, without making any further remarks upon it. We are induced to do this for two reaſons; of which the firſt is that many of our readers will probably prefer his theory to ours; and the ſecond is, that his concluſions reſpecting the ſigns and language of paſſion hold equally good from either theory.

We perfectly agree with him, that manifold and admirable are the purpoſes to which the external ſigns of paſſion are made ſubſervient by the Author of our nature.

1. The ſigns of internal agitation diſplayed externally to every ſpectator, tend to fix the ſignification of many words. The only effectual means to aſcertain the meaning of any doubtful word, is an appeal to the thing it repreſents; and hence the ambiguity of words expreſſive of things that are not objects of external ſenſe; for in that caſe an appeal is denied. Paſſion, ſtrictly ſpeaking, is not an object of external ſenſe; but its external ſigns are: and by means of theſe ſigns, paſſions may be appealed to with tolerable accuracy: thus the words that denote our paſſions, next to thoſe that denote external objects, have the moſt diſtinct meaning. Words ſignifying internal action and the more delicate feelings, are leſs diſtinct. This defect, with regard to internal action, is what chiefly occaſions the intricacy of logic: the terms of that ſcience are far from being ſufficiently aſcertained, even after much care and labour beſtowed by an eminent writer * to whom, however, the world is greatly indebted, for removing a mountain of rubbiſh, and moulding the ſubject into a rational and correct form. The ſame defect is remarkable in criticiſm, which has for its object the more delicate feelings; the terms that denote theſe feelings being not more diſtinct than thoſe of logic.

2. Society among individuals is greatly promoted by that univerſal language. Looks and geſtures give direct acceſs to the heart, and lead us to ſelect, with tolerable accuracy, the perſons who are worthy of our confidence. It is ſurpriſing how quickly, and for the moſt part how corrrectly, we judge of character from external appearance.

3. After ſocial intercourſe is commenced theſe external ſigns, which diffuſe through a whole aſſembly the feelings of each individual, contribute above all other means to improve the ſocial affections. Language, no doubt, is the moſt comprehenſive vehicle for communicating emotions; but in expedition as well as in power of conviction, it falls ſhort of the ſigns under conſideration; the involuntary ſigns eſpecially, which are incapable of deceit. Where the countenance, the tones, the geſtures, the actions join with the words in communicating emotions, theſe united have a force irreſiſtible. Thus all the pleaſant emotions of the human heart, with all the ſocial and virtuous affections, are by means of theſe external ſigns, not only perceived but felt. By this admirable contrivance, converſation becomes the lively and animating amuſement, without which life would at beſt be inſipid; one joyful countenance ſpreads cheerfulneſs inſtantaneouſly through a mulitude of ſpectators.

4. Diſſocial paſſions, being hurtful by prompting violence and miſchief, are noted by the moſt conſpicuous external ſigns, in order to put us upon our guard; thus anger and revenge, eſpecially when ſudden, diſplay themſelves on the countenance in legible characters. The external ſigns, again, of every paſſion that threatens danger, raiſe in us the paſſion of fear; which frequently operating without reaſon or reflection, moves us by a ſudden impulſe to avoid the impending danger.

5. Thoſe external ſigns are remarkably ſubſervient to morality. A painful paſſion, being accompanied with diſagreeable external ſigns, muſt produce in every ſpectator a painful emotion: but then if the paſſion be ſocial, the emotion he produces is attractive, and connects the ſpectator with the perſon who ſuffers. Diſſocial paſſions only are productive of repulſive emotions, involving the ſpectator's averſion, and frequently his indignation. This artful contrivance makes us cling to the virtuous, and abhor the wicked.

6. Of all the external ſigns of paſſions, thoſe of affliction or diſtreſs are the moſt illuſtrious with reſpect to a final cauſe, and deſervedly merit a place of diſtinction. They are illuſtrious by the ſingularity of their contrivance; and alſo by inſpiring ſympathy, a paſſion to which human ſociety is indebted for its greateſt bleſſing, that of providing relief for the diſtreſſed. A ſubject ſo intereſting deſerves a leiſurely and attentive examination. The conformity of the nature of man to his external circumſtances is in every particular wonderful: his nature makes him prone to ſociety: and ſociety is neceſſary to his well-being, becauſe in a ſolitary ſtate he is a helpleſs being, deſtitute of ſupport, and in his diſtreſſes deſtitute of relief; but mental ſupport, the ſhining attribute of ſociety, is of too great moment to be left dependent upon cool reaſon: it is ordered more wiſely, and with greater conformity to the analogy of nature, that it ſhould be enforced even inſtinctively by the paſſion of ſympathy. Here ſympathy makes a capital figure; and contributes more than any other means, to make life eaſy and comfortable. But however eſſential the ſympathy of others may be to our well-being, one beforehand would not readily conceive how it could be raiſed by external ſigns of diſtreſs: for conſidering, the analogy of nature, if theſe ſigns be agreeable they muſt give birth to a pleaſant emotion leading every beholder to be pleaſed with human woes: if diſagreeable, as they undoubtedly are, ought they not

* Locke.

naturally to repel the ſpectator from them, in order to be relieved from pain? Such would be the reaſoning beforehand; and ſuch would be the effect were man purely a ſelfiſh being. But the benevolence of our nature gives a very different direction to the painful paſſion of ſympathy, and to the deſire involved in it; inſtead of avoiding diſtreſs, we fly to it in order to afford relief; and our ſympathy cannot be otherwiſe gratified but by giving all the ſuccour in our power. Thus external ſigns of diſtreſs, though diſagreeable, are attractive: and the ſympathy they inſpire is a powerful cauſe, impelling us to afford relief even to a ſtranger, as if he were our friend or relation.

It is a noted obſervation, that the deepeſt tragedies are the moſt crowded: which in an overly view will be thought an unaccountable bias in human nature. Love of novelty, deſire of occupation, beauty of action, make us fond of theatrical repreſentations; and when once engaged, we muſt follow the ſtory to the concluſion, whatever diſtreſs it may create. But we generally become wiſe by experience: and when we foreſee what pain we ſhall ſuffer during the courſe of the repreſentation, is it not ſurpriſing that perſons of reflection do not avoid ſuch ſpectacles altogether? And yet one who has ſcarce recovered from the diſtreſs of a deep tragedy, reſolves coolly and deliberately to go to the very next, without the ſlighteſt obſtruction from ſelf-love. The whole myſtery is explained by a ſingle obſervation; That ſympathy, though painful, is attractive; and attaches us to an object in diſtreſs, inſtead of prompting us to fly from it. And by this curious mechaniſm it is, that perſons of any degree of ſenſibility are attracted by affliction ſtill more than by joy.

To conclude: the external ſigns of paſſion are a ſtrong indication, that man, by his very conſtitution, is framed to be open and ſincere. A child, in all things obedient to the impulſes of nature, hides none of its emotions; the ſavage and clown, who have no guide but pure nature, expoſe their hearts to view, by giving way to all the natural ſigns. And even when men learn to diſſemble their ſentiments, and when behaviour degenerates into art, there ſtill remain checks, that keep diſſimulation within bounds, and prevent a great part of its miſchievous effects: the total ſuppreſſion of the voluntary ſigns during any vivid paſſion, begets the utmoſt uneaſineſs, which cannot be endured for any conſiderable time: this operation becomes indeed leſs painful by habit; but luckily the involuntary ſigns cannot, by any effort be ſuppreſſed nor even diſſembled. An abſolute hypocriſy, by which the character is concealed and a fictitious one aſſumed, is made impracticable; and nature has thereby prevented much harm to ſociety. We may pronounce, therefore, that Nature herſelf, ſincere and candid, intends that mankind ſhould preſerve the ſame character, by cultivating ſimplicity and truth, and baniſhing every ſort of diſſimulation that tends to miſchief.

Influence of Paſſion with reſpect to our Perceptions, Opinions, and Belief. So intimately are our perceptions, paſſions, and actions, connected, it would be wonderful if they ſhould have no mutual influence. That our actions are too much influenced by paſſion, is a known truth; but it is not leſs certain though not ſo well known, that paſſion hath alſo an influence upon our perceptions, opinions, and belief. For example, the opinions we form of men and things are generally directed by affection: An advice given by a man of figure hath great weight; the ſame advice from one in a low condition is deſpiſed or neglected; a man of courage under-rates danger; and to the indolent the ſlighteſt obſtacle appears unſurmountable. All this may be accounted for by the ſimple principle of aſſociation.

There is no truth more univerſally known, than that tranquillity and ſedateneſs are the proper ſtate of mind for accurate perception and cool deliberation; and for that reaſon we never regard the opinion even of the wiſeſt man, when we diſcover prejudice or paſſion behind the curtain. Paſſion hath ſuch influence over us, as to give a falſe light to all its objects. Agreeable paſſions prepoſſeſs the mind in favour of their objects; and diſagreeable paſſions, not leſs againſt their objects; A woman is all perfection in her lover's opinion, while in the eye of a rival beauty ſhe is aukward and diſagreeable: when the paſſion of love is gone, beauty vaniſhes with it:—nothing is left of that genteel motion, that ſprightly converſation, thoſe numberleſs graces, which formerly, in the lover's opinion, charmed all hearts. To a zealot every one of his own ſect is a ſaint, while the moſt upright of a different ſect are to him children of perdition: the talent of ſpeaking in a friend, is more regarded than prudent conduct in any other. Nor will this ſurpriſe any one acquainted with the world; our opinions, the reſult frequently of various and complicated views, are commonly ſo ſlight and wavering, as readily to be ſuſceptible of a bias from paſſion.

With that natural bias another circumſtance concurs, to give paſſion an undue influence on our opinions and belief: and that is a ſtrong tendency in our nature to juſtify our paſſions as well as our actions, not to others only, but even to ourſelves. That tendency is peculiarly remarkable with reſpect to diſagreeable paſſions: by its influence, objects are magnified or leſſened, circumſtances ſupplied or ſuppreſſed, every thing coloured and diſguiſed to anſwer the end of juſtification. Hence the foundation of ſelf-deceit, where a man impoſes upon himſelf innocently, and even without ſuſpicion of a bias.

We proceed to illuſtrate the foregoing obſervations by proper examples.

Gratitude, when warm, is often exerted upon the children of the benefactor; eſpecially where he is removed out of reach by death or abſence. The paſſion in this caſe being exerted for the ſake of the benefactor requires no peculiar excellence in his children; but the practice of doing good to theſe children produces affection for them, which never fails to advance them in our eſteem. By ſuch means ſtrong connections of affection are often formed among individuals, upon the ſlight foundation now mentioned.

Envy is a paſſion, which, being altogether unjuſtifiable, cannot be excuſed but by diſguiſing it under ſome plauſible name. At the ſame time, no paſſion is more eager than envy to give its object a diſagreeable appearance: it magnifies every bad quality, and fixes on the moſt humbling circumſtances:

Caſſius. I cannot tell what you and other men
Think of this life; but for my ſingle ſelf,
I had as lief not be, as live to be
In awe of ſuch a thing as I myſelf.
I was born free as Cæſar, ſo were you;
We both have fed as well; and we can both
Endure the winter's cold as well as he.
For once, upon a raw and guſty day,
The troubled Tyber chafing with his ſhores,
Cæſar ſays to me, Dar'ſt thou, Caſſius, now
Leap in with me into this angry flood,
And ſwim to yonder point?—Upon the word,
Accoutred as I was, I plunged in,
And bid him follow; ſo indeed he did.
The torrent roar'd, and we did buffet it
With luſty ſinews; throwing it aſide,
And ſtemming it with hearts of controverſy.
But ere we could arrive the point propos'd,
Cæſar cry'd, Help me, Caſſius, or I ſink.
I, as Æneas, our great anceſtor,
Did from the flames of Troy upon his ſhoulder
The old Anchiſes bear; ſo from the waves of Tyber
Did I the tired Cæſar: and this man
Is now become a god; and Caſſius is
A wretched creature, and muſt bend his body
If Cæſar careleſsly but nod on him.
He had a fever when he was in Spain;
And when the fit was on him, I did mark
How he did ſhake. 'Tis true, this god did ſhake;
His coward lips did from their colour fly;
And that ſame eye whoſe bend doth awe the world
Did loſe its luſtre: I did hear him groan;
Ay, and that tongue of his, that bade the Romans
Mark him, and write his ſpeeches in their books,
Alas! it cry'd—Give me ſome drink, Titinius,—
As a ſick girl. Ye gods, it doth amaze me,
A man of ſuch a feeble temper ſhould
So get the ſtart of the majeſtic world,
And bear the palm alone. *Julius Cæſar, act. 1. ſc.* 3.

Glo'ſter, inflamed with reſentment againſt his ſon Edgar, could even force himſelf into a momentary conviction that they were not related:

O ſtrange faſten'd villain!
Would he deny his letter?—I never got him.
King Lear, act 2. ſc. 3.

When by great ſenſibility of heart, or other means, grief becomes immoderate, the mind, in order to juſtify itſelf, is prone to magnify the cauſe; and if the real cauſe admit not of being magnified, the mind ſeeks a cauſe for its grief in imagined future events:

Buſhy. Madam, your majeſty is much too ſad:
You promis'd, when you parted with the king,
To lay aſide ſelf-harming heavineſs,
And entertain a cheerful diſpoſition.
Queen. To pleaſe the king, I did; to pleaſe myſelf,
I cannot do it. Yet I know no cauſe
Why I ſhould welcome ſuch a gueſt as grief;
Save bidding farewell to ſo ſweet a gueſt
As my ſweet Richard: yet again, methinks,
Some unborn ſorrow, ripe in Fortune's womb,
Is coming tow'rd me; and my inward ſoul
With ſomething trembles, yet at nothing grieves,
More than with parting from my lord the king.
Richard II. *act.* 2. *ſc.* 5.

Reſentment at firſt is vented on the relations of the offender, in order to puniſh him; but as reſentment, when ſo outrageous, is contrary to conſcience, the mind to juſtify its paſſion, is diſpoſed to paint theſe relations in the blackeſt colours; and it comes at laſt to be convinced, that they ought to be puniſhed for their own demerits.

Anger, raiſed by an accidental ſtroke upon a tender part of the body, is ſometimes vented upon the undeſigning cauſe. But as the paſſion in that caſe is abſurd and as there can be no ſolid gratification in puniſhing the innocent, the mind, prone to juſtify as well as to gratify its paſſion, deludes itſelf into a conviction of the action's being voluntary. The conviction, however, is but momentary; the firſt reflection ſhows it to be erroneous: and the paſſion vaniſheth almoſt inſtantaneouſly with the conviction. But anger, the moſt violent of all paſſions, has ſtill greater influence; it ſometimes forces the mind to perſonify a ſtock or a ſtone if it happen to occaſion bodily pain, and even to believe it a voluntary agent, in order to be a proper object of reſentment. And that we have really a momentary conviction of its being a voluntary agent, muſt be evident from conſidering, that without ſuch conviction the paſſion can neither be juſtified nor gratified; the imagination can give no aid; for a ſtock or a ſtone imagined inſenſible, cannot be an object of puniſhment, if the mind be conſcious that it is an imagination merely without any reality (A). Of ſuch perſonification, involving a conviction of reality, there is one illuſtrious inſtance. When the firſt bridge of boats over the Helleſpont was deſtroyed by a ſtorm, Xerxes fell into a tranſport of rage, ſo exceſſive, that he commanded the ſea to be puniſhed with 300 ſtripes; and a pair of fetters to be thrown into it, enjoining the following words to be pronounced: "O thou ſalt and bitter water! thy maſter hath condemned thee to this puniſhment for offending him without cauſe; and is reſolved to paſs over thee in deſpite of thy inſolence: with reaſon all men neglect to ſacrifice to thee, becauſe thou art both diſagreeable and treacherous."

Herodot. lib. 7.

Shakeſpeare exhibits beautiful examples of the irregular influence of paſſion in making us believe things to be otherwiſe than they are. King Lear, in his diſtreſs perſonifies the rain, wind, and thunder; and in order to juſtify his reſentment, believes them to be taking part with his daughters:

(A) We have already ſhown how a man may be inſtigated to wreck his vengeance on a ſtock or a ſtone, without ever conſidering whether it be ſenſible or inſenſible; (See Passion). If the ſtory of Xerxes be true, he may have conſidered the ſea as ſenſible and animated without dreaming that a ſtock or a ſtone is ſo. The ſea was a god among many of the pagans, and was conſidered as ſuch by Xerxes, or he could not have applauded men for not ſacrificing to it.

Lear. Rumble thy bellyful, ſpit fire, ſpout rain!
Nor rain, wind, thunder, fire, are my daughters.
I tax not you, ye elements, with unkindneſs;
I never gave you kingdoms, call'd you children;
You owe me no ſubſcription. Then let fall
Your horrible pleaſure.—Here I ſtand, your brave;
A poor, infirm, weak and deſpis'd old man!
But yet I call your ſervile miniſters,
That have with two pernicious daughters join'd
Your high-engender'd battles 'gainſt a head.
So old and white as this. Oh! oh! 'tis foul.
Act 3. *ſc*. 2.

King Richard, full of indignation againſt his favourite horſe for carrying Bolingbroke, is led into the conviction of his being rational:

Groom. O, how it yearn'd my heart, when I beheld
In London ſtreets, that coronation-day,
When Bolingbroke rode on Roan Barbary,
That horſe that thou ſo often haſt beſtrid,
That horſe that I ſo carefully have dreſſed.
K. Rich. Rode he on Barbary? tell me, gentle friend,
How went he under him?
Groom. So proudly as he had diſdain'd the ground.
K. Rich. So proud that Bolingbroke was on his back!
That jade had eat bread from my royal hand.
This hand hath made him proud with clapping him.
Would he not ſtumble? would he not fall down,
(Since pride muſt have a fall), and break the neck
Of that proud man that did uſurp his back?
Richard II. *act* 5. *ſc*. 11.

Hamlet, ſwelled with indignation at his mother's ſecond marriage, was ſtrongly inclined to leſſen the time of her widowhood, the ſhortneſs of the time being a violent circumſtance againſt her; and he deludes himſelf by degrees into the opinion of an interval ſhorter than the real one:

Hamlet.————————That it ſhould come to this?
But two months dead! nay, not ſo much; not two—
So excellent a king, that was, to this,
Hyperion to a ſatyr: ſo loving to my mother,
That he permitted not the wind of heav'n
Viſit her face too roughly. Heav'n and earth!
Muſt I remember—why, ſhe would hang on him,
As if increaſe of appetite had grown
By what it fed on: yet, within a month——
Let me not think—Frailty; thy name is *Woman!*
A little month! or ere thoſe ſhoes were old,
With which ſhe followed my poor father's body,
Like Niobe, all tears——why ſhe, ev'n ſhe—
(O heav'n! a beaſt, that wants diſcourſe of reaſon,
Wou'd have mourn'd longer) married with mine uncle,
My father's brother; but no more like my father
Than I to Hercules. Within a month!—
Ere yet the ſalt of moſt unrighteous tears
Had left the fluſhing in her galled eyes,
She married——Oh, moſt wicked ſpeed! to poſt
With ſuch dexterity to inceſtuous ſheets!
It is not, nor it cannot, come to good,
But break my heart, for I muſt hold my tongue.
Act. 1. *ſc*. 3.

The power of paſſion to falſify the computation of time is remarkable in this inſtance; becauſe time, which hath an accurate meaſure, is leſs obſequious to our deſires and wiſhes, than objects which have no preciſe ſtandard of leſs or more.

Good news are greedily ſwallowed upon very ſlender evidence; our wiſhes magnify the probability of the event, as well as the veracity of the relater; and we believe as certain, what at beſt is doubtful:

Quel, che l' huom vede, amor li fa inviſible
E l' inviſibil fa veder amore.
Queſto creduto fu, che 'l miſer ſuole
Dar facile credenza a' quel, che vnole.
Orland, Furioſ. cant. 1. *ſt*. 56.

For the ſame reaſon, bad news gain alſo credit upon the ſlighteſt evidence; fear, if once alarmed, has the ſame effect with hope, to magnify every circumſtance that tends to conviction. Shakeſpeare, who ſhows more knowledge of human nature than any of our philoſophers, hath in his Cymbeline repreſented this bias of the mind; for he makes the perſon who alone was affected with the bad news, yield to evidence that did not convince any of his companions. And Othello is convinced of his wife's infidelity from circumſtances too ſlight to move any perſon leſs intereſted.

If the news intereſt us in ſo low a degree as to give place to reaſon, the effect will not be altogether the ſame: judging of the probability or improbability of the ſtory, the mind ſettles in a rational conviction either that it is true or not. But even in that caſe, the mind is not allowed to reſt in that degree of conviction which is produced by rational evidence; if the news be in any degree favourable, our belief is raiſed by hope to an improper height; and if unfavourable, by fear.

This obſervation holds equally with reſpect to future events; if a future event be either much wiſhed or dreaded, the mind never fails to augment the probability beyond truth.

That eaſineſs of belief, with reſpect to wonders and prodigies, even the moſt abſurd and ridiculous, is a ſtrange phenomenon; becauſe nothing can be more evident than the following propoſition, That the more ſingular any event is, the more evidence is required to produce belief; a familiar event daily occurring, being in itſelf extremely probable, finds ready credit, and therefore is vouched by the ſlighteſt evidence; but to overcome the improbability of a ſtrange and rare event, contrary to the courſe of nature, the very ſtrongeſt evidence is required. It is certain, however, that wonders and prodigies are ſwallowed by the vulgar, upon evidence that would not be ſufficient to aſcertain the moſt familiar occurrence. It has been reckoned difficult to explain that irregular bias of mind; but we are now made acquainted with the influence of paſſion upon opinion and belief; a ſtory of ghoſts or faries, told with an air of gravity and truth, raiſeth an emotion of wonder, and perhaps of dread; and theſe emotions impoſing on a weak mind, impreſs upon it a thorough conviction contrary to reaſon.

Opinion and belief are influenced by propenſity as well as by paſſion. An innate propenſity is all we have to convince us that the operations of nature are uniform; influenced by that propenſity, we often raſhly think that good or bad weather will never have an end; and in natural philoſophy, writers, influenced by the ſame propenſity, ſtretch commonly their analogical reaſonings beyond juſt bounds. See METAPHYSICS, nº 133, 134.

Opinion and belief are influenced by affection as well as by propenſity. The noted ſtory of a fine lady and a curate viewing the moon through a teleſcope is a pleaſant illuſtration: "I perceive (ſays the lady) two ſhadows inclining to each other; they are certainly two happy lovers;" "Not at all (replies the curate), they are too ſteeples of a cathedral."

Language of Passion. Among the particulars that compoſe the ſocial part of our nature, a propenſity to communicate our opinions, our emotions, and every thing that affects us is remarkable. Bad fortune and injuſtice affect us greatly; and of thoſe we are ſo prone to complain, that if we have no friend or acquaintance to take part in our ſufferings, we ſometimes utter our complaints aloud, even where there are none to liſten.

But this propenſity operates not in every ſtate of mind. A man if moderately grieved, ſeeks to afflict himſelf, rejecting all conſolation: immoderate grief accordingly is mute. complaining is ſtruggling for conſolation.

It is the wretch's comfort ſtill to have
Some ſmall reſerve of near and inward wo,
Some unſuſpected hoard of inward grief,
Which they unſeen may wail, and weep, and mourn,
And glutton-like alone devour.
Mourning Bride, act 1. *ſc.* 1.

When grief ſubſides, it then, and no ſooner, finds a tongue: we complain, becauſe complaining is an effort to diſburden the mind of its diſtreſs. This obſervation is finely illuſtrated by a ſtory which Herodotus records, *b.* 3. Cambyſes, when he conquered Egypt, made Pſammeticus the king priſoner; and for trying his conſtancy, ordered his daughter to be dreſſed in the habit of a ſlave, and to be employed in bringing water from the river; his ſon alſo was led to execution with a halter about his neck. The Egyptians vented their ſorrow in tears and lamentations: Pſammeticus only, with a downcaſt eye, remained ſilent. Afterward meeting one of his companions, a man advanced in years, who, being plundered of all, was begging alms, he wept bitterly, calling him by his name. Cambyſes, ſtruck with wonder, demanded an anſwer to the following queſtion: "Pſammeticus, thy maſter Cambyſes is deſirous to know, why after thou hadſt ſeen thy daughter ſo ignominiouſly treated, and thy ſon led to execution, without exclaiming or weeping, thou ſhouldſt be ſo highly concerned for a poor man, noway related to thee?" Pſammeticus returned the following anſwer: "Son of Cyrus, the calamities of my family are too great to leave me the power of weeping; but the miſfortunes of a companion, reduced in his old age to want of bread, is a fit ſubject for lamentation."

Surpriſe and terror are ſilent paſſions, for a different reaſon: they agitate the mind ſo violently, as for a time to ſuſpend the exerciſe of its faculties, and among others the faculty of ſpeech.

Love and revenge, when immoderate, are not more loquacious than immoderate grief. But when theſe paſſions become moderate, they ſet the tongue free, and, like moderate grief, become loquacious. Moderate love, when unſucceſsful, is vented in complaints; when ſucceſsful, is full of joy expreſſed by words and geſtures.

As no paſſion hath any long uninterrupted exiſtence, nor beats always with an equal pulſe, the language ſuggeſted by paſſion is not only unequal but frequently interrupted: and even during an uninterrupted fit of paſſion, we only expreſs in words the more capital ſentiments. In familiar converſation, one who vents every ſingle thought, is juſtly branded with the character of *loquacity;* becauſe ſenſible people expreſs no thoughts but what make ſome figure: in the ſame manner, we are only diſpoſed to expreſs the ſtrongeſt impulſes of paſſion, eſpecially when it returns with impetuoſity after interruption.

It is elſewhere obſerved * that the ſentiments ought to be turned to the paſſion, and the language to both. Elevated ſentiments require elevated language: tender ſentiments ought to be clothed in words that are ſoft and flowing; when the mind is depreſſed with any paſſion, the ſentiments muſt be expreſſed in words that are humble, not low. Words being intimately connected with the ideas they repreſent, the greateſt harmony is required between them: to expreſs, for example, an humble ſentiment in high ſounding words, is diſagreeable by a diſcordant mixture of feelings; and the diſcord is not leſs when elevated ſentiments are dreſſed in low words:

* See the article Sentiments.

Verſibus exponi tragicis res comica non vult.
Indignatur item privatis ac prope ſocco
Dignis carminibus narrari cœna Thyeſtæ.
Horat. Ars poet. l. 89.

This, however, excludes not figurative expreſſion, which, within moderate bounds, communicates to the ſentiment an agreeable elevation. We are ſenſible of an effect directly oppoſite, where figurative expreſſion is indulged beyond a juſt meaſure: the oppoſition between the expreſſion and the ſentiment makes the diſcord appear greater than it is in reality.

At the ſame time, figures are not equally the language of every paſſion: pleaſant emotions, which elevate or ſwell the mind, vent themſelves in ſtrong epithets and figurative expreſſion; but humbling and diſpiriting paſſions affect to ſpeak plain:

Et tragicus plerumque dolet ſermone pedeſtri.
Telephus et Peleus, cum pauper et exul uterque,
Projicit ampullas et ſeſquipedalia verba,
Si curat cor ſpectantis tetigiſſe querela.
Horat. Ars poet. 95.

Figurative expreſſion, being the work of an enlivened imagination, cannot be the language of anguiſh or diſtreſs. Otway, ſenſible of this, has painted a ſcene of diſtreſs in colours finely adapted to the ſubject: there is ſcarce a figure in it, except a ſhort and natural ſimile with which the ſpeech is introduced. Belvidera, talking to her father of her huſband:

Think you ſaw what paſt our laſt parting,
Think you beheld him like a raging lion,
Pacing the earth, and tearing up his ſteps,
Fate in his eyes, and roaring with the pain
Of burning fury; think you ſaw his one hand
Fix'd on my throat, while the extended other
Graſp'd a keen threat'ning dagger; oh, 'twas thus
We laſt embrac'd, when, trembling with revenge,

He dragg'd me to the ground, and at my boſom
Preſented horrid death; cry'd out, My friends!
Where are my friends? ſwore, wept, rag'd, threaten'd, lov'd;
For he yet lov'd, and that dear love preſerv'd me
To this laſt trial of a father's pity.
I fear not death, but cannot bear a thought
That that dear hand ſhould do th' unfriendly office.
If I was ever then your care, now hear me;
Fly to the ſenate, ſave the promis'd lives
Of his dear friends, ere mine be made the ſacrifice.
Venice Preſerv'd, *act* 5.

To preſerve the aforeſaid reſemblance between words and their meaning, the ſentiments of active and hurrying paſſions ought to be dreſſed in words where ſyllables prevail that are pronounced ſhort or faſt; for theſe make an impreſſion of hurry and precipitation. Emotions, on the other hand, that reſt upon their objects, are beſt expreſſed by words where ſyllables prevail that are pronounced long or ſlow. A perſon affected with melancholy, has a languid and ſlow train of perceptions. The expreſſion beſt ſuited to that ſtate of mind, is where words, not only of long but of many ſyllables, abound in the compoſition; and for that reaſon, nothing can be finer than the following paſſage:

In thoſe deep ſolitudes, and awful cells,
Where heav'nly-penſive Contemplation dwells,
And ever-muſing Melancholy reigns.
POPE, *Eloiſa to Abelard*.

To preſerve the ſame reſemblance, another circumſtance is requiſite, that the language, like the emotion, be rough or ſmooth, broken or uniform. Calm and ſweet emotions are beſt expreſſed by words that glide ſoftly: ſurpriſe, fear, and other turbulent paſſions, require an expreſſion both rough and broken.

It cannot have eſcaped any diligent inquirer into nature, that, in the hurry of paſſion, one generally expreſſes that thing firſt which is moſt at heart; which is beautifully done in the following paſſage:

Me, me; adſum qui feci: in me convertite ſerum,
O Rutuli, mea fraus omnis *Æneid*. ix. 427.

Paſſion has often the effect of redoubling words, the better to make them expreſs the ſtrong conception of the mind. This is finely imitated in the following examples.

——————Thou ſun, ſaid I, fair light!
And thou enlighten'd earth, ſo freſh and gay!
Ye hills and dales, ye rivers, woods, and plains!
And ye that live, and move, fair creatures! tell,
Tell, if ye ſaw, how came I thus, how here.—
Paradiſe Loſt, *b*. viii. 273.

——————Both have ſinn'd! but thou
Againſt God only; I, 'gainſt God and thee:
And to the place of judgment will return;
There with my cries importune Heaven, that all
The ſentence, from thy head remov'd, may light
On me, ſole cauſe to thee of all this wo;
Me! me! only juſt object of his ire.
Paradiſe Loſt, *b*. x. 930.

In general, the language of violent paſſion ought to be broken and interrupted. Soliloquies ought to be ſo in a peculiar mannner: language is intended by nature for ſociety; and a man when alone, though he always clothes his thoughts in words, ſeldom gives his words utterance, unleſs when prompted by ſome ſtrong emotion: and even then by ſtarts and intervals only. Shakeſpeare's ſoliloquies may be juſtly eſtabliſhed as a model; for it is not eaſy to conceive any model more perfect. Of his many incomparable ſoliloquies, the two following only ſhall be quoted, being different in their manner.

Hamlet, Oh, that this too, too ſolid fleſh, would melt,
Thaw, and reſolve itſelf into a dew!
Or that the Everlaſting had not fix'd
His canon 'gainſt ſelf-ſlaughter! O God! O God!
How weary, ſtale, flat, and unprofitable,
Seem to me all the uſes of this world!
Fie on't! O fie! 'tis an unweeded garden,
That grows to ſeed; things rank and groſs in nature
Poſſeſs it merely.——That it ſhould come to this!
But two months dead! nay, not ſo much; not two—
So excellent a king, that was, to this,
Hyperion to a ſatyr: ſo loving to my mother,
That he permitted not the winds of heav'n
Viſit her face too roughly. Heav'n and earth!
Muſt I remember—why, ſhe would hang on him,
As if increaſe of appetite had grown
By what it fed on; yet, within a month——
Let me not think.—Frailty, thy name is *Woman!*
A little month: or ere theſe ſhoes were old,
With which ſhe follow'd my poor father's body,
Like Niobe, all tears————why ſhe, ev'n ſhe——
(O heav'n! a beaſt, that wants diſcourſe of reaſon,
Would have mourn'd longer—) married with mine uncle,
My father's brother; but no more like my father
Than I to Hercules. Within a month!———
Ere yet the ſalt of moſt unrighteous tears
Had left the fluſhing in her galled eyes,
She married————Oh, moſt wicked ſpeed, to poſt
With ſuch dexterity to inceſtuous ſheets!
It is not, nor it cannot come to good,
But break, my heart, for I muſt hold my tongue.
Hamlet, *act* 1. *ſc*. 3.

"*Ford*. Hum! ha! is this a viſion? is this a dream? "do I ſleep? Mr Ford; awake; awake, Mr Ford; "there's a hole made in your beſt coat, Mr Ford; "this 'tis to be married! this 'tis to have linen and "buck-baſkets? Well, I will proclaim myſelf what "I am; I will now take the leacher; he is at my "houſe; he cannot 'ſcape me; 'tis impoſſible he "ſhould; he cannot creep into a halfpenny purſe, "nor into a pepper-box. But leſt the devil that "guides him ſhould aid him, I will ſearch impoſſible "places; tho' what I am I cannot avoid, yet to be "what I would not, ſhall not make me tame."
Merry Wives of Windſor, *act*. 3. *ſc*. *laſt*.

Theſe ſoliloquies are accurate and bold copies of nature; in a paſſionate ſoliloquy one begins with thinking aloud, and the ſtrongeſt feelings only are expreſſed; as the ſpeaker warms, he begins to imagine one liſtening; and gradually ſlides into a connected diſcourſe.

How far diſtant are ſoliloquies generally from theſe models? So far indeed as to give diſguſt inſtead of pleaſure. The firſt ſcene of Iphigenia in Tauria diſcovers that princeſs, in a ſoliloquy, gravely reporting to herſelf her own hiſtory. There is the ſame impropriety in the firſt ſcene of Alceſtes, and in the other introductions of Euripides, almoſt without exception, Nothing can be more ridiculous ; it puts one in mind of a moſt curious device in Gothic paintings, that of making every figure explain itſelf by a written label iſſuing from its mouth. The deſcription which a paraſite, in the Eunuch of Terence (*act.* 2. *ſc.* 2.) gives of himſelf, makes a ſprightly ſoliloquy : but it is not conſiſtent with the rules of propriety ; for no man, in his ordinary ſtate of mind and upon a familiar ſubject, ever thinks of talking aloud to himſelf. The ſame objection lies againſt a ſoliloquy in the Adelphi of the ſame author (*act.* 1. *ſc.*) The ſoliloquy which makes the third ſcene act third of his *Heicyra*, is inſufferable ; for there Pamphilius, ſoberly and circumſtantially, relates to himſelf an adventure which had happened to him a moment before.

Corneille is unhappy in his ſoliloquies: Take for a ſpecimen the firſt ſcene of Cinna.

Racine is extremely faulty in the ſame reſpect. His ſoliloquies are regular harangues, a chain completed in every link, without interruption or interval : that of Antiochus in Berenice (*act.* 1. *ſc.* 2.) reſembles a regular pleading, where the parties *pro* and *con* diſplay their arguments at full length. The following ſoliloquies are equally faulty : *Bajazet*, *act* 3. *ſc.* 7. ; *Mithridate*, *act* 3. *ſc.* 4. ; and *act* 4. *ſe.* 5. ; *Iphigenia*, *act* 4. *ſc.* 8.

Soliloquies upon lively or intereſting ſubjects, but without any turbulence of paſſion, may be carried on in a continued chain of thought. If, for example, the nature and ſprightlineſs of the ſubject, prompt a man to ſpeak his thoughts in the form of a dialogue, the expreſſion muſt be carried on without break or interruption, as in a dialogue between two perſons : which juſtifies Falſtaff's ſoliloquy upon honour :

> "What need I be ſo forward with Death, that
> "calls not on me? Well, 'tis no matter, Honour pricks
> "me on. But how if Honour prick me off, when I
> "come on? how then? can honour ſet a leg? No. Or
> "an arm? No. Or take away the grief of a wound?
> "No. Honour hath no ſkill in ſurgery then? No.
> "What is honour? A word.—What is that word *ho-*
> "*nour?* Air; a trim reckoning.—Who hath it? He
> "that dy'd a Wedneſday. Doth he feel it? No
> "Doth he hear it? No. Is it inſenſible then? Yea,
> "to the dead. But will it not live with the living?
> "No. Why? Detraction will not ſuffer it. There-
> "fore I'll none of it; honour is a mere ſcutcheon:
> "and ſo ends my catechiſm."
>
> *Firſt Part, Henry IV. act.* 5. *ſc.* 2.

And even without dialogue a continued diſcourſe may be juſtified, where a man reaſons in a ſoliloquy upon an important ſubject ; for if in ſuch a caſe it be at all excuſeable to think aloud, it is neceſſary that the reaſoning be carried on in a chain ; which juſtifies that admirable ſoliloquy in *Hamlet* upon life and immortality, being a ſerene meditation upon the moſt intereſting of all ſubjects. And the ſame conſideration will juſtify the ſoliloquy that introduces the 5th act of Addiſon's *Cato*.

Language ought not to be elevated above the tone of the ſentiment.

Zara. Swift as occaſion, I
Myſelf will fly ; and earlier than the morn
Wake thee to freedom. Now 'tis late ; and yet
Some news few minutes paſt arriv'd, which ſeem'd
To ſhake the temper of the king——Who knows
What racking cares diſeaſe a monarch's bed ?
Or love, that late at night ſtill lights his lamp,
And ſtrikes his rays through duſk, and folded lids,
Forbidding reſt, may ſtretch his eyes awake,
And force their balls abroad at the dead hour.
I'll try. *Mourning Bride, act* 3. *ſc.* 4.

The language here is undoubtedly too pompous and laboured for deſcribing ſo ſimple a circumſtance as abſence of ſleep. In the following paſſage, the tone of the language, warm and plaintive, is well ſuited to the paſſion, which is recent grief : but every one will be ſenſible, that in the laſt couplet ſave one the tone is changed, and the mind ſuddenly elevated to be let fall as ſuddenly in the laſt couplet.

Il deteſte á jamais ſa coupable victorie,
Il renonce a la cour, aux humains, à la gloire,
Et ſe fuiant lui-même, au milieu des deſerts,
Il va cacher ſa peine' au bout de l'univers ;
Là, ſoit que le ſoleil rendît le jour au monde,
Soit qu' il finît ſa courſe au vaſte ſeine de l'onde,
Sa voix faiſoit redire aux echos attendris,
Le nom, le triſte nom, de ſon malheureux fils.
Henriade, chant. viii. 229.

Light and airy language is unſuitable to a ſevere paſſion.

Imagery and figurative expreſſion are diſcordant in the higheſt degree, with the agony of a mother, who is deprived of two hopeful ſons by a brutal murder. Therefore the following paſſage is undoubtedly in a bad taſte ;

Queen. Ah, my poor princes ! ah, my ~~tender babes~~ ?
My unblown flowers, new appearing ſweets !
If yet your gentle ſouls fly in the air,
And be not fixt in doom perpetual,
Hover about me with your airy wings,
And hear your mother's lamentation.
Richard III. act 4. *ſc.* 4.

Again,

K. Philip. You are as fond of grief as of your child.
Conſtance. Grief fills the room up of my abſent child,
Lies in his bed, walks up and down with me,
Puts on his pretty looks, repeats his words,
Remembers me of all his gracious parts,
Stuffs out his vacant garment with his form ;
Then have I reaſon to be fond of grief,
King John, act 3, *ſc.* 9.

Thoughts that turn upon the expreſſion inſtead of the ſubject, commonly called *a play of words*, being low and childiſh, are unworthy of any compoſition, whether gay or ſerious, that pretends to any degree of elevation.

In the *Amynta* of Taſſo, the lover falls into a mere play of words, demanding how he who had loſt himſelf, could find a miſtreſs. And for the ſame reaſon, the

Paſſion.

the following paſſage in Corneille has been generally condemned :

Chimene. Mon pere eſt mort, Elvire, et la premiere épée
Dont s'eſt armée Rodrigue a ſa trame coup ée.
Pleurez, pleurez, mes yeux, et ſondez-vous en eaux,
La moietié, de ma vie a mis l'autre au tombeau.
Et m'oblige à venger, après ce coup funeſte,
Celle que je n'ai plus, ſur celle que me reſte.
Cid, act 3. *ſc*. 3.

To die is to be baniſh'd from myſelf ;
And Sylvia is myſelf : baniſh'd from her,
Is ſelf from ſelf ; a deadly baniſhment !
Two Gentlemen of Verona, act 3. *ſc*. 3.

Counteſs. I pray thee, Lady, have a better cheer :
If thou engroſſeſt all the griefs as thine,
Thou robb'ſt me of a moiety.
All's well that ends well, act 3. *ſc*. 3.

K. Henry. O my poor kingdom ſick with civil blows !
When that my care could not with-hold thy riots,
What wilt thou do when riot is thy care ?
O, thou wilt be a wilderneſs again,
Peopled with wolves, thy old inhabitants.
Second Part of Henry IV. act. 4. *ſc*. 11.

Cruda Amarilli, che col nome ancora
D'amar, ahi laſſo, amaramente inſegni.
Paſtor Fido, act 1. *ſc*. 2.

Antony, ſpeaking of Julius Cæſar :

O world ! thou waſt the foreſt of this hart ;
And this indeed, O world, the heart of thee.
How like a deer, ſtricken by many princes,
Doſt thou here lie ! *Julius Cæſar, act* 3. *ſc*. 3.

Playing thus with the ſound of words, which is ſtill worſe than a pun, is the meaneſt of all conceits. But Shakeſpeare, when he deſcends to a play of words, is not always in the wrong ; for it is done ſometimes to denote a peculiar character, as in the following paſſage :

K. Philip. What ſay'ſt thou, boy ? look in the lady's face.
Lewis. I do, my Lord, and in her eye I find
A wonder, or a wond'rous miracle :
The ſhadow of myſelf form'd in her eye ;
Which being but the ſhadow of your ſon,
Becomes a ſon, and makes your ſon a ſhadow.
I do proteſt, I never lov'd myſelf
Till now infixed I beheld myſelf
Drawn in the flatt'ring table of her eye.
Faulconbridge. Drawn in the flattering table of her eye !
Hang'd in the frowning wrinkle of her brow !
And quarterd in her heart ! he doth eſpy
Himſelf Love's traitor ; this is pity now,
That hang'd, and drawn, and quarter'd there ſhould be
In ſuch a love ſo vile a lout as he.
King John, act 2. *ſc*. 5.

A jingle of words is the loweſt ſpecies of that low wit, which is ſcarce ſufferable in any caſe, and leaſt of all in an heroic poem : and yet Milton in ſome inſtances has deſcended to that puerility :

Paſſions.

And brought into the world a world of wo.
——Begirt th' Almighty throne
Beſeeching or beſieging——
Which tempted our attempt——
At one ſlight bound high overleap'd all bound.
————————With a ſhout
Loud as from numbers without number.

One ſhould think it unneceſſary to enter a caveat againſt an expreſſion that has no meaning, or no diſtinct meaning : and yet ſomewhat of that kind may be found even among good writers.

Sebaſtian. I beg no pity for this mould'ring clay.
For if you give it burial, there it takes
Poſſeſſion of your earth :
If burnt and ſcatter'd in the air ; the winds
That ſtrow my duſt, diffuſe my royalty,
And ſpread me o'er your clime ; for where one atom
Of mine ſhall light, know there Sebaſtian reigns.
DRYDEN, *Don Sebaſtian King of Portugal, act* 1.

Cleopatra. Now, what news, my Charmion ?
Will he be kind ? and will he not forſake me ?
Am I to live or die ? nay, do I live ?
Or am I dead ? for when he gave his anſwer,
Fate took the word, and then I liv'd or dy'd.
DRYDEN, *All for love, act* 2.

If ſhe be coy, and ſcorn my noble fire.
If her chill heart I cannot move ;
Why, Ill enjoy the very love,
And make a miſtreſs of my own deſire.
COWLEY, *poem inſcribed* " The Requeſt."

His whole poem inſcribed *My Picture* is a jargon of the ſame kind.

————————'Tis he they cry, by whom
Not men, but war itſelf is overcome.
Indian Queen.

Such empty expreſſions are finely ridiculed in the *Rehearſal*.

Was't not unjuſt to raviſh hence her breath,
And in life's ſtead to leave us nought but death ?
Act 1. *ſc*. 1.

PASSIONS, in medicine make one of the nonnaturals, and produce very ſenſible effects. Joy, anger, and fear, are the principal. In the two firſt, the ſpirits are hurried with too great vivacity ; whereas, in fear or dread, they are as it were curbed and concentrated : whence we may conclude, that they have a very bad effect upon health : and therefore it will be beſt to keep them within bounds as much as poſſible, and to preſerve an inward ſerenity, calmneſs, and tranquillity.

PASSIONS, in painting, are the external expreſſions of the different diſpoſitions and affections of the mind ; but particularly their different effects upon the ſeveral features of the face : for though the arms, and indeed every part of the body*, ſerve likewiſe, by their quick, languid, and variouſly diverſified motions, to expreſs the paſſions of the ſoul ; yet, in painting, this difference

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* See Oratory, n° 20. 37.

is moſt conſpicuous in the face. See **Painting**, p. 620. and **Drawing**, § 8.

As we have given engravings of Le Brun's drawings of the paſſions, we ſhall here ſubjoin the account which he has given of each of theſe heads. See Plates CCCLXXVIII. and CCCLXXIX.

1. The effects of *attention* are, to make the eye-brows ſink and approach the ſides of the noſe; to turn the eye-balls toward the object that cauſes it; open the mouth, and eſpecially the upper part; to decline the head a little, and fix it without any other remarkable alteration.

2. *Admiration* cauſes but little agitation in the mind, and therefore alters but very little the parts of the face; nevertheleſs the eye brow riſes; the eye opens a little more than ordinary; the eye-ball placed equally between the eye-lids appears fixed on the object; the mouth half opens, and makes no ſenſible alteration in the cheeks.

3. The motions that accompany *admiration with aſtoniſhment* are hardly different from thoſe of ſimple admiration, only they are more lively and ſtronger marked; the eye-brow more lively and ſtronger opens the eye-ball further from the lower eye-lid, and more ſteadily fixed: The mouth is more open, and all the parts in a much ſtronger emotion.

4. Admiration begets eſteem, and this produces *veneration*, which, when it has for its object ſomething divine or beyond our comprehenſion, makes the face decline, and the eye-brows bend down; the eyes are almoſt ſhut and fixed: the mouth is ſhut. Theſe motions are gentle, and produce but little alterations in the other parts.

5. Although *rapture* has the ſame object as veneration, only conſidered in a different manner, its motions are not the ſame; the head inclines to the left ſide; the eye balls and eye-brows riſe directly up; the mouth half opens, and the two corners are alſo a little turned up: the other parts remain in their natural ſtate.

6. The paſſion of *deſire* brings the eye-brows cloſe together and forwards toward the eyes, which are more open than ordinary; the eye-ball is inflamed, and places itſelf in the middle of the eye; the noſtrils riſe up, and are contracted towards the eyes; the mouth half opens, and the ſpirits being in motion give a lively glowing colour.

7. Very little alteration is remarked in the face of thoſe that feel within themſelves the *ſweetneſs of joy*, or *joy with tranquillity*. The forehead is ſerene; the eye-brow without motion, elevated in the middle; the eye pretty open and with a laughing air; the eye ball lively and ſhining; the corners of the mouth turn up a little; the complexion is lively; the cheeks and lips are red.

8. *Laughter*, which is produced by joy mixed with ſurpriſe, makes the eye-brows riſe towards the middle of the eye, and bend towards the ſides of the noſe; the eyes are almoſt ſhut, and ſometimes appear wet, or ſhed tears, which make no alteration in the face; the mouth half open, ſhows the teeth; the corners of the mouth drawn back, cauſe a wrinkle in the cheeks, which appear ſo ſwelled as to hide the eyes in ſome meaſure; the noſtrils are open, and all the face is of a red colour.

9. *Acute pain* makes the eye-brows approach one another and riſe towards the middle; the eye-ball is hid under the eye-brows; the noſtrils riſe and make a wrinkle in the cheeks; the mouth half opens and draws back: all the parts of the face are agitated in proportion to the violence of the pain.

10. *Simple bodily pain* produces proportionally the ſame motions as the laſt, but not ſo ſtrong: The eye-brows do not approach and riſe ſo much; the eye-ball appears fixed on ſome object; the noſtrils riſe, but the wrinkles in the cheeks are leſs perceivable; the lips are further aſunder towards the middle, and the mouth is half open.

11. The dejection that is produced by *ſadneſs* makes the eye-brows riſe towards the middle of the forehead more than towards the cheeks; the eye-ball appears full of perturbation; the white of the eye is yellow; the eye-lids are drawn down, and a little ſwelled; all about the eyes is livid; the noſtrils are drawn downward; the mouth is half open, and the corners are drawn down; the head careleſsly leaning on one of the ſhoulders; the face is of a lead colour; the lips pale.

12. The alterations that *weeping* occaſions are ſtrongly marked: The eye brows ſink down towards the middle of the forehead; the eyes are almoſt cloſed, wet, and drawn down towards the cheeks; the noſtrils ſwelled; the muſcles and veins of the forehead appear; the mouth is ſhut, and the ſides of it are drawn down, making wrinkles on the cheeks; the under lip puſhed out, preſſes the upper one; all the face is wrinkled and contracted; its colour is red, eſpecially about the eye-brows, the eyes, the noſe, and the cheeks.

13. The lively attention to the misfortunes of another, which is called *compaſſion*, cauſes the eye-brows to ſink towards the middle of the forehead; the eye-ball to be fixed upon the object; the ſides of the noſtrils next the noſe to be a little elevated, making wrinkles in the cheeks; the mouth to be open; the upper lip to be lifted up and thruſt forwards; the muſcles and all the parts of the face ſinking down and turning towards the object which excites the paſſion.

14. The motions of *ſcorn* are lively and ſtrong: The forehead is wrinkled; the eye-brow is knit; the ſide of it next the noſe ſinks down, and the other ſide riſes very much; the eye is open, and the eye-ball is in the middle; the noſtrils riſe, and draw towards the eyes, and make wrinkles in the cheeks; the mouth ſhuts, its ſides ſinking down, and the under lip is puſhed out beyond the upper one.

15. An object deſpiſed ſometimes cauſes *horror*, and then the eye-brow knits, and ſinks a great deal more. The eye-ball, placed at the bottom of the eye, is half covered by the lower eye lid; the mouth is half open, but cloſer in the middle than the ſides, which being drawn back, makes wrinkles in the cheeks; the face grows pale, and the eyes become livid; the muſcles and the veins are marked.

16. The violence of *terror or fright* alters all the parts of the face; the eye-brow riſes in the middle;

Paſſions ‖ Paſſive.

its muſcles are marked, ſwelled, preſſed one againſt the other, and ſunk towards the noſe, which draws up as well as the noſtrils; the eyes are very open; the upper eye-lid is hid under the eye brow; the white of the eye is encompaſſed with red; the eye ball fixes toward the lower part of the eye; the lower part of the eye lid ſwells and becomes livid; the muſcles of the noſe and cheeks ſwell, and theſe laſt terminate in a point toward the ſides of the noſtrils; the mouth is very open, and its corners very apparent; the muſcles and veins of the neck ſtretched! the hair ſtands on end; the colour of the face, that is, the end of the noſe, the lips, the ears, and round the eyes, is pale and livid: and all ought to be ſtrongly marked.

17. The effects of *anger* ſhow its nature. The eyes become red and inflamed; the eye-ball is ſtaring and ſparkling; the eye-brows are ſometimes elevated and ſometimes ſunk down equally; the forehead is very much wrinkled, with wrinkles between the eyes; the noſtrils are open and enlarged; the lips preſſing againſt one another, the under one riſing over the upper one leaves the corners of the mouth a little open, making a cruel and diſdainful grin.

18. *Hatred or jealouſy* wrinkles the forehead; the eye-brows are ſunk down and knit; the eye-ball is half hid under the eye-brows, which turn towards the object; it ſhould appear full of fire, as well as the white of the eye and the eye-lid; the noſtrils are pale, open, more marked than ordinary, and drawn backward ſo as to make wrinkles in the cheeks; the mouth is ſo ſhut as to ſhow the teeth are cloſed: the corners of the mouth are drawn back and very much ſunk; the muſcles of the jaw appear ſunk; the colour of the face is partly inflamed and partly yellowiſh; the lips pale or livid.

19. As *deſpair* is extreme, its motions are ſo likewiſe; the forehead wrinkles from the top to the bottom; the eye-brows bend down over the eyes, and preſs one another on the ſides of the noſe; the eye ſeems to be on fire, and full of blood; the eye ball is diſturbed, hid under the eye-brow, ſparkling and unfixed; the eye-lid is ſwelled and livid; the noſtrils are large, open, and lifted up; the end of the noſe ſinks down; the muſcles, tendons, and veins are ſwelled and ſtretched; the upper part of the cheeks is large, marked, and narrow towards the jaw; the mouth drawn backwards is more open at the ſides than in the middle; the lower lip is large and turned out; they gnaſh their teeth; they foam; they bite their lips, which are pale; as is the reſt of the face; the hair is ſtrait and ſtands on end.

Passion-Flower. See Passiflora.

Passion-Week, the week immediately preceding the feſtival of Eaſter; ſo called, becauſe in that week our Saviour's paſſion and death happened. The Thurſday of this week is called *Maunday Thurſday*; the Friday, *Good Friday*; and the Saturday, the *Great Sabbath*.

PASSIVE, in general, denotes ſome thing that ſuffers the action of another, called an *agent* or *active power*. In grammar, the verb or word that expreſſes this paſſion is termed a *paſſive verb*: which in the learned languages, has a peculiar termination; as *amor doceor*, &c. in Latin: that is an *r* is added to the actives *amo doceo*; and, in the Greek, the inflection is made by changing ω into ομαι; as τυπτω τυπτομαι, &c. But, in the modern languages; the paſſive inflection is performed by means of auxiliary verbs, joined to the participle of the paſt tenſe; as, "I am praiſed," in Latin *laudor*, and in Greek επαινεομαι; or, "I am loved," in Latin *amor*, and in Greek φιλεομαι. Thus it appears, that the auxiliary verb *am*, ſerves to form the paſſives of Engliſh verbs; and the ſame holds of the French; as, *Je ſuis loué*, "I am praiſed; *j'ai eté loué*, "I have been praiſed," &c. See Grammar.

Paſſive.

Passive Title, in Scots law. See Law, Part III. N° clxxx. 30.

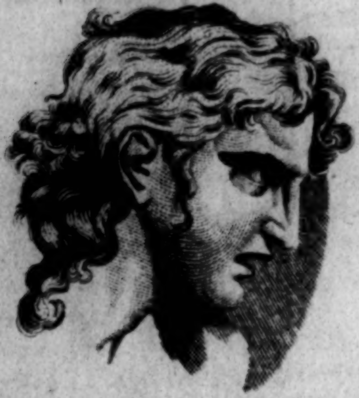
Passive Obedience, a political doctrine which has been much miſrepreſented, and is of courſe, very obnoxious to the friends of freedom. Some nonjurors, in the end of the laſt and in the beginning of the paſſing century, imagining that monarchy is the only lawful form of government, and that hereditary monarchy is the only lawful ſpecies of that government, have coupled with paſſive obedience the ridiculous notion of a divine, hereditary, indefeaſible right of certain families to govern with deſpotic ſway all other families of the ſame nation. The abſurdity of this notion needs not to be dwelt upon; but it may not be improper to obſerve, that it has nothing to do with paſſive obedience.

As taught by the ableſt reaſoners, who think that they are ſupported by holy ſcripture, paſſive obedience is as much a duty under republican as under monarchial governments; and it means no more, but that private individuals are bound by the moſt ſolemn moral ties not to reſiſt the ſupreme power wheresoever placed in any nation. The ſupreme power can only be the legiſlature; and no man or body of men, who have not the power of enacting and abrogating laws can, on this principle, claim paſſive obedience from any ſubject. Whether the principle be well or ill founded, the abſurdity which commonly attaches to the phraſe *paſſive obedience*, originates from the miſtaken loyalty of the adherents of the houſe of Stuart, who to aggravate the illegality of the revolution, were wont to repreſent James II. as ſupreme over both houſes of parliament and of courſe over all law. That ſuch reveries were fooliſh, we need no other evidence than the ſtatue-book, which ſhows, that in the office of legiſlation, the king, lords, and commons, are coordinate; and that when any one of theſe powers ſhall take upon itſelf to counteract the other two, the duty of paſſive obedience will not oblige the ſubject to ſupport the legiſlature. That reſiſtance to the legiſlature, if lawful on any occaſion, can be ſo only to oppoſe the moſt violent tyranny, has been ſhown by Mr Hume with great cogency of argument, and is indeed a propoſition ſelf evident. That it can never be lawful on any occaſion, Biſhop Berkeley endeavoured to prove by a chain of reaſoning which it would be difficult to break. We enter not into the controverſy, but refer our readers to *Hume's Eſſays* and *Berkeley's Paſſive obedience and Nonreſiſtance*, or, as it was intitled by a late editor, *the Meaſure of Submiſſion to civil Government*. We ſhall only obſerve, that there is a great difference between *active* and *paſſive* obedience; and that many who conſider themſelves as bound on *no account* whatever to *reſiſt* the ſupreme power, would *ſuffer death* rather than do an immoral action in obedience to any law of earthly origin.

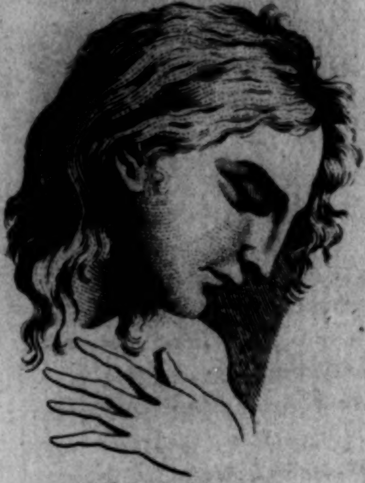
Passive

PASSIONS. **Plate CCCLXXVIII.**

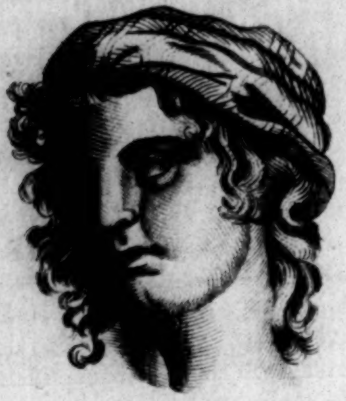
Attention



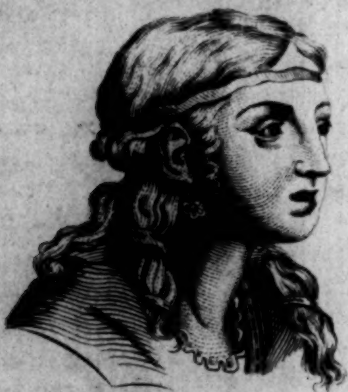
Veneration



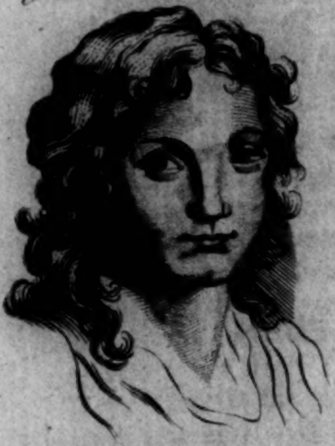
Admiration



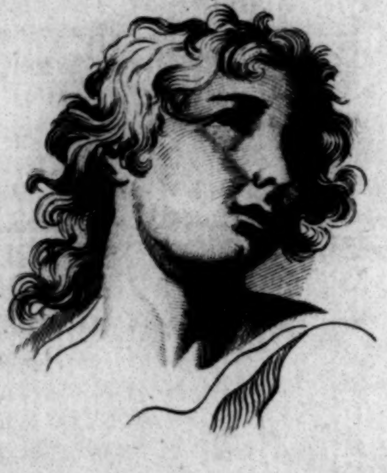
Admiration with Astonishment



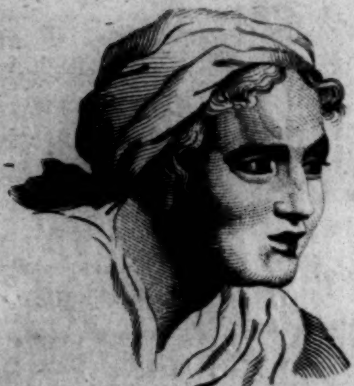
Joy with Tranquility



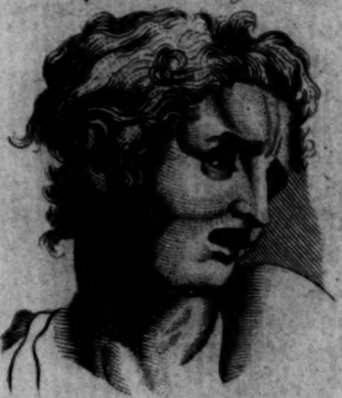
Rapture



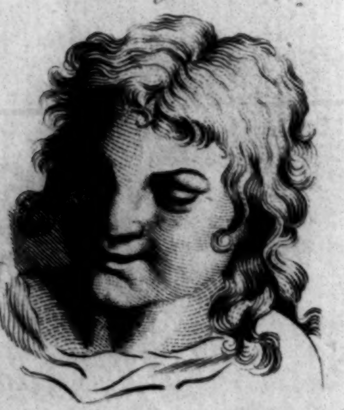
Desire



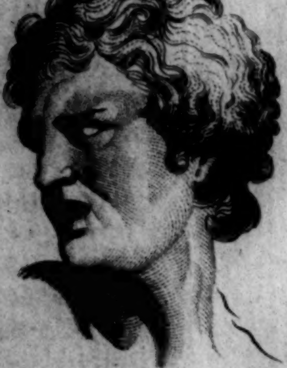
Simple Bodily Pain



Laughter



Acute Pain

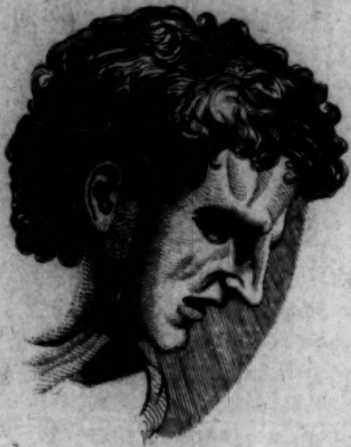


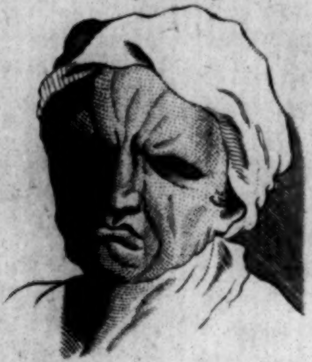
Seymour sc.

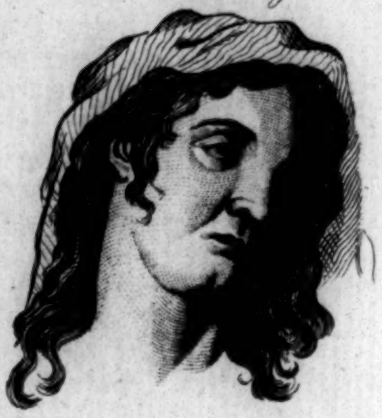
BRITISH MUSEUM

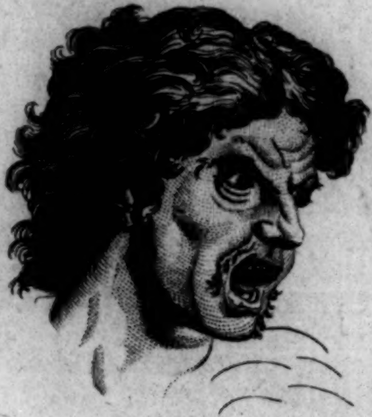
PASSIONS.

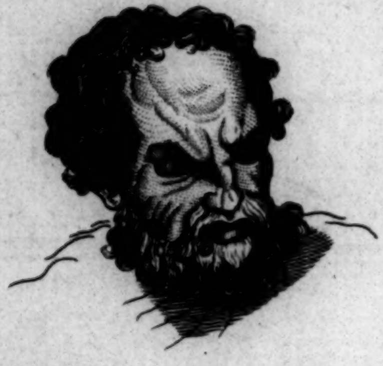
Plate CCCLXXIX.

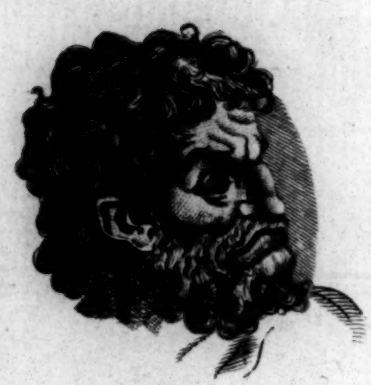

Compaſsion.

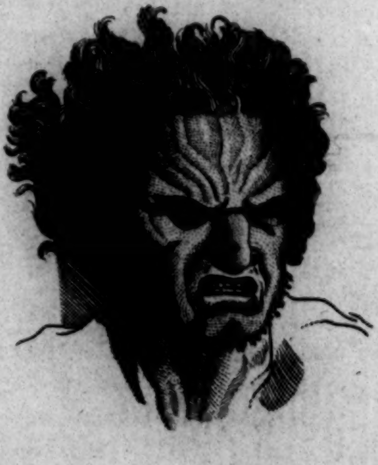

Weeping.

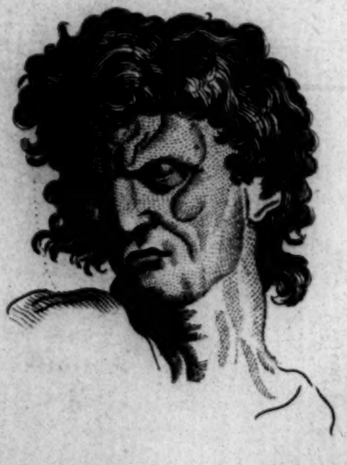

Sadneſs.

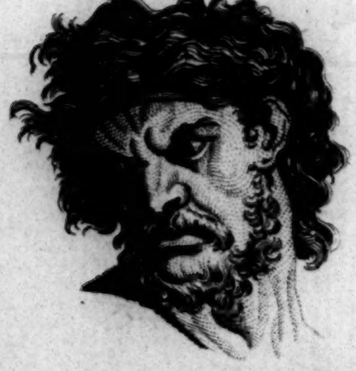

Terror or Fright.


Horor.


Scorn


Despair.


Hatred or Jealousy.


Anger.

Seymour ſc.

BRITISH MUSEUM

Paſſive, Paſſover.

Passive Prayer, among the *myſtic divines*, is a total ſuſpenſion or ligature of the intellectual faculties; in virtue whereof, the ſoul remains of itſelf, and as to its own power, impotent with regard to the producing of any effects. The paſſive ſtate, according to Fenelon, is only paſſive in the ſame ſenſe as contemplation is, *i. e.* it does not exclude peaceable, diſintereſted acts, but only unquiet ones, or ſuch as tend to our own intereſt. In the paſſive ſtate, the ſoul has not properly any activity, any ſenſation, of its own; it is a mere infinite flexibility of the ſoul, to which the feebleſt impulſe of grace gives motion.

PASSOVER, a ſolemn feſtival of the Jews, inſtituted in commemoration of their coming out of Egypt, becauſe the night before their departure, the deſtroying angel, who put to death the firſt-born of the Egyptians, paſſed over the houſes of the Hebrews without entering therein, becauſe they were marked with the blood of the lamb which was killed the evening before, and which for this reaſon was called the *paſchal lamb.* This feaſt was called *paſcha* by the old Greeks and Romans; not we preſume from πασχω "I ſuffer," as Chryſoſtom, Irenæus, and Tertullian, ſuppoſe, but from the Hebrew word *peſaph*, *paſſage*, *leap*. The following is what God ordained concerning the paſſover of the Jews, (Exod. xii.) The month of the coming forth from Egypt was looked upon from this time to be the firſt month of the ſacred or eccleſiaſtical year, and the fourteenth day of this month, between the two veſpers, that is, between the ſun's decline and his ſetting: or rather, according to our manner of reckoning, between two o'clock in the afternoon and ſix o'clock in the evening, at the equinox, they were to kill the paſchal lamb, and to abſtain from leavened bread. The day following being the fifteenth, counting from ſix o'clock of the foregoing evening, which concluded the fourtenth, was the grand feaſt of the paſſover, which continued ſeven days. But it was only the firſt and the ſeventh day that were ſolemn. The lamb that was killed ought to be without any defect, a male, and yeaned that year. If no lamb could be found, they might take a kid. They killed a lamb or a kid in every family; and if the number of thoſe that lived in the houſe was not ſufficient to eat a lamb, they might join two houſes together. With the blood of the paſchal lamb they ſprinkled the door-poſts and lintel of every houſe, that the deſtroying angel, at the ſight of the blood, might paſs over them, and ſave the Hebrew children. They were to eat the lamb the ſame night that followed the ſacrifice; they eat it roaſted, with unleavened bread, and a ſallad of wild lettuce. The Hebrew ſays literally, with bitter things, as ſuppoſe muſtard, or any thing of this nature to give a reliſh. It was forbid to eat any part of it raw, or boiled in water, nor were they to break a bone, (Exod. xii. 46. Numb. ix. 12. John xix. 36.); and if any thing remained to the day following, it was thrown into the fire. They that eat it were to be in the poſture of travellers, having their reins girt, their ſhoes on their feet, their ſtaves in their hands, and eating in a hurry. But this laſt part of the ceremony was but little obſerved, at leaſt it was of no obligation, but only upon that night they came forth out of Egypt. For the whole eight days of the paſſover no leavened bread was to be uſed: and whoever ſhould eat any, was threatened to be cut off from his people. With regard to the ceremonies which are obſerved in relation to the bread, ſee the article Bread, p. 531. col. 2.

Paſſover.

They kept the firſt and laſt day of the feaſt, yet ſo as that it was allowed to dreſs victuals, which was forbidden on the Sabbath-day. The obligation of keeping the paſſover was ſo ſtrict, that whoever ſhould neglect to do it, was condemned to death, (Numb. ix. 13.) But thoſe who had any lawful impediment, as a journey, ſickneſs, or any uncleanneſs, voluntary or involuntary; for example, thoſe that had been preſent at a funeral, or by any other accident had been defiled, were to defer the celebration of the paſſover till the ſecond month of the eccleſiaſtical year, or to the fourteenth day of the month Jiar, which anſwers to April and May. It was thus the Lord ordered Moſes, upon the occaſion of the inquiry of ſome Iſraelites, who had been obliged to pay their laſt offices to ſome of their relations, and who being thus polluted, were not capable of partaking of the paſchal ſacrifice, (2 Chr. xxx. 1, 2, &c,) The modern Jews obſerve in general the ſame ceremonies that were practiſed by their anceſtors, in the celebration of the paſſover. On the fourteenth of Niſan, the firſt-born faſt in memory of God's ſmiting the firſt-born of the Eyptians. The morning prayers are the ſame with thoſe ſaid on other feſtivals. They take the roll of the pentateuch out of the cheſt, and read it as far as the end of the twelfth chapter of Exodus, and what is contained in the eighteenth chapter of Numbers, relating to the paſſover. The matron of the family then ſpreads a table, and ſets on it two unleavened cakes, and two pieces of the lamb, a ſhoulder boiled and another roaſted, to put them in mind that God delivered them with a ſtretched out arm. To this they add ſome ſmall fiſhes, becauſe of the leviathan; a hard egg, becauſe of the viz.; ſome meal, becauſe of the behemoth, (theſe three animals being appointed for the feaſt of the elect in the other life); and peas and nuts for the children to provoke their curioſity to aſk the reaſon of this ceremony. They likewiſe uſe a kind of muſtard, which has the appearance of mortar, to repreſent their making bricks in Egypt. The father of the family ſits down with his children and ſlaves, becauſe on this day all are free. Being ſet down, he takes bitter herbs, and dips them in the muſtard, then eats them, and diſtributes to the reſt. Then they eat of the lamb, the hiſtory and inſtitution of which is at that time recited by the maſter of the family. The whole repaſt is attended with hymns and prayers. They pray for the prince under whoſe dominion they live, according to the advice of Jeremiah (xxix. 7.), "Seek the peace of the city whither I have cauſed you to be carried away captives, and pray unto the Lord for it: for in the peace thereof ſhall ye have peace." See the article Feast, &c. The ſame things are put in practice the two following days; and the feſtival is concluded by the ceremony habdala or diſtinction. This ceremony is performed at the cloſing of the Sabbath-day, at which time the maſter of the houſe pronounces certain benedictions, accompanied with certain formalities, requeſting that every thing may ſucceed well the week following. After going out of the ſynagogue, they then eat leavened bread for the laſt time. (Leo of

Modena, p. iii. c. 3. and the Rabbins.) While the temple was ſtanding, they brought their lambs thither, and ſacrificed them, offering the blood to the prieſt, who poured it out at the foot of the altar. The paſſover was typically predictive of Chriſt our chriſtian paſſover, (1 Cor. v. 7.). As the deſtroying angel paſſed over the houſes marked with the blood of the paſchal lamb, ſo the wrath of God paſſes over them whoſe ſouls are ſprinkled with the blood of Chriſt. The paſchal lamb was killed before Iſrael was delivered, ſo it was neceſſary Chriſt ſhould ſuffer before we could be redeemed. It was killed before Moſes's law or Aarons's ſacrifices were enjoined, to ſhow that deliverance comes to mankind by none of them: but only the true paſſover, that lamb of God ſlain from the foundation of the world, (Rom. iii. 25. Heb. ix. 14.) It was killed the firſt month of the year, which prefigured that Chriſt ſhould ſuffer death in this month, (John xviii. 28.). It was killed in the evening, (Exod. xii. 6.) So Chriſt ſuffered in the laſt days, and at this time of the day, (Matt. xxvii. 46. Heb. i. 2.) At even alſo the ſun ſets, which ſhows that it was the Sun of Righteouſneſs who was to ſuffer and die, and that at his paſſion univerſal darkneſs ſhould be upon the whole earth, (Luke xxiii. 44.) The paſſover was roaſted with fire, to denote the ſharp and dreadful pains which Chriſt ſhould ſuffer, not only from men, but from God alſo. It was to be eaten with bitter herbs, not only to put them in remembrance of their bitter bondage in Egypt, but alſo to typify our mortification to ſin, and readineſs to undergo afflictions for Chriſt, (Col. i. 24.) Many erroneouſly imagine, that the paſſover was inſtituted in memory of the Iſraelites paſſing the Red Sea; though it is certain the feaſt was held, and had its name, before the Iſraelites took a ſtep of their way out of Egypt, and conſequently ſeveral days before their paſſing the Red Sea. Beſides the paſſover celebrated on the fourteenth of the firſt month, there was a ſecond paſſover held on the fourteenth of the ſecond month after the equinox, inſtituted by God in favour of travellers and ſick perſons who could not attend at the firſt, nor be at Jeruſalem on that day. The Greeks, and even ſome of the catholic doctors, from the thirteenth, eighteenth, and nineteenth chapters, of St John, take occaſion to conclude, that Jeſus anticipated the day marked for the paſſover in the law; but the authority of three evangeliſts ſeems to evince the contrary. See Whitby's Diſſertation on this ſubject, in an appendix to the fourteenth chapter of St Mark. F. Lamy ſuppoſes, that our Lord did not attend at the paſſover the laſt year of his life; which ſentiment has drawn upon him abundance of oppoſers. F. Hardouin aſſerts, that the Galileans celebrated the paſſover on one day, and the Jews on another.

PASSPORT, or Pass, a licence or writing obtained from a prince or governor, granting permiſſion and a ſafe conduct to paſs through his territories without moleſtation: Alſo a permiſſion granted by any ſtate to navigate in ſome particular ſea, without hinderance or moleſtation from it. It contains the name of the veſſel, and that of the maſter, together with her tonnage and the number of he crew, certifying that ſhe belongs to the ſubjects of a particular ſtate, and requiring all perſons at peace with that ſtate to ſuffer her to proceed on her voyage without interruption.

The violation of ſafe-conducts or paſſports expreſsly granted by the ſtate or by its ambaſſadors to the ſubjects of a foreign power in time of mutual war, or committing acts of hoſtility againſt ſuch as are in amity, league or truce with us, who are here under a general implied ſafe conduct, are breaches of the public faith, without which there can be no intercourſe or commerce between one nation and another; and ſuch offences may according to the writers upon the law of nations, be a proper ground of a national war. And it is enacted by the ſtatute 31 Hen. VI. cap. 4. ſtill in force, that if any of the king's ſubjects attempt or offend upon the ſea, or in any port within the king's obeyſance, or againſt any ſtranger in amity, league, or truce, or under ſafe-conduct, and eſpecially by attacking his perſon, or ſpoiling him, or robbing him of his goods; the lord chancellor, with any of the juſtices of either the king's-bench or common-pleas, may cauſe full reſtitution and amends to be made to the party injured. Paſquier ſays, that *paſſport* was introduced for *paſſe par-tout*. Balzac mentions a very honourable paſſport given by an emperor to a philoſopher in theſe terms: "If there be any one on land or ſea hardy enough to moleſt Potamon, let him conſider whether he be ſtrong enough to wage war with Cæſar."

Passport is uſed likewiſe for a licence granted by a prince for the importing or exporting merchandizes, moveables, &c. without paying the duties. Merchants procure ſuch paſſports for certain kinds of commodities: and they are always given to ambaſſadors and miniſters for their baggage, equipage, &c.

Passport is alſo a licence obtained for the importing or exporting of merchandizes deemed contraband, and declared ſuch by tariffs, &c. as gold, ſilver, precious ſtones, ammunition of war, horſes, corn, wool, &c. upon paying duties.

PASSUS, among the Romans, a meaſure of length, being about four feet ten inches, or the thouſandth part of a Roman mile. The word properly ſignifies, the ſpace betwixt the feet of a man walking at an ordinary rate. See Measure.

PASTE, in cookery, a ſoft compoſition of flour, wrought up with proper fluids, as water, milk, or the like, to ſerve for caſes or coffins, therein to bake meats, fruits, &c. It is the baſis or foundation of pyes, tarts, patties, paſties, and other works of paſtry. It is alſo uſed in confectionary, &c. for a preparation of ſome fruit made by beating the pulp thereof with ſome fluid or other admixture, into a ſoft pappy conſiſtence, ſpreading it into a diſh, and drying it with ſugar, till it becomes as pliable as an ordinary paſte. It is uſed occaſionally alſo for making the cruſts and bottoms of pyes, &c. Thus, with proper admixtures, are made almond paſtes, apple paſtes, apricot paſtes, cherry, currant, lemon, plum, peach, and pear paſtes.

Paste is likewiſe uſed for a preparation of wheaten flour, boiled up and incorporated with water; uſed by various artificers, as upholſterers, ſaddlers, bookbinders, &c. inſtead of glue or ſize, to faſten or cement their cloths, leathers, papers, &c. When paſte is uſed by bookbinders, or for paper hangings to rooms, they mix a fourth, fifth, or ſixth, of the weight of the flour of powdered reſin; and where it is wanted ſtill more tenacious,

nacious, gum arabic or any kind of ſize may be added. Paſte may be preſerved, by diſſolving a little ſublimate, in the proportion of a dram to a quart, in the water employed for making it, which will prevent not only rats and mice, but any other kind of vermin and inſects, from preying upon it.

Pastes, in the glaſs trade, or the imitation or counterfeiting of gems in glaſs, ſee Gem, p. 603.

PASTEBOARD, a kind of thick paper, formed of ſeveral ſingle ſheets paſted one upon another. The chief uſe of paſteboard is for binding books, making letter-caſes, &c. See Paper.

PASTERN *of a* Horse, in the manege, is the diſtance betwixt the joint next the foot and the coronet of the hoof. This part ſhould be ſhort, eſpecially in middle-ſized horſes; becauſe long paſterns are weak, and cannot ſo well endure travelling.

Pastern Joint, the joint next a horſe's foot.

PASTIL, or Pastel, among painters, a kind of paſte made of different colours ground up with gum-water, in order to make Crayons.

Pastil, in pharmacy, is a dry compoſition of ſweet-ſmelling reſins, aromatic woods, &c. ſometimes burnt to clear and ſcent the air of a chamber.

PASTIME, a ſport, amuſement, or diverſion. Paſtimes of ſome kind ſeem to be abſolutely neceſſary, and to none more than to the man of ſtudy; for the moſt vigorous mind cannot bear to be always bent. Conſtant application to one purſuit, if it deeply engage the attention, is apt to unhinge the mind, and to generate madneſs: of which the Don Quixote of Cervantes, and the aſtronomer of Johnſon, are two admirably conceived inſtances. But though paſtime is neceſſary to relieve the mind, it indicates great frivolity when made the buſineſs of life; and yet the rich and the great, who are not obliged to labour for the means of ſubſiſtence, too often rove from paſtime to paſtime with as conſtant aſſiduity as the mechanic toils for his family, or as the philoſopher devotes himſelf to the cultivation of ſcience. When thoſe paſtimes tend to give elaſticity to the mind or ſtrength to the body, ſuch conduct is not only allowable, but praiſeworthy; but when they produce effects the reverſe of theſe, it is both hurtful and criminal. The gaming-table, the maſquerade, the midnight aſſembly of any ſort, muſt of neceſſity enfeeble both the body and the mind; and yet ſuch are the faſhionable amuſements of the preſent day, to which many a belle and many a beau ſacrifice their beauty, their health, their quiet, and their virtue.

Far different were the paſtimes of our wiſer anceſtors: Remote from vice and effeminacy, they were innocent, manly, and generous exerciſes. From the ancient records of this country, it appears that the ſports, amuſements, pleaſures, and recreations, of our anceſtors, as deſcribed By Fitz Stephen (a), added ſtrength and agility to the wheels of ſtate mechaniſm, while they had a direct tendency towards utility. For moſt of thoſe ancient recreations are reſolvable into the public defence of the ſtate againſt the attacks of a foreign enemy. The play at ball derived from the Romans, is firſt introduced by this author as the common exerciſe of every ſchool boy. The performance was in a field, where the reſort of the moſt ſubſtantial and conſiderable citizens, to give encouragement and countenance to this feat of agility, was ſplendid and numerous. The intention of this amuſement at this period of time was to make the juvenile race active, nimble, and vigorous; which qualities were requiſite whenever their aſſiſtance ſhould be wanted in the protection of their country. The next ſpecies of paſtime indeed does not ſeem to have this tendency; but it was only, as it ſeems, an annual cuſtom; This was cock-fighting. The author tells us, that in the afternoon of Shrove-Tueſday, on which day this cuſtom prevailed, they concluded the day in throwing the ball: which ſeems to inſinuate, that the cock fighting was merely in conformity to ancient uſage, and limited only to part of the day, to make way for a more laudible performance. We may reaſonably ſuppoſe, although this author is entirely ſilent upon this head, that while cock-fighting was going on, cock-throwing was the ſport of the loweſt claſs of people, who could not afford the expence of the former (b). Another ſpecies of manly exerciſe was truly martial, and intended to qualify the adventures for martial diſcipline. It is related by Fitz-Stephen thus: "Every Friday in Lent, a company of young men comes into the field on horſeback, attended and conducted by the beſt horſemen: then march forth the ſons of the citizens, and other young men, with diſarmed lances and ſhields; and there practiſe feats of war. Many courtiers likewiſe, when the king is near the ſpot, and attendants upon noblemen, do repair to theſe exerciſes; and while the hope of victory does inflame their minds, thew ſhow by good proof how ſerviceable they would be in martial affairs."

(a) Otherwiſe called William Stephanides, a monk of Canterbury, who lived in the reign of King Stephen, to the time of Richard I. He wrote a Latin treatiſe, in which he gives an account of the ſeveral paſtimes which were countenanced in his time. Bale in his writings draws a pleaſing portrait of him. He is likewiſe ſketched in ſtrong and forcible outlines of praiſe and commendation by Leland. Bale ſays thus of him: "The time which other people uſually miſemployed in an idle and frivolous manner, he conſecrated to inquiries which tended to increaſe the fame and dignity of his country: in doing which he was not unworthy of being compared to Plato; for, like him, he made the ſtudy of men and heaven his conſtant exerciſe."

(b) There were places ſet apart for the battles of theſe animals, as at this day, where no one was admitted without money. Theſe places, commonly called pits, were ſchools, as at this day, in which people were inſtructed in the doctrines of chance, loſs and gain, betting and wagers, and particularly in the liberal art of *laying two to one*. Cock-throwing has been laudably aboliſhed; for it was a ſpecies of cruelty towards an innocent and uſeful animal; and ſuch cruelty as would have kindled compaſſion in the heart of the darkeſt barbarian.

This evidently is of Roman deſcent, and immediately brings to our recollection the *Ludus Trojæ*, ſuppoſed to be the invention, as it was the common exerciſe, of Aſcanius. The common people, in this age of maſculine manners, made every amuſement where ſtrength was exerted the ſubject-matter of inſtruction and improvement: inſtructed to exert their bodily ſtrength in the maintenance of their country's rights; and their minds improved, by ſuch exertion, into every manly and generous principle.

In the vacant intervals of induſtry and labour, commonly called the holy-days, indolence and inactivity, which at this day mark this portion of time, were found only in thoſe whoſe lives were diſtempered with age or infirmity. The view which Fitz-Stephen gives us of the Eaſter-holydays is animated, "In Eaſter-holydays they fight battles upon the water. A ſhield is hanged upon a pole, fixed in the middle of the ſtream. A boat is prepared without oars, to be borne along by the violence of the water; and in the forepart thereof ſtandeth a young man, ready to give charge upon the ſhield with his lance. If ſo be that he break his lance againſt the ſhield, and doth not fall, he is thought to have performed a worthy deed. If without breaking his lance he runs ſtrongly againſt the ſhield, down he falleth into the water; for the boat is violently forced with the tide: but on each ſide of the ſhield ride two boats, furniſhed with young men, who recover him who falleth as ſoon as they may. In the holydays all the ſummer the youths are exerciſed in leaping, dancing. ſhooting, wreſtling, caſting the ſtone, and practiſing their ſhields; and the maidens trip with their timbrels, and dance as long as they can well ſee. In winter, every holyday before dinner, the boars prepared for brawn are ſet to fight, or elſe bulls or bears are baited."

Theſe were the laudable purſuits to which leiſure was devoted by our forefathers, ſo far back as the year 1130. Their immediate ſucceſſors breathed the ſame generous ſpirit. In the year 1222, the 6th year of Henry III. we find, that certain maſters in exerciſes of this kind made a public profeſſion of their inſtructions and diſcipline, which they imparted to thoſe who were deſirous of attaining excellence and victory in theſe honourable atchievements. About this period, the perſons of better rank and family introduced the play of *Tennis* (c); and erected courts or oblong edifices for the performance of the exerciſe.

About the year 1253, in the 38th year of Henry III. the *Quintan* was a ſport much in faſhion in almoſt every part of the kingdom. This contrivance conſiſted of an upright poſt firmly fixed in the ground, upon the top of which was a croſs piece of wood, moveable upon a ſpindle; one end of which was broad like the flat part of an halberd, while at the other end was hung a bag of ſand. The exerciſe was performed on horſeback. The maſterly performance was, when, upon the broad part being ſtruck with a lance, which ſometimes broke it, the aſſailant rode ſwiftly on, ſo as to avoid being ſtruck on the back by the bag of ſand, which turned round inſtantly upon the ſtroke given with a very ſwift motion. He who executed this feat in the moſt dexterous manner was declared victor, and the prize to which he became intitled was a peacock. But if upon the aim taken, the contender miſcarried in ſtriking at the broadſide, his impotency of ſkill became the ridicule and contempt of the ſpectators.

Dr Plott, in his Natural Hiſtory of Oxfordſhire, tells us, that this paſtime was in practice in his time at Deddington in this county. "They firſt (ſays this author) fixed a poſt perpendicularly in the ground, and then placed a ſmall piece of timber upon the top of it, faſtened on a ſpindle, with a board nailed to it on one end, and a bag of ſand hanging at the other. Againſt this board they anciently rode with ſpears: now as I ſaw it at Deddington only with ſtrong ſtaves, which violently bringing about the bag of ſand, if they make not good ſpeed away, it ſtrikes them in the neck or ſhoulders, and ſometimes perhaps ſtrikes them down from their horſes; the great deſign of the ſport being to try the agility both of man and horſe, and to break the board; which, whoever did, was accounted conqueror: for whom heretofore there was ſome reward always appointed." (D)

Matthew Paris, ſpeaking of this manly diverſion, ſays, ' The London youths made trial of their ſtrength on horſeback, by running at the *Quintan;* in doing which, whoever excelled all the reſt was rewarded with a peacock." This ſport is continued to this day in Wales; and being in uſe only upon marriages, it may be conſidered as a votive paſtime, by which theſe heroic ſpirits ſeem to wiſh, that the male iſſue of ſuch marriage may be as ſtrong, vigorous, and active, as thoſe who are at that time engaged in the celebration of this feſtive exertion of manhood. Virtuous exerciſes of this kind would be too rude and barbarous for the attendants on pleaſure in the preſent age. The hand would tremble at the weight of the javelin; and the heart would pant upon the apprehenſion of perſonal inſecurity. While theſe exertions of triumphant proweſs continued, the ſordid degeneracy of diſpoſition, the ſupple baſeneſs of temper were unknown: for the love of country, as the Roman orator has wiſely obſerved, *included all other virtues*. But if we guard the palace of honour, like the brazen caſtle of Danae, with every poſſible ſecurity, importunate corruption will be ever waiting at the gate, to ſeize an opportunity of intruſion. Theſe feats of honourable conteſts were ſucceeded by the gilded banners of exhibition, and all the long train of dependents in the intereſt of indolence: for the writers of theſe times inform us, that the ſoft pleaſures of the ſtage forced the paſſes to public favour in the year 1391, and likewiſe in the year 1409; ſo that utility, which before ſtood on the right hand of pleaſure, was now ordered to withdraw for a ſeaſon. The drama, it ſeems, was attempted by a ſet of uſeleſs and inſignificant perſons called *pariſh-clerks;* who, becauſe they had the knowledge of the alphabet, ignorantly preſumed that this included every other ſpecies of knowledge. The ſubject was truly ſerious, the creation of the world; but the performance muſt have been ludicrous. It was, however, honoured with the attendance of noble perſonages; and royalty itſelf deigned to caſt a favourable eye upon it, for the king and queen were preſent. Theſe interludes laſted no longer than the time requiſite for the former confederacy of utility and pleaſure to reſume its powers; as when the pliable bow by being too much bent is put out of ſhape, and by its elaſticity recovers its former poſition. The lance, the ſhield, the ball, and the equeſtrian proceſſion, came forward again, and put the dramatic uſurper to flight. After this period, theſe objects of generous pleaſure ſeem to have had their audience of leave, and one general object, indeed no leſs manly than the former, to have filled their ſtations, which was archery. This had a continuance to the reign of Charles I. for we find in many hoſpitals founded in that reign, among the articles of benefaction recorded upon their walls, this ſingular proviſion, *arms for the boys*, which ſignified *bows and arrows*.

(c) The word *Tennis* ſeems to owe its original to the French language: if ſo, the game is of French production. Yet the word *tenez* will hardly be found to afford incontrovertible evidence upon this ſubject. For the holding or keeping poſſeſſion of the ball is no part of the game, but rather a circumſtance caſually attending it: ſince, during the performance of it, the ball is in continual motion, ſo there can be no *tenez* at this juncture. Perhaps a place in France called *Tennois* (as there is a town which differs only in a letter, called *Sennois*, in the diſtrict of Champagne) was the place where the balls were firſt made, and the game firſt introduced.

(D) This was certainly an exerciſe derived from a military inſtitution of the Romans, though not inſtrumentally the ſame. Whoever conſiders the form and diſpoſition of the Roman camps, which were formed into a ſquare figure, will find there were four principal gates or paſſages. Near the *Quæſtorium*, or Quæſtor's apartment, was the *Forum*, or what is now called a ſuttling-houſe, and from being near the Quæſtor's ſtation called *Quæſtorium forum*. At this part was a fifth gate *Quintana*, where the ſoldiers were inſtructed in the diſcipline of the *Palaria*, which was to aim at and ſtrike their javelins againſt an upright poſt fixed in the ground, as a kind of *proluſion* to a real engagement with an enemy. By the frequent practice of this exerciſe, ſometimes called *exercitium ad palum* by Roman writers, the ſoldiers at length acquired not only a dexterity and addreſs in the management of their arms, but a conſtant and regular exactneſs in the direction of them. *Titus Livius Patavinus*, cap. 2. *Pancirollus Rerum Memoral.* lib. ii. tit. 21. *Vulturius in Auguſtanis Monumentis*, lib. ii. p. 237.

Upon the irruption of the *Iſtri* into the Roman camps, which they plundered, ſays Livius, *ad Quæſtorium forum, quintanamque pervenerunt.*

There are many places at this day, formerly reſorted to, for the practice of this noble art, diſtinguiſhed by appellations which indicate their ancient uſage: ſuch as Brentford Butts, Newington Butts, and many others of the like denomination. It appears from 33 Hen. VIII. that by the intruſion of other pernicious games, archery had been for a long time diſuſed; to revive which this ſtatute was made. It ſeems that the bows of the beſt kind were made of yew; and that this wood might be readily obtained for this purpoſe, yew-trees were planted in churchyards. The ſons of thoſe only who were perſons of fortune and faſhion, if under 17 years of age, were permitted to uſe ſuch bows. The words of the ſtatute are ſingular, and ran thus: "No perſon under ſeventeen years, except he, or his father or mother, have lands or tenements to the yearly value of ten pounds, or be worth in value or moveables the ſum of forty marks ſterling, ſhall ſhoot with any bow of yew, which ſhall be bought for him, after the feaſt of our Lady next coming, under the pain to loſe and forfeit ſix ſhilings and eightpence." Two obſervations ariſe here upon theſe words. One, that the yew-wood, not being ſo common as other wood, might probably be ſoon found deficient, as it was the beſt wood for making bows, if not reſtrained in the uſe of it to particular ages and perſons, as young people wantonly deſtroy what is put into their hands for uſeful purpoſes. The other obſervation is, that the age of 17 is by this ſtatute diſtinguiſhed as the age of diſcretion, when young people are more attentive and conſiderate in things of private concern; an age in theſe times which few ever arrive at, and ſome never. This ſtatute makes proviſion of other kinds of wood for the common people in the following manner: "To the intent that every perſon may have bows of mean price, be it enacted, that every bowyer ſhall, for every bow that he maketh of yew, make four other bows, meet to ſhoot with, of elm, wich, haſill, aſh, or other wood apt for the ſame, under pain to loſe and forfeit for every ſuch bow ſo lacking the ſum of three ſhillings and fourpence." It ſeems there was a ſpecies of yew at this time called *elk*, which wood was ſtronger and more pliant than the common yew mentioned in this ſtatute, and the price of it fixed. "Moreover, no bowyer ſhall ſell or put to ſale to any of the king's ſubjects, any bow of yew of the tax called *elk*, above the price of three ſhillings and fourpence, under the pain to forfeit twenty ſhillings for every bow ſold above the ſame price."

From theſe ſeveral conſiderations which occur in this ſtatute, we can trace three reſplendent qualities, courage, ſtrength, and agility; which three united, inſpired two more, generoſity and magnanimity. Upon the decline of this and other poliſhed (E) amuſements, a ſavage deformity of manners ſprung up, but ſpangled

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(E) How widely different the conceptions of politeneſs at this day from what they were in the moſt refined ages of Greece and Rome! Theſe two ſtates agreed in fixing the ſtandard of this accompliſhment upon the fitneſs and propriety of things. Modern nations bend to an arbitrary impoſture of language and manners which enervate the mind. To define politeneſs in its ancient and true ſenſe, it is a manly exertion of conduct, founded upon every noble and virtuous principle. Much of the politeneſs of modern times is an effeminate impotence of demeanor, founded upon fallacy, evaſion, and every inſidious artifice. There can be no ſecurity, no happineſs, Paſtime. ſpangled here and there with the oppoſite character of lazy opulence, which began now to erect her velvet ſtandard in defiance of chaſte and regular manners.

Towards the beginning of James I.'s reign, military proweſs ſeems to have ſounded a retreat (F). He, to gratify the importunity of the common people, and at the ſame time to obviate his own fears upon a refuſal, publiſhed a book of ſports, in which the people had been ſome time before uſually indulged on Sunday evenings, but which had been lately prohibited. Theſe ſports conſiſted of dancing, ſinging, wreſtling, church ales, and other profanations of that day.

Charles, his ſucceſſor, wiſely, in the very entrance of his reign, aboliſhed theſe ſports. The act of Charles ſtates the ſeveral amuſements in part; by which we may conjecture what was the remainder as ſtated in the book of ſports by James. It is neceſſary to tranſcribe that part of the act relating to this ſubject. "Foraſmuch as there is nothing more acceptable to God, than the true and ſincere worſhip of Him, and ſervice according to His holy will, and that the holy keeping of the Lord's day is a principal part of the ſervice of God, which in many places of this realm hath been, and now is, prophaned and neglected by a diſorderly ſort of people, in exerciſing and frequenting bear-baiting, bull-baiting, interludes, and common-plays, and other unlawful exerciſes and paſtimes, neglecting divine ſervice both in their own pariſhes and elſewhere: Be it enacted, that from and after forty days next after the end of this ſeſſion of parliament, there ſhall be no meetings, aſſemblies, or concourſe of people, out of their own pariſhes, on the Lord's day, within this realm of England, or any the dominions thereof, for any ſports or paſtimes whatſoever: nor any bear-baiting, bull-baiting, interludes, common plays, or other unlawful exerciſes or paſtimes, uſed by any perſon or perſons within their own pariſhes: and that every perſon and perſons offending in any of the ſaid premiſes, ſhall forfeit for every offence the ſum of three ſhillings and fourpence; the ſame to be employed and converted to the uſe of the poor of the pariſh where ſuch offence ſhall be committed." All this was perhaps proper, and ſhowed the diſtinguiſhed piety of this unfortunate monarch. But in this age likewiſe ended the manly ſports of Britons, and nothing was introduced that could compenſate for the loſs.

All theſe luſory arts, conſidered as vehicles of pleaſure, from the variety of their inventions, repreſent pleaſure as a fleeting phantom; evincing at the ſame time the ſtability of happineſs as ſpringing from internal order. Even reflex acts, pregnant with future hopes of ſolace and ſocial recreation, have more true feelings in expectancy than thoſe which ariſe from the object in poſſeſſion. Nay, pleaſure is found frequently in the imagination only: for Ixion's diſappointment frequently awaits us when we advance to embrace this Juno of our deſires.

Upon the whole, happineſs, the only thing of intrinſic value, muſt ariſe in the heart, and be ſomething more ſolid than what mere amuſement can poſſibly ſupply. Amuſements or paſtimes ought to be conſidered only as neceſſary relaxations from ſeverer and more uſeful employment; and in this point of view they may be ſafely purſued; but they become criminal when they occupy the place of the buſineſs of life.

Paſtinaca. **PASTINACA**, the PARSNEP: a genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The fruit is an elliptical compreſſed plane: the petals are involuted and entire. There are only two ſpecies of this genus; the principal of which is the *paſtinaca ſativa*, or garden parſnep: which is an exceeding fine eſculent root. It is to be propagated by ſowing the ſeeds in February or March, in a rich mellow ſoil, which muſt be deep dug, that the roots may be able to run deep without hinderance.

It is a common practice to ſow carrots at the ſame time, upon the ſame ground with the parſneps; and if the carrots are deſigned to be drawn young, there is no harm in it. The parſneps, when they are grown up a little, muſt be thinned to a foot diſtance, and carefully kept clear of weeds. They are fineſt taſted juſt at the ſeaſon when the leaves are decayed: and ſuch as are deſirous to eat them in ſpring ſhould have them taken up in autumn and preſerved in ſand. When the ſeeds are to be ſaved, ſome very ſtrong and fine plants ſhould be left four feet diſtance; and towards the end of Auguſt, or in the beginning of September, the ſeeds will be ripe: they muſt then be carefully gathered, and dried on a coarſe cloth. They ſhould always be ſown the ſpring following: for they do not keep well.

Hints have been given and experiments made by agricultural ſocieties reſpecting parſneps, in order to raiſe them for winter food to cattle. It has long been a cuſtom in ſome parts of Brittany, to ſow parſneps in the open field for the food of cattle; as we are informed by the firſt volume of the Tranſactions of a Society inſtituted in that province, for the encouragement of the œconomical and commercial intereſts of their country. "It is of great importance (ſay they) that parſneps ſhould be univerſally cultivated; becauſe they afford an excellent and wholeſome food for all kinds of cattle during the winter, and may be uſed to great advantage to fatten them. Our hogs have no other food in all that ſeaſon, and our bullocks and oxen thrive well upon it. Our cows fed with parſneps give more milk than with any other winter fodder, and that milk yields better butter than the milk of cows nouriſhed with any other ſubſtance. Our horſes fatten with this food; though ſome pretend that it renders them leſs mettleſome, and hurts their legs and eyes. Cattle eat theſe roots raw at firſt ſliced lengthwiſe;

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pineſs, no proſperity, awaiting thoſe who fawn to faſhions that diſgrace humanity, and to manners which conſiſt more of artificial affectation than of manly freedom.

(F) It hath been confidently aſſerted by ſome hiſtorians, that James was, during his whole life, ſtruck with terror upon the ſight of a drawn ſword; which was the reaſon of his great unwillingneſs in beſtowing the honour of knighthood. For at this juncture, he had ſuch a tremor upon him, that inſtead of laying the ſword upon the ſhoulder of the perſon to be knighted, he frequently would be obſerved almoſt to thruſt the point of it into the face of the party: which occaſioned thoſe about him to aſſiſt him in the direction of his hand.

lengthwiſe; and when they begin not to reliſh them, they are cut in pieces, put into a large copper, preſſed down there, and boiled with only ſo much water as fills up the chaſms between them. They then eat them very greedily, and continue to like them." See Panax and Opopanax.

PASTOPHORI, among the ancients, were prieſts whoſe office it was to carry the images, along with the ſhrines of the gods, at ſolemn feſtivals, when they were to pray to them for rain, fair weather, or the like. The Greeks had a college of this order of prieſts in Sylla's time. The cells or apartments near the temples, where the paſtophori lived, were called *paſtophoria*. There were ſeveral lodging-rooms for the prieſts of a ſimilar kind in the temple of Jeruſalem.

PASTORAL, in general, ſomething that relates to ſhepherds: hence we ſay, paſtoral life, manners, poetry, &c.

Blair's Lectures, Vol. III. p. 117.

Paſtoral life may be conſidered in three different views; either ſuch as it now actually is; when the ſtate of ſhepherds is reduced to be a mean, ſervile, and laborious ſtate; when their employments are become diſagreeable and their ideas groſs and low: or ſuch as we may ſuppoſe it once to have been, in the more early and ſimply ages, when it was a life of eaſe and abundance; when the wealth of men conſiſted chiefly in flocks and herds, and the ſhepherd, though unrefined in his maners, was reſpectable in his ſtate: or, laſtly, ſuch as it never was, and never can in reality be, when, to the eaſe, innocence, and ſimplicity of the early ages, we attempt to add the poliſhed taſte, and cultivated manners, of modern times. Of theſe three ſtates, the firſt is too groſs and mean, the laſt too refined and unnatural, to be made the ground-work of paſtoral poetry. Either of theſe extremes is a rock upon which the poet will ſplit if he approach too near it. We ſhall be diſguſted if he give us too much of the ſervile employments and low ideas of actual peaſants, as Theocritus is cenſured for having ſometimes done; and if, like ſome of the French and Italian writers of paſtorals, he makes his ſhepherds diſcourſe as if they were courtiers and ſcholars, he then retains the name only, but wants the ſpirit of paſtoral poetry.

Pastoral Poetry. See Poetry, Part II. Sect. IV.

PASTRY, that branch of cookery which is chiefly taken up in making pies, paſties, cakes, &c. See Paste.

Dr Cullen obſerves, that paſte is very hard and indigeſtible without butter; and even with it, is apt to produce heart-burn and aceſcency. Perhaps this is increaſed by the burned butter, from a certain ſenſibility in the ſtomach, which occaſions all empyreumatic oils to be long retained, and ſo turn ranceſcent and acid.

PASTURE, or Pasture *Land*, is that reſerved for feeding cattle.

Paſture land is of ſuch advantage to huſbandry, that many prefer it even to corn-land, becauſe of the ſmall hazard and labour that attends it; and as it lays the foundation for moſt of the profit that is expected from the arable land, becauſe of the manure afforded by the cattle which are fed upon it. Paſture ground is of two ſorts; the one is meadow land, which is often overflowed; and the other is upland, which lies high and dry. The firſt of theſe will produce a much greater quantity of hay than the latter, and will not require manuring or dreſſing ſo often: but then the hay produced on the upland is much preferable to the other; as is alſo the meat which is fed in the upland more valued than that which is fatted in rich meadows; though the latter will make the fatter and larger cattle, as is ſeen by thoſe which are brought from the low rich lands in Lincolnſhire. But where people are nice in their meat, they will give a much larger price for ſuch as hath been fed on the downs, or in ſhort upland paſture, than for the other which is much larger. Beſides this, dry paſtures have an advantage over the meadows, that they may be fed all the winter, and are not ſo ſubject to poach in wet weather; nor will there be ſo many bad weeds produced; which are great advantages, and do in a great meaſure recompenſe for the ſmallneſs of the crop.

We have already mentioned the advanges of meadow land, or ſuch as is capable of being overflowed with water, and given directions for draining and improving low paſture land, under the article Meadow; therefore ſhall not repeat that here, but juſt mention ſome methods for improving of upland paſture.

The firſt improvement of upland paſture is, by fencing it, and dividing it into ſmall fields of four, five, ſix, eight, or ten, acres each, planting timber trees in the hedge-rows, which will ſcreen the graſs from the dry pinching winds of March, which will prevent the graſs from growing in large open lands; ſo that if April proves a dry month, the land produces very little hay; whereas in the ſheltered fields, the graſs will begin to grow early in march, and will cover the ground, and prevent the ſun from parching the roots of the graſs, whereby it will keep growing, ſo as to afford a tolerable crop if the ſpring ſhould prove dry. But in fencing of land the incloſure muſt not be made too ſmall, eſpecially when the hedge-rows are planted with trees; becauſe, when the trees are advanced to a conſiderable height, they will ſpread over the land; and where they are cloſe, will render the graſs ſour; ſo that inſtead of being of an advantage, it will greatly injure the paſture.

The next improvement of upland paſture is, to make the turf good, where, either from the badneſs of the ſoil, or for want of proper care, the graſs hath been deſtroyed by ruſhes, buſhes, or mole hills. Where the ſurface of the land is clayey and cold, it may be improved by paring it off, and burning it; but if it is an hot ſandy land, then chalk, lime, marle or clay, are very proper manures to lay upon it; but this ſhould be laid in pretty good quantities, otherwiſe it will be of little ſervice to the land.

If the ground is over run with buſhes or ruſhes, it will be of great advantage to the land to grub them up towards the latter part of ſummer, and after they are dried to burn them and ſpread the aſhes over the ground juſt before the autumnal rains; at which time the ſurface of the land ſhould be levelled, and ſown with graſs-ſeed, which will come up in a ſhort time, and make good graſs the following ſpring. So alſo, when the land is full of mole-hills, theſe ſhould be pared off, and either burnt for the aſhes, or ſpread immediately on the ground when they are pared off, obſerving to ſow the bare patches with graſs-ſeed juſt as the autumnal rains begin.

Where the land has been thus managed, it will be of great ſervice to roll the turf in the months of February and March with an heavy wood roller; always obſerving to do it in moiſt weather, that the roller may make an impreſſion; this will render the ſurface level, and make it much eaſier to mow the graſs than when the ground lies in hills; and will alſo cauſe the turf to thicken, ſo as to have what the people uſually term a *good bottom*. The graſs likewiſe will be the ſweeter for this huſbandry, and it will be a great help to deſtroy bad weeds.

Another improvement of upland paſtures is, the feeding of them; for where this is not practiſed, the land muſt be manured at leaſt every third year; and where a farmer hath much arable land in his poſſeſſion, he will not care to part with his manure to the paſture. Therefore every farmer ſhould endeavour to proportion his paſture to his arable land, eſpecially where manure is ſcarce, otherwiſe he will ſoon find his error; for the paſture is the foundation of all the profit which may ariſe from the arable land.

Whenever the upland paſtures are mended by manure, there ſhould be a regard had to the nature of the ſoil, and a proper ſort of manure applied: as for inſtance, all hot ſandy land ſhould have a cold manure; neat's dung and ſwine's dung are very proper for ſuch lands; but for cold lands, horſe dung, aſhes, and other warm manures, are proper. And when theſe are applied it ſhould be done in autumn, before the rains have ſoaked the ground, and rendered it too ſoft to cart on; and it ſhould be carefully ſpread, breaking all the clods as ſmall as poſſible, and then harrowed with buſhes, to let it down to the roots of the graſs. When the manure is laid on at this ſeaſon, the rains in winter will waſh down the ſalts, ſo that the following ſpring the graſs will receive the advantage of it.

There ſhould alſo be great care taken to deſtroy the weeds in the paſture every ſpring and autumn: for, where this is not practiſed, the weeds will ripen their ſeeds, which will ſpread over the ground, and thereby fill it with ſuch a crop of weeds as will ſoon overbear the graſs and deſtroy it; and it will be very difficult to root them out after they have gotten ſuch poſſeſſion, eſpecially ragwort, and ſuch other weeds as have down adhering to their ſeeds.

The graſs which is ſown in theſe upland paſtures ſeldom degenerates, if the land is tolerably good: whereas the low meadows, which are overflowed in winter, in a few years turn to an harſh ruſhy graſs, though the upland will continue a fine ſweet graſs for many years without renewing.

There is no part of huſbandry of which the farmers are in general more ignorant than that of the paſture; moſt of them ſuppoſe, that when old paſture is plowed up, it can never be brought to have a good ſward again; ſo their common method of managing their land after ploughing, is to ſow with their crop of barley ſome graſs ſeeds as they call them; that is, either the red clover, which they intend to ſtand two years after the corn is taken off the ground, or rye-graſs mixed with trefoil; but as all theſe are at moſt but biennial plants, whoſe roots decay ſoon after their ſeeds are perfected, ſo the ground, having no crop upon it, is again ploughed for corn; and this is the conſtant round which the lands are employed in by the better ſort of farmers.

But whatever may have been the practice of theſe people, it is certainly poſſible to lay down lands which have been in tillage with graſs, in ſuch a manner as that the ſward ſhall be as good, if not better, than any natural graſs, and of as long duration. But this is never to be expected in the common method of ſowing a crop of corn with the graſs ſeeds; for, wherever this has been practiſed, if the corn has ſucceded well, the graſs has been very poor and weak; ſo that if the land has not been very good, the graſs has ſcarcely been worth ſaving; for the following year it has produced but little hay, and the year after the crop is worth little, either to mow or feed. Nor can it be expected to be otherwiſe, for the ground cannot nouriſh two crops; and if there were no deficiency in the land, yet the corn, being the firſt and moſt vigourous of growth, will keep the graſs from making any conſiderable progreſs: ſo that the plants will be extremely weak, and but very thin, many of them which come up in the ſpring being deſtroyed by the corn: for whenever there are roots of corn, it cannot be expected there ſhould be any graſs. Therefore the graſs muſt be thin; and if the land is not in good heart to ſupply the graſs with nouriſhment, that the roots may branch out after the corn is gone, there cannot be any conſiderable crop of clover; and as their roots are biennial, many of the ſtrongeſt plants will periſh ſoon after they are cut; and the weak plants, which had made but little progreſs before, will be the principal part of the crop for the ſucceding year; which is many times not worth ſtanding.

Therefore, when ground is laid down for graſs, there ſhould be no crop of any kind ſown with the ſeeds; or at leaſt the crop ſhould be ſown very thin, and the land ſhould be well ploughed and cleaned from weeds, otherwiſe the weeds will come up the firſt, and grow ſo ſtrong as to overbear the graſs, and if they are not pulled up, will entirely ſpoil it. The beſt ſeaſon to ſow the graſs ſeeds upon dry land, when no other crop is ſown with them, is about the middle of September or ſooner, if there is an appearance of rain: for the ground being then warm, if there happen ſome good ſhowers of rain after the ſeed is ſown, the graſs will ſoon make its appearance, and get ſufficient rooting in the ground before winter; ſo will not be in danger of having the roots turned out of the ground by froſt, eſpecially if the ground is well rolled before the froſt comes on, which will preſs it down and fix the earth cloſe to the roots. Where this hath not been practiſed, the froſt has often looſened the ground ſo much, as to let in the air to the roots of the graſs, and done it great damage; and this has been brought as an objection to the autumnal ſowing of graſs; but it will be found to have no weight if the above direction is practiſed: nor is there any hazard of ſowing the graſs at this ſeaſon, but that of dry weather after the ſeeds are ſown; for if the graſs comes up well, and the ground is well rolled in the end of October, or the beginning of November, and repeated again the beginning of March, the ſward will be cloſely joined at bottom, and a good crop of hay may be expected the ſame ſummer. But where the ground cannot be prepared for ſowing at that ſeaſon, it may be performed the middle or latter end of March, according to the ſeaſon's being early or late; for, in backward ſprings, and in cold land, we have often ſowed the graſs in the middle of April with ſucceſs; but there is danger, in ſowing late, of dry weather, and eſpecially if the land is light and dry; for we have ſeen many times the whole ſurface of the ground removed by ſtrong winds at that ſeaſon; ſo that the ſeeds have been driven in heaps to one ſide of the field. Therefore, whenever the ſeeds are ſown late in the ſpring, it will be proper to roll the ground well ſoon after the ſeeds are ſown, to ſettle the ſurface, and prevent its being removed.

The ſorts of ſeeds which are the beſt for this purpoſe, are, the beſt ſort of upland hay-ſeeds, taken from the cleaneſt paſtures, where there are no bad weeds; if this ſeed is ſifted to clean it from rubbiſh, three buſhels will be ſufficient to ſow an acre of land. The other ſort is the *trifolium pratenſe album*, which is commonly known by the names *white Dutch clover*, or *white honeyſuckle graſs*. Eight pounds of this ſeed will be enough for one acre of land. The graſs ſeed ſhould be ſown firſt, and then the Dutch clover-ſeed may be afterwards ſown; but they ſhould not be mixed together, becauſe the clover-ſeeds being the heavieſt will fall to the bottom, and conſequently the ground will be unequally ſown.

When the ſeeds are come up, if the land ſhould produce many weeds, theſe ſhould be drawn out before they grow ſo tall as to overbear the graſs; for where this has been neglected, the weeds have taken ſuch poſſeſſion of the ground as to keep down the graſs, and ſtarve it; and when theſe weeds have been ſuffered to remain until they have ſhed their ſeeds, the land has been ſo plentifully ſtocked with them as entirely to deſtroy the graſs; therefore it is one of the principal parts of huſbandry never to ſuffer weeds to grow on the land.

If the ground is rolled two or three times at proper diſtances after the graſs is up, it will preſs down the graſs, and cauſe it to make a thicker bottom: for, as the Dutch clover will put out roots from every joint of the branches which are near the ground, ſo, by preſſing down of the ſtalks, the roots will mat ſo cloſely together, as to form a ſward ſo thick as to cover the whole ſurface of the ground, and form a green carpet, and will better reſiſt the drought. For if we do but examine the common paſtures in ſummer, in moſt of which there are patches of this white honeyſuckle graſs growing naturally, we ſhall find theſe patches to be the only verdure remaining in the fields. And this, the farmers in general acknowledge, is the ſweeteſt feed for all ſorts of cattle; yet never had any notion of propagating it by ſeed, nor has this been long practiſed in England.

As the white clover is an abiding plant, ſo it is certainly the very beſt ſort to ſow, where paſtures are laid down to remain; for as the hay-ſeeds which are taken from the beſt paſtures will be compoſed of various ſorts of graſs, ſome of which may be but annual, and others biennial; ſo, when thoſe go off, there will be many and large patches of ground left bare and naked, if there is not a ſufficient quantity of the white clover to ſpread over and cover the land. Therefore a good ſward can never be expected where this is not ſown; for in moſt of the natural paſtures, we find this plant makes no ſmall ſhare of the ſward; and it is equally good for wet and dry land, growing naturally upon gravel and clay in moſt parts of England: which is a plain indication how eaſily this plant may be cultivated to great advantage in moſt ſorts of land throughout Great Britain.

Therefore the true cauſe why the land which has been in tillage is not brought to a good turf again, in the uſual method of huſbandry, is, from the farmers not diſtinguiſhing which graſſes are annual from thoſe which are perennial: for if annual or biennial graſſes are ſown, theſe will of courſe ſoon decay; ſo that, unleſs where ſome of their ſeeds may have ripened and fallen, nothing can be expected on the land but what will naturally come up. Therefore this, with the covetous method of laying down the ground with a crop of corn, has occaſioned the general failure of increaſing the paſture in many parts of Britain, where it is now much more valuable than any arable land.

After the ground has been ſown in this manner before directed, and brought to a good ſward, the way to preſerve it good is, by conſtantly rolling the ground with a heavy roller, every ſpring and autumn, as hath been before directed. This piece of huſbandry is rarely practiſed by farmers; but thoſe who do, find their account in it, for it is of great benefit to the graſs. Another thing ſhould alſo carefully be performed, which is, to cut up docks, dandelion, knapweed, and all ſuch bad weeds, by their roots every ſpring and autumn; this will increaſe the quantity of good graſs, and preſerve the paſtures in beauty. Dreſſing of theſe paſtures every third year is alſo a good piece of huſbandry; for otherwiſe it cannot be expected the ground ſhould continue to produce good crops. Beſides this, it will be neceſſary to change the ſeaſons of mowing, and not to mow the ſame ground every year, but to mow one ſeaſon and feed the next; for where the ground is every year mown, it muſt be conſtantly dreſſed, as are moſt of the graſs grounds near London, otherwiſe the ground will be ſoon exhauſted.

PATÆCI, in mythology, images of gods which the Phœnicians carried on the prows of their gallies. Herodotus, lib. iv. calls them παταικοι. The word is Phœnician, and derived from *pethica*, i. e. *titulus*. See Bochart's Chanaan, lib. ii. cap. 3. But Scaliger does not agree. Morin derives it from πιθηκος, *monkey*, this animal having been an object of worſhip among the Egyptians, and hence might have been honoured by their neighbours. Mr Elſner has obſerved, that Herodotus does not call the patæci *gods*; but that they obtained this dignity from the liberality of Heſychius and Suidas, and other ancient lexicographers, who place them at the ſtern of ſhips; whereas Herodotus placed them at the prow. Scaliger, Bochart, and Selden have taken ſome pains about this ſubject.—Mr Morin has alſe given us a learned diſſertation on this head in the *Memoires de l'Acad. des Inſcript. & Belles Lettres*, tom. i.; but Mr Elſner thinks it defective in point of evidence.

PATAGONIA, a country of South America, comprehending all that country extending from Chili and Paraguay to the utmoſt extremity of South America; that is, from 35° almoſt to 54° of latitude: being ſurrounded by the countries juſt mentioned, the South and North Seas, and the Straits of Magellan, which ſeparate it from the iſland called *Terra del Fuego*, and extend about 116 leagues in length from ſea to ſea, but only from half a league to three or four in breadth.

This country had the name of *Terra Magellanica*, from Ferdinand Magellan, a Portugueſe officer in the ſervice of the Catholic king, who is reported to have ſailed through the ſtraits that alſo bear his name, from the North to the South Sea, in the year 1519.

The lofty mountains of the Andes, which are covered with ſnow a great part of the year, traverſing the country from north to ſouth, the air is ſaid to be much colder than in the north under the ſame parallels of latitude. Towards the north, it is ſaid to be covered with wood, and ſtored with an inexhauſtible fund of large timber; whereas, to the ſouthward, not ſo much as a ſingle tree fit for any mechanical purpoſe is to be ſeen: yet there is good paſture, and incredible numbers of wild horned cattle and horſes, which were firſt brought hither by the Spaniards, and have increaſed amazingly. Freſh water, we are told by ſome writers, is very ſcarce: but if that were really the caſe, it is difficult to conceive how the preſent inhabitants and ſuch multitudes of cattle could ſubſiſt. The eaſt coaſt is moſtly low land, with few or no good harbours: one of the beſt is Port St Julian.

Patagonia is inhabited by a variety of Indian tribes; as the Patagons, from which the country takes its name; the Pampas, the Coſſares, &c. of whom we know very little. Only it appears, from the accounts of former voyagers, lately confirmed by Commodore Byron and his crew, and the teſtimonies of other navigators, that ſome of them are of a gigantic ſtature, and clothed with ſkins; but it would ſeem that there are others who go almoſt quite naked, notwithſtanding the inclemency of the climate. Some of them alſo, that live about the Straits, if we may credit the navigators who have paſſed that way into the South Sea, are perfect ſavages: but thoſe with whom Commodore Byron and his people converſed, are repreſented as of a more gentle, humane diſpoſition; only, like other ſavages, they live on fiſh and game, and what the earth produces ſpontaneouſly.

The Spaniards once built a fort on the Straits, and left a garriſon in it, to prevent any other European nation paſſing that way into the South Sea: but moſt of the men periſhed by famine, whence the place obtained the name of *Port Famine;* and no people have attempted to plant colonies here ever ſince.

About the middle of the Strait is a promontory called *Cape Froiſard*, which is the moſt ſoutherly on the continent of South America.

On the coaſts of Patagonia lie a great number of iſlands, or cluſters of iſlands. On the weſt coaſt are the iſlands Maidre de Dios, Santa Trinidad, Santa Cruz, and the iſles of Chunians and Huillans, the Sarmientos, and many others; to the number of 80 in all, as ſome ſay. Of thoſe on the ſouth coaſt, the moſt conſiderable are *Terra del Fuego,* and *Staten Land.* See theſe articles.

A vaſt deal has been ſaid reſpecting the ſtature of the Patagonians, by people of different nations, and on various occaſions. We ſhall inſert the following letter from Mr Charles Clarke, who was on board Byron's ſhip in 1764, and gave this account to Dr Matty.

"We had not got above 10 or 12 leagues into the ſtraits of Magellan, from the Atlantic Ocean, before we ſaw ſeveral people, ſome on horſeback, ſome on foot, upon the north ſhore (continent), and with the help of our glaſſes could perceive them beckoning to us to come on ſhore, and at the ſame time obſerved to each other, that they ſeemed to be of an extraordinary ſize: However, we continued to ſtand on, and ſhould have paſſed without taking the leaſt further notice of them, could we have proceeded; but our breeze dying away, and the tide making againſt us, we were obliged to anchor; when the Commodore ordered his boat of 12 oars, and another of ſix, to be hoiſted out, manned and armed. In the firſt went the Commodore, in the other Mr Cummins, our firſt lieutenant, and myſelf. At our firſt leaving the ſhip, their number did not exceed 40; but as we approached the ſhore, we perceived them pouring down from all quarters, ſome galloping, others running, all making uſe of their utmoſt expedition. They collected themſelves into a body juſt at the place we ſteered off for. When we had got within 12 or 14 yards of the beach, we found it a diſagreeable flat ſhore, with very large ſtones, which we apprehended would injure the boats; ſo we looked at two or three different places to find the moſt convenient for landing. They ſuppoſed we deferred coming on ſhore through apprehenſions of danger from them; upon which they all threw open the ſkins which were over their ſhoulders, which was the only clothing they had, and conſequently the only thing they could ſecret any kind of arms with, and many of them lay down cloſe to the water's edge.—The Commodore made a motion for them to go a little way from the water, that we might have room to land, which they immediately complied with, and withdrew 30 or 40 yards; we then landed, and formed each man with his muſket, in caſe any violence ſhould be offered. As ſoon as we were formed, the Commodore went from us to them, then at about 20 yards diſtance: they ſeemed vaſtly happy at his going among them, immediately gathered round him, and made a rude kind of noiſe, which I believe was their method of ſinging, as their countenances beſpoke it a ſpecies of jollity. The Commodore then made a motion to them to ſit down, which they did in a circle, with him in the middle, when Mr Byron took ſome beads and ribbons; which he had brought for that purpoſe, and tied about the womens necks, with which they ſeemed infinitely pleaſed. We were ſtruck with the greateſt aſtoniſhment at the ſight of people of ſuch a gigantic ſtature, notwithſtanding our previous notice with glaſſes from the ſhip. Their body was increaſed, by the time we got in there, to the number of 500 men, women, and children. The men and women both rid in the ſame manner; the women had a kind of belt to cloſe their ſkins round the waiſt, which the men had not, as theirs were only flung over their ſhoulders, and tied with two little ſlips, cut from the ſkin, round the neck. At the time of the Commodore's motion for them to retire farther up the beach, they all diſmounted, and turned their horſes looſe, which were gentle, and ſtood very quiet. The Commodore having diſpoſed of all his preſents, and ſatisfied his curioſity, thought proper to retire; but they were vaſtly anxious to have him go up into the country to eat with them. That they wanted him to go with them to eat, we could very well underſtand by their motion, but their language was wholly unintelligible to us.—There was a very great ſmoke to which they pointed about a mile from us, where there muſt have been ſeveral fires; but ſome intervening hills prevented our ſeeing any thing but the ſmoke. The Commodore returned the compliment, by inviting them on board the ſhip; but they would not favour him with their company; ſo we embarked, and returned to the ſhip. We were with them near two hours at noon-day, within a very few yards, tho' none had the honour of ſhaking hands but Mr Byron and Mr Cummins; however, we were near enough, and long enough with them, to convince our ſenſes, ſo far as not to be cavilled out of the very exiſtence of thoſe ſenſes at that time, which ſome of our countrymen and friends would abſolutely attempt to do. They are of a copper colour, with long black hair, and ſome of them are certainly nine feet, if they do not exceed it. The Commodore, who is very near ſix feet, could but juſt reach the top of one of their heads, which he attempted on tip-toes, and there were ſeveral taller than him, on whom the experiment was tried. They are prodigious ſtout, and as well and as proportionably made as ever as I ſaw people in my life. That they have ſome kind of arms among them, is, I think, indiſputable, from their taking methods to convince us they had none at that time about them. The women, I think, bear much the ſame proportion to the men as Europeans do; there was hardly a man there leſs than eight feet, moſt of them conſiderably more. The women I believe, run from ſeven and an half to eight feet.—Their horſes were ſtout and bony, but not remarkably tall; they are in my opinion, from 15 to 15½ hands. They had a great number of dogs, about the ſize of a middling pointer, with a fox noſe. They continued on the beach till we got under way, which was two hours after we got on board. I believe they had ſome expectations of our returning again; but as ſoon as they ſaw us getting off, they betook themſelves to the country.

"The country of Patagonia is rather hilly, though not remarkably ſo. You have here and there a ridge of hills, but no very high ones. We lay ſome time at Port Deſire, which is not a great way to the northward of the Straits, where we traverſed the country many miles round. We found fire-brands in different places, which convinced us there had been people, and we ſuppoſe them to have been the Patagonians. The ſoil is ſandy, produces nothing but a coarſe harſh graſs, and a few ſmall ſhrubs, of which Sir John Naborough remarked, he could not find one of ſize enough to make the helve of an hatchet; which obſervation we found very juſt. It was ſome time in the winter we made this viſit to our gigantic friends. I am debarred being ſo particular as I could wiſh, from the loſs of my journals, which were demanded by their Lordſhips of the Admirality immediately upon our return."

That the whole of this account is true, we cannot aſſert; but that the writer has been miſled in ſome reſpects, and miſinformed with regard to ſome of his facts, is at leaſt probable: for Captain Wallis, who went out to the Straits of Magellan after Byron's return, gives a different turn to many of the obſervations; and with reſpect to the ſtature of the people, he differs very materially. We ſhall give the following epitome of his remarks on what occurred to him—He had three ſhips with him, which entered the Straits on the 16th December 1766, and came to an anchor in a bay ſouth of Cape Virgin Mary, where they were immediately accoſted by a whole troop of Patagonians, who made ſigns for them to come on ſhore. The Captain, having made previous diſpoſitions for the ſecurity of his men in caſe of an attack, manned all the boats belonging to the three ſhips, and with a party of marines landed on the beach where thoſe giants had aſſembled. The commanders of the three ſhips, and moſt of their officers, were of this party. On their leaping aſhore, the Indians ſeemed to welcome them; and being by ſigns deſired to retreat, they all fell back, and made room for the marines to form. When they were drawn up, Captain Wallis advanced, and by ſigns directed the Indians to ſeat themſelves in a ſemicircle, which they readily underſtood and obeyed. He then diſtributed among them knives, ſciſſars, buttons, beads, combs, and particularly ribbons, with which he complimented the women, who received them with a mixture of pleaſure and reſpect. He then gave them to underſtand that he had ſtill more valuable articles to beſtow, and ſhowed them axes and bill-hooks; but, at the ſame time, pointed to ſome guanicoes and oſtriches, intimating that he expected ſome of thoſe in return: but they either did not, or would not, underſtand him; ſo that no traffic took place.

The whole company that were aſſembled on this occaſion, had each a horſe, with a ſaddle and bridle. The ſaddle had a ſort of ſtirrups, and the bridle was made of thongs of leather very well put together, for the purpoſe of guiding the horſes. The women, as well as the men, rode aſtride. The men, in general, wore each a wooden ſpur; but one of them had a large pair of Spaniſh ſpurs, braſs ſtirrups, and a Spaniſh ſcimitar. Their horſes were nimble and ſpirited, but ſmall in proportion to their riders, ſeemingly not above 14 hands high. Their dogs were of the Spaniſh breed. The Captain having purpoſely provided himſelf with meaſuring rods, found that the talleſt man among them meaſured only ſix feet ſeven inches high: ſeveral were within an inch or two as tall; but the ordinary ſize was from five feet ten inches to ſix feet. It is a pity that none of our voyagers thought of meaſuring the whole ſize of one of thoſe gigantic men. They tell us, indeed, that they are well made, that they are proportionally large, and that they are robuſt and bony: but they give us no criterion to judge of their bulk, nor one inſtance of their extraordinary ſtrength. As they are repreſented not only peaceable, but remarkably tractable, ſome trials might have been made of the weight they could have lifted, and how much they could exceed in that reſpect the ſtrongeſt man in the ſhips. This in a great meaſure would have determined the point, which is yet left doubtful by the different relations that are given by the different voyagers who have ſeen theſe people, no two of them agreeing in the ſame deſcription. All agree, however, that their hair is black, and harſh like briſtles; that they are of a dark-copper colour, and that their features are rather handſome than ugly; that they clothe themſelves decently with the ſkins of gaunicoes; that they paint themſelves variouſly; and there is reaſon to ſuſpect, that by that variety they diſtinguiſh their tribes. Thoſe ſeen by Commodore Byron were painted round both eyes, no two of them alike; thoſe ſeen by Captain Wallis had only a red circle round the left eye; and thoſe ſeen by Bougainville had no circle round the eyes, but had their cheeks painted red. This may account for the different reports of voyagers concerning their ſtature: it is not impoſſible, nay, it is very probable, that they may vary in this particular, according to their tribes; as is ſeen in the Highlands of Scotland, where one clan of the Campbells is remarkably tall, and another of the Fraſers remarkably ſhort. Were it not for ſome ſuch natural diſcrimination, there could not be ſo wide a difference in the deſcriptions of gentlemen, who, having no ends to ſerve either in falſifying one another's reports, or in impoſing upon the public, cannot be ſuppoſed to miſtake willfully.

One remarkable obſervation made by our voyagers muſt not be omitted; and that is, that though our people could diſtinguiſh but one word of their language, which the Engliſh pronounce *chewow*, and the French *ſhawa*, yet the Patagonians could repeat whole ſentences after our men more diſtinctly than almoſt any European foreigner of what nation ſoever. This appears the more ſingular, as, among the iſlanders between the Tropics, it was hardly poſſible to make them articulate any of our words. Sydney Parkinſon, in a ſpecimen he has given us, ſays, that though the Engliſh remained at Otaheitee three months, the neareſt the natives could approach the ſound of *Cook* was *Toote; Banks*, *Opane; Solander*, *Tolano; Gore*, *Towara; Monkhouſe*, *Mata;* and ſo of the reſt: whereas the Patagonians preſently got by heart this ſentence of invitation, *Come aſhore, Engliſhmen!* which they ſhowed they well underſtood, by repeating it afterwards whenever the ſhips came ſo near the ſhore as to be within call.

Another very remarkable particular is, that they had none of the characters of a ferocious people; there was no offenſive weapon among them, except the ſcimitar already mentioned. The men, indeed, had a kind of ſling, which they uſe in hunting, conſiſting of two round ſtones of about a pound weight each, connected together by a thong. Theſe ſtones were faſtened to the extremities of the thong; and, when they threw them, they held one ſtone in the hand, and ſwung the other about the head. "They are ſo expert in the management of this double-headed ſhot (ſays the writer of the voyage), that they will hit a mark not bigger than a ſhilling with both theſe ſtones at the diſtance of fifteen yards; but their method of availing themſelves of their dexterity againſt the guanicoe and oſtrich is, to fling the ſtones ſo as to entangle their legs, by which means they are retarded in their flight, and eaſily overtaken. Bougainville ſpeaks of theſe ſlings as common among other Indian nations in South America; but we do not remember to have ſeen this aſſertion confirmed by any other voyager.

Theſe people certainly dreſs differently as well as paint differently; for the dreſs deſcribed by Bougainville is very unlike the dreſs of thoſe ſeen by the Engliſh voyagers. Captain Wallis invited ſome of them on board his ſhip: but, among all the wonders that were ſhown them, none ſeemed to attract their notice ſo much as the looking-glaſſes: they looked in the glaſſes and at each other; they laughed and gazed, and gazed again and laughed; in ſhort, there was no end to their merriment when in poſſeſſion of this article of curioſity. They eat whatever was given them, but would drink nothing but water. In this they differ from all the tribes of Indians in North America, who are immoderately fond of ſpirituous liquors. They admired the European ſheep, hogs, and poultry; but did not ſeem over-deſirous of any thing they ſaw except clothes. When the marines were exerciſed to entertain them, they appeared diſconcerted; an old man among them made ſigns, by ſtriking his breaſt, and tumbling down and lying as if he had been dead upon deck, that he knew the effect of their guns; and none of them ſeemed eaſy till the firing was over. When the Captain had ſatisfied his own curioſity, and, as he imagined, theirs, he gave them to underſtand, that he was going to ſail, and that they muſt depart; which they were very unwilling to do. However, having given each of them a canvas bag, with ſome needles ready threaded, a knife, a pair of ſciſſars, a few beads, a comb, and a looking-glaſs, he diſmiſſed them, with great reluctance on their part, particularly on that of the old man's, who by very ſignificant ſigns expreſſed his deſire to ſtay till ſunſet.

PATAGONULA, in botany; a genus of the monogynia order, and of the pentandria claſs of plants. The characters are theſe: the cup is an extremely ſmall perianthium, divided into five ſegments, and remains after the flower is fallen; the flower conſiſts of a ſingle petal, with almoſt no tube, the margin of which is divided into five acute oval ſegments; the ſtamina are five filaments of the length of the flower; the antheræ ſimple; the germen of the piſtil is oval and pointed; the ſtyle is ſlender and ſlightly bifid, its ramifications are alſo bifid; this is of the ſame length with the ſtamina, and remains when the flower is fallen, the ſtigmata are ſimple; the fruit is an oval and pointed capſule, ſtanding on a large cup, made up of five long ſegments emarginated or rimmed round their edges; the ſeeds of this plant are yet unknown; but the conſtruction of the cup, in which the capſule ſtands, is alone a ſufficient diſtinction for this genus. There is but a ſingle ſpecies.

PATAN, a kingdom of Aſia, in the Eaſt Indies, and in the peninſula of Malacca, and on the eaſtern coaſt between the kingdoms of Siam and Paha. The inhabitants are partly Mahometans and partly Gentoos; but they are all very voluptuous. The air is wholeſome, though very hot; and they have no ſeaſons but the winter and ſummer. The former is more properly the rainy ſeaſon; and contains the months of November, December, and January. The woods are full of elephants and many wild animals. Some voyagers pretend that this country is governed by a queen, who never marries, but may have as many gallants as ſhe pleaſes. They have ſome trade with the Chineſe; and the principal town is of the ſame name, which is one of the ſtrongeſt in theſe parts, having a well defended harbour.

PATAN; a town of Aſia, and capital of a province of the ſame name, in the dominions of the Great Mogul; it is very little known. E. Long. 109. 0. N. Lat. 27. 30.

PATAVINITY, among critics, denotes a peculiarity of Livy's diction, derived from Patavium or Padua, the place of his nativity; but wherein this patavinity conſiſts, they are by no means agreed.

Aſinius Pollio, according to Quintilian, taxed Livy with patavinity. But what he meant by this cenſure we believe no man can ſay. Morhof believes it to be a ſingular turn of expreſſion, and ſome phraſes peculiar to the Paduеſe. All we certainly know about it is, that it was a fault in the language of Livy, not in the ſentiments or manners. In all probability it is one of thoſe delicacies that are loſt in a dead language. Dan. Georg. Morhof publiſhed a treatiſe *De Patavinitate Liviana*, at Kiel, 1685, where he explains, very learnedly, the urbanity and peregrinity of the Latin tongue.

PATARA, (Livy, Mela); the capital of Lycia, to the eaſt of the mouth of the river Xanthus; famous for a temple and oracle of Apollo, thence called *Patareus*, three ſyllables only; but *Partaræus* (Horace). For the ſix winter months, Apollo gave anſwers at Patara; and for the ſix ſummer at Delos, (Virgil, Servius): theſe are the *Lyciæ Sortes* of Virgil. The town was ſituated in a peninſula, called *Liciorum Cherſoneſus*, (Stephanus). Acts xxi. 1. St Paul in his paſſage from Philippi to Jeruſalem, came to Miletus, hence to Coos, then to Rhodes, and from Rhodes, to Patara; where having found a ſhip that was bound for Phœnicia, he went on board and arrived at Jeruſalem, to be at the feaſt of Pentecoſt.

PATAVIUM (Tacitus, Strabo), a town of the Tranſpadana, ſituated on the left or north bank of the Medoacus Minor; founded by Antenor the Trojan, (Mela, Virgil, Seneca); *Patavini*, the people, (Livy); who himſelf was a native, and by Aſinius Pollio charged with pativinity. Now *Padua*, in the territory and to the weſt of Venice. W. Long. 12. 15. N. Lat. 45. 30.

PATAY, a town of France, in the province of Orleannois, remarkable for the defeat of the Engliſh in 1429, and where Joan of Arc did wonders. E. Long. 1. 43. N. Lat. 48. 5.

PATE, in fortification, a kind of platform, reſembling what is called an *horſe's ſhoe*.

PATEE, or PATTEE, in heraldry, a croſs, ſmall in the centre, and widening to the extremities, which are very broad.

PATELLA, or KNEE-PAN, in anatomy. See there, n° 59.

PATELLA, or LIMPET, a genus of inſects belonging to the order of vermes teſtacea; the animal being of the ſnail kind. The ſhells are of that claſs which is called *univalves*; they have no *contour*, and are in the form of little pointed cones. They are always attached to ſome hard body. Their ſummit is ſometimes acute, ſometimes obtuſe, flatted, turned back, or perforated. The rock or other hard body to which they are always found adhering, ſerves as a kind of ſecond or under ſhell to preſerve them from injury; and for this reaſon Aldrovandus and Rondelet have claſſed them among the bivalves; but in this error they have not been followed by any other writer. Fabius Columna diſtinguiſhes four ſorts of the lepas or limpets: *lepas vulgaris*, a ſort very common at Naples, of an oval figure and aſh colour. *Lepas major exotica*, which comes from Spain, the ſhell is hard, thick, and ribbed in angles, and the rim is denticulated. The *lepas agrea*, or *ſylveſtris*, which is a ſmall ſhell, irregularly oval, of an aſh colour, marked with radii and zones croſſing each other, and perforated at the top by an aperture which ſerves the fiſh for a vent. And the *patella regalis*, *quia regis menſa ſit digna*; this is of a mother-of-pearl colour within, and is ribbed and perforated in many places: theſe ſhells have been found on the back of the ſea-tortoiſe, or turtle, and on a large pinna marina. The diſtinguiſhing mark or characteriſtic of the lepas is to have but one convex ſhell, which adheres by its rim to a rock, or ſome other hard ſubſtance. There are 36 ſpecies of this genus, which are principally diſtinguiſhed by peculiarities in their ſhells. Of ſome of theſe ſhells we have given engravings in Plate CCCLXXXII. of which we add the following deſcription:

The limpet marked 1. has large yellow furrows and ridges from the centre to the circumference, which is indented; the eye is perfectly white, and ſhaped like a nipple.

That marked 2. is perfectly ſmooth, but radiated with brown ſtreaks, and perforated in the ſummit.

Fig. 3. is ribbed, and indented at the circumference; its coat is ſpotted with brown, in a zig-zag form, and its eye is of a ruby colour.

Fig. 4. is a ſmall brown ſhell, the ribs or ſtriæ of which are armed with ſmall white points.

Fig. 5. is ſtriated with radii, reaching from the eye to the circumference, which are croſſed by other ſtreaks nearly parallel to the circumference; it is of the uſual colour, and its eye is perforated.

Fig. 5. This is white, ſhaped ſomething like an hand-bell, and has within a protuberance ſomewhat reſembling a clapper.

Fig 7. is a ſeven-ſided limpet, divided at each angle by ridges from the ſummit, which form a ſtar on a white ground, variegated with black ſpots.

Fig. 8. is a ſmall ribbed ſhell, of a brown colour, and rough; it has a chamber, and a beak faſhioned eye placed at one of its extremities.

Fig. 9. is the fineſt ſhell of this ſpecies: its ſize, the fine mother of pearl colour on the inſide, and the beauty of its red ſpots without, which have the appearance of tortoiſe ſhell, give it the pre-eminence over all others. It is called the *Tortoiſe ſhell buckler*.

The wild limpet, or patella fera, is a name very improperly applied by Rondilitius and Aldrovand to the *aures marinæ*, or *chonca veneris*, which certainly is not of the patella kind.

PATELLA, in the Hiſtory of Inſects, a name given by Liſter and other authors to a little huſk or ſhell, found on the bark of the cherry, plum, roſe, and other trees, containing an animal within, and uſeful in colouring. Theſe patellæ are of the form of globes, except when they adhere to the tree, and are for the moſt part of a ſhining cheſnut colour. The huſk itſelf ſtrikes a very fine crimſon colour on paper, and within it is found a white maggot which is of no value: this, in time hatches into a very ſmall but beautiful bee. The ſize of this bee is about half that of an ant. They have a ſting like bees, and three ſpots placed in a triangle on the forehead, which are ſuppoſed to be eyes. They are of a black colour, and have a large round whitiſh or pale yellow ſpot on the back. The upper pair of wings are ſhaded and ſpotted, but the under pair are clear. It might be worth while to try the ſhells or huſks in order to diſcover whether the colour they yield might not be uſeful. It is to be remarked, that the deepeſt coloured huſks afford the fineſt and deepeſt purple; they muſt be uſed while the animal in them is in the maggot-form; for when it is changed into the bee ſtate the ſhell is dry and colourleſs. Liſter, who firſt obſerved theſe patellæ, went ſo far on comparing them with the common kermes, as to aſſert that they were of the ſame nature with that production: but his account of their being the workmanſhip of a bee, to preſerve her young maggot in, is not agreeable to the true hiſtory of the kermes; for that is an inſect of a very peculiar kind. He has in other inſtances been too juſtly cenſured for his precipitancy of judging of things, and perphaps has fallen into an error by means of it here. It is very poſſible that theſe pattellæ may be the ſame ſort of animals with the kermes, but then it produces its young within this ſhell or huſk, which is no other than the ſkin of the body of the mother animal; but as there are many flies whoſe worms or maggots are lodged in the bodies of other animals, it may be that this little bee may love to lay its egg in the body of the proper inſect, and the maggot hatched from that egg may eat up the proper progeny, and, undergoing its own natural changes there, iſſue out at length in form of the bee. This may have been the caſe in ſome few which Dr Liſter examined; and he may have been miſled by this to ſuppoſe it the natural change of the inſect.

PATENT, in general, denotes ſomething that ſtands open or expanded: thus a leaf is ſaid to be a patent, when it ſtands almoſt at right angles with the ſtalk.

PATENT, or *Letters Patent*. See LETTER.

PATER NOSTER, the *Lord's Prayer*, ſo called from the two firſt words thereof in Latin.

PATER Noſter, iſlands of Aſia, in the Eaſt Indian ſea, ſo called becauſe of the great number of rocks, which ſailors have likened to the beads with which the Papiſts tell their pater noſter. They abound in corn and fruits, and are very populous.

PATER Patratus, was the name of the firſt and principal perſon the college of heralds called *Feciales*. Some ſay the Pater Patratus was a conſtant officer and perpetual chief of that body; and others ſuppoſe him to have been a temporary miniſter, elected upon account of making peace or denouncing war, which were both done by him. See FECIALES.

PATERA, among antiquaries, a goblet or veſſel uſed by the Romans in their ſacrifices; wherein they offered their conſecrated meats to the gods, and wherewith they made libations. See SACRIFICE and LIBATION.

The word is Latin, formed from *pateo*, "I am open;" *quod pateat*, "becauſe it has a great aperture;" in contradiſtinction to bottles, &c. which have only narrow necks, or whoſe aperture is leſs than the body of the veſſel.

On medals the patera is ſeen in the hands of ſeveral deities; and frequently in the hands of princes, to mark the ſacerdotal authority joined with the imperial, &c.

Hence F. Joubert obſerves, that beſide the patera, there is frequently an altar upon which the patera ſeems to be pouring its contents.

The patera was of gold, ſilver, marble, braſs, glaſs, or earth; and they uſed to incloſe it in urns with the aſhes of the deceaſed, after it had ſerved for the libations of the wine and liquors at the funeral.

The patera is an ornament in architecture, frequently ſeen in the Doric freeze, and the tympans of arches; and they are ſometimes uſed by themſelves, to ornament a ſpace; and in this caſe it is common to hang a ſtring of huſks or drapery over them: ſometimes they are much enriched with foliage, and have a maſk or head in the centre.

PATERCULUS (Caius Velleius), an ancient Roman hiſtorian, who flouriſhed in the reign of Tiberius Cæſar, was born in the year of Rome 735. His anceſtors were illuſtrious for their merit and their offices. His grandfather eſpouſed the party of Tiberius Nero, the emperor's father; but being old and infirm, and not able to accompany Nero when he retired from Naples, he ran himſelf through with his ſword. His father was a ſoldier of rank, and ſo was Paterculus himſelf. He was a military tribune when Caius Cæſar, a grandſon of Auguſtus, had an interview with the king of the Parthians, in an iſland of the river Euphrates, in the year 753. He commanded the cavalry in Germany under Tiberius; and accompanied that prince for nine years ſucceſſively in all his expeditions. He received honourable rewards from him; but we do not find that he was preferred to any higher dignity than the prætorſhip. The praiſes he beſtows upon Sejanus give ſome probability to the conjecture, that he was looked upon as a friend of this favourite, and conſequently that he was involved in his ruin. His death is placed by Mr Dodwell in the year of Rome 784, when he was in his 50th year.

He wrote an Abridgement of the Roman Hiſtory in two books, which is very curious. His purpoſe was only to deduce things from the foundation of Rome to the time wherein he lived; but he began his work with things previous to that memorable era: for, though the beginning of his firſt book is wanting, we yet find in what remains of it, an account of many cities more ancient than Rome. He promiſed a larger hiſtory; and no doubt would have executed it well; for during his military expeditions he had ſeen, as he tells us, the provinces of Thrace, Macedonia, Achaia, Aſia Minor, and other more eaſterly regions; eſpecially upon the ſhores of the Euxine ſea, which had furniſhed his mind with much entertaining and uſeful knowledge. In the Abridgement which we have, many particulars are related that are no where elſe to be found; and this makes it the more valuable. The ſtyle of Paterculus, though miſerably diſguiſed through the careleſſneſs of tranſcribers, and impoſſible to be reſtored to purity for want of manuſcripts, is yet manifeſtly worthy of his age, which was the time of pure Latinity. The greateſt excellence of this hiſtorian lies in his manner of commending and blaming thoſe he ſpeaks of; which he does in the fineſt terms and moſt delicate expreſſions. He is, however, condemned, and indeed with the greateſt reaſon, for his partiality to the houſe of Auguſtus; and for making the moſt extravagant eulogies, not only upon Tiberius, but even upon his favourite *Sejanus*: whom, though a vile and cruel monſter, Paterculus celebrates as one of the moſt excellent perſons the Roman commonwealth had produced. Lipſius, though he praiſes him in other reſpects, yet cenſures him moſt ſeverely for his inſincerity and partiality. "Velleius Paterculus (ſays he) raiſes my indignation: he repreſents Sejanus as endowed with all good qualities. The impudence of this hiſtorian! But we know that he was born, and died, to the deſtruction of mankind. After many commendations, he concludes, that Livia was a woman more reſembling the gods than men: and as to Tiberius, he thinks it a crime to ſpeak otherwiſe of him than as of an immortal Jove. What ſincere and honeſt mind can bear this? On the other hand, how artfully does he everywhere conceal the great qualities of Cæſar Germanicus! how obliquely does he ruin the reputation of Agrippina and others, whom Tiberius was thought to hate! In ſhort, he is nothing but a court-proſtitute. You will ſay, perhaps, it was unſafe to ſpeak the truth at thoſe times: I grant it; but if he could not write the truth he ought not to have written lies: none are called to account for ſilence." La Mothe le Vayer has made a very juſt remark upon this occaſion: "The ſame fault (ſays he) may be obſerved in many others, who have written the hiſtory of their own times, with a deſign to be publiſhed while they lived."

It is ſtrange, that a work ſo elegant and worthy to be preſerved, and of which, by reaſon of its ſhortneſs, copies might be ſo eaſily taken, ſhould have been ſo near being loſt. One manuſcript only has had the luck to be found, as well of this author among the Latins as of Heſychius among the Greeks: in which, ſays a great critic of our own nation, "The faults of the ſcribes are found ſo numerous, and the defects ſo beyond all redreſs, that notwithſtanding the pains of the learned and moſt acute critics for two whole centuries, theſe books ſtill are, and are like to continue, a mere heap of errors." No ancient author but Priſcian makes mention of Paterculus: the moderns have done him infinitely more juſtice, and have illuſtrated him with notes and commentaries. He was firſt publiſhed, from the manuſcript of Morbac, by Rhenanus, at Baſil in 1520: afterwards by Lipſius at Leyden in 1581; then by Gerard Voſſius in 1639; next by Boeclerus at Straſburg in 1642: then by Thyſius and others; and laſtly, by Peter Burman at Leyden, 1719, in 8vo. To the Oxford edition in 1693, 8vo, were prefixed the *Annales Velleiani* of Mr Dodwell, which ſhow deep learning and a great knowledge of antiquity.

PATH, in general, denotes the courſe or track marked out or run over by a body in motion.

For the path of the moon, &c. ſee Astronomy, n° 359, 360.

PATHETIC, whatever relates to the paſſions, or that is proper to excite or awake them. The word comes from the Greek παθος, *paſſion* or *emotion*. See Passion.

Pathetic, in muſic, ſomething very moving, expreſſive, or paſſionate; capable of exciting pity, compaſſion, anger, or other paſſions. Thus we ſpeak of the pathetic ſtyle, a pathetic figure, pathetic ſong, &c. The chromatic genus, with its greater and leſſer ſemitones, either aſcending or deſcending, is very proper for the pathetic; as is alſo an artful management of diſcords; with a variety of motions, now briſk, now languiſhing, now ſwift, now ſlow.

Nieuwentyt ſpeaks of a muſician at Venice who ſo excelled in the pathetic, that he was able to play any of his auditors into diſtraction: he ſays alſo, that the great means he made uſe of was the variety of motions, &c.

PATHOGNOMONIC, among phyſicians, an appellation for a ſymptom, or concourſe of ſymptoms, that are inſeparable from a diſtemper, and are found in that only, and in no other.

PATHOLOGY, that part of medicine which explains the nature of diſeaſes, their cauſes and ſymptoms. See Medicine.

PATHOS, a Greek term, literally ſignifying paſſion.

PATHROS, a city and canton of Egypt, of which the prophets Jeremiah and Ezekiel make mention; Jerem. xliv. 1. 15. Ezek. xxix. 14. xxx. 14. We do not very well know its ſituation, though Pliny and Ptolemy the geographer ſpeak of it by the name of Phaturis; and it appears to have been in Upper Egypt. Iſaiah (xii. 2.) calls it Pathros; and it is the country of the Pathruſim, the poſterity of Mizraim, of whom Moſes ſpeaks, Gen. x. 14. Ezekiel threatens them with an entire ruin. The Jews retired thither notwithſtanding the remonſtrances of Jeremiah; and the Lord ſays by Iſaiah, that he will bring them back from thence.

PATIENCE, that calm and unruffled temper with which a good man bears the evils of life, from a conviction that they are at leaſt permitted, if not ſent, by the beſt of Beings, who makes all things work together for good to thoſe who love and fear him.

The evils by which life is embittered may be reduced to theſe four: 1. Natural evils, or thoſe to which we are by nature ſubject as men, and as periſhable animals. The greateſt of theſe are, the death of thoſe whom we love, and of ourſelves. 2. Thoſe from which we might be exempted by a virtuous and prudent conduct, but which are the inſeparable conſequences of imprudence or vice, which we ſhall call puniſhments; as infamy proceeding from fraud, poverty from prodigality, debility and diſeaſe from intemperance. 3. Thoſe by which the fortitude of the good are exerciſed; ſuch as the perſecutions raiſed againſt them by the wicked. To theſe may be added, 4. The oppoſition againſt which we muſt perpetually ſtruggle, ariſing from the diverſity of ſentiments, manners, and characters of the perſons among whom we live.

Under all theſe evils patience is not only neceſſary but uſeful: it is neceſſary, becauſe the laws of nature have made it a duty, and to murmur againſt natural events is to affront providence; it is uſeful, becauſe it renders our ſufferings lighter, ſhorter, and leſs dangerous.

Is your reputation ſullied by invidious calumnies? rejoice that your character cannot ſuffer but by falſe imputations. You are arraigned in a court of judicature; and are unjuſtly condemned: paſſion has influenced both your proſecutor and your judge, and you cannot forbear repining that you ſuffer although in-

Patience.

nocent. But would it have been better that you ſhould have ſuffered being guilty? Would the greateſt misfortune that can befal a virtuous man be to you a conſolation? The opulence of a villain, the elevated ſtation to which he is raiſed, and the honours that are paid to him, excite your jealouſy, and fill your boſom with repinings and regret. What! ſay you, are riches, dignity, and power, reſerved for ſuch wretches as this? Ceaſe theſe groundleſs murmurs. If the poſſeſſions you regret were real benefits, they would be taken from the wicked and transferred to you. What would you ſay of a ſucceſsful hero, who having delivered his country, ſhould complain that his ſervices were ill requited, becauſe a few ſugar-plums were diſtributed to ſome children in his preſence, of which they had not offered him a ſhare? Ridiculous as this would appear, your complaints are no better ſounded. Has the Lord of all no reward to confer on you but periſhable riches and empty precarious honour?

It is fancy, not the reaſon of things, that makes life ſo uneaſy to us. It is not the place nor the condition, but the mind alone, that can make any body happy or miſerable.

He that values himſelf upon conſcience, not opinion, never heeds reproaches. When we are evil ſpoken of, if we have not deſerved it, we are never the worſe; if we have, we ſhould mend.

Tiberius the Roman emperor, at the beginning of his reign, acted in moſt things like a truly generous, good natured, and clement prince. All ſlanderous reports, libels, and lampoons upon him and his adminiſtration, he bore with extraordinary patience; ſaying, "That in a free ſtate the thoughts and tongues of every man ought to be free:" and when the ſenate would have proceeded againſt ſome who had publiſhed libels againſt him, he would not conſent to it; ſaying, "We have not time enough to attend to ſuch trifles; if you once open a door to ſuch informations, you will be able to do nothing elſe; for under that pretence every man will revenge himſelf upon his enemies by accuſing them to you." Being informed that one had ſpoken detractingly of him: "If he ſpeaks ill of me," ſays he, "I will give him as good an account of my words and actions as I can; and if that is not ſufficient, I will ſatisfy myſelf with having as bad an opinion of him as he has of me." Thus far even Tiberius may be an example to others.

Men will have the ſame veneration for a perſon that ſuffers adverſity without dejection, as for demoliſhed temples, the very ruins whereof are reverenced and adored.

A virtuous and well-diſpoſed perſon, is like to good metal; the more he is fired, the more he is refined; the more he is oppoſed, the more he is approved: wrongs may well try him and touch him, but cannot imprint in him any falſe ſtamp.

The man therefore who poſſeſſes this virtue (patience), in this ample ſenſe of it, ſtands upon an eminence, and ſees human things below him: the tempeſt indeed may reach him; but he ſtands ſecure and collected againſt it upon the baſis of conſcious virtue, which the ſevereſt ſtorms can ſeldom ſhake, and never overthrow.

Patience, however, is by no means incompatible with ſenſibility, which, with all its inconveniences, is to be cheriſhed by thoſe who underſtand and wiſh to maintain the dignity of their nature. To feel for others, diſpoſes us to exerciſe the amiable virtue of charity, which our religion indiſpenſably requires. It conſtitutes that enlarged benevolence which philoſophy inculcates, and which is indeed comprehended in Chriſtian charity. It is the privilege and the ornament of man; and the pain which it cauſes is abundantly recompenſed by that ſweet ſenſation which ever accompanies the exerciſe of beneficence.

Patience ‖ Patin.

To feel our own miſery with full force is not to be deprecated. Affliction ſoftens and improves the heart. Tears, to ſpeak in the ſtyle of figure, fertilize the ſoil in which the virtues grow. And it is the remark of one who underſtood human nature, that the faculties of the mind, as well as the feelings of the heart, are meliorated by adverſity.

But in order to promote theſe ends, our ſufferings muſt not be permitted to overwhelm us. We muſt oppoſe them with the arms of reaſon and religion; and to expreſs the idea in the language of the philoſopher, as well as the poet, of Nature, every one, while he is compelled to feel his misfortunes like a man, ſhould reſolve alſo to bear them like a man.

Reſign'd in ev'ry ſtate,
With patience bear, with prudence puſh, your fate;
By ſuffering well our fortune we ſubdue,
Fly when ſhe frowns, and when ſhe calls purſue.

PATIGUMO (a corruption of the words *pate-de-guimauve*); the name of a ſort of paſte or cakes much uſed on the continent as an agreeable and uſeful remedy for catarrhal defluxions, and ſuppoſed by Dr Percival to conſiſt of gum-arabic combined with ſugar and the whites of eggs (See the article Hunger, p. 715, col. 1.) But we have been informed that the powdered ſubſtance of the marſhmallow is the chief ingredient of the compoſition.

PATIN (Guy), profeſſor of phyſic in the royal college of Paris, was born in 1602. He made his way into the world merely by the force of his genius, being at firſt corrector of a printing-houſe. He was a man of great wit and erudition: he ſpoke with the gravity of a Stoic, but his expreſſions were very ſatirical. He hated bigotry, ſuperſtition, and knavery; had an upright ſoul, and a well-diſpoſed heart. He was a moſt tender father, courteous to every body, and polite in the higheſt degree. He died in 1672, and did not owe his reputation to any writings publiſhed in his lifetime upon phyſic; but his letters which appeared after his death have rendered his name very famous. He left a ſon mentioned in the enſuing article.

Patin (Charles), who made a great figure in the world, and excelled in the knowledge of medals. He was born in Paris in 1633; and made ſo ſurpriſing a progreſs, that he maintained theſes in Greek and Latin, on all parts of philoſophy, in 1647. He ſtudied the law in compliance to an uncle, and was admitted an advocate in the parliament of Paris; but could not lay aſide that of phyſic, for which he always had an inclination. He therefore quitted the law, and devoted himſelf to phyſic; in which, after taking the doctor's degree, he applied himſelf to practice with great ſucceſs. He afterwards travelled into Germany, Holland, England, Switzerland, and Italy. In 1676 he was

appointed

Patkul.

appointed profeſſor of phyſic in Padua; and three years after was created a knight of St Mark. He died in that city in 1694. His works are many, and well known to the learned world. His wife too, and his daughters, were authoreſſes.

PATKUL (John Reinhold), was born of a noble family in Livonia, a northern province belonging to the crown of Sweden. The Livonians having been ſtript of their privileges, and great part of their eſtates, by Charles XI. Patkul was deputed to make their complaint; which he did with ſuch eloquence and courage, that the king, laying his hand upon his ſhoulder, ſaid, 'You have ſpoken for your country as a brave man ſhould, and I eſteem you for it."

Charles, however, who added the baſeneſs of hypocriſy to the ferocity of a tyrant, was determined to puniſh the zeal and honeſty which he thought fit to commend; and a few days afterwards cauſed Patkul to be declared guilty of high treaſon, and condemned to die. Patkul, however, found means to eſcape into Poland, where he continued till Charles was dead. He hoped that his ſentence would have been then reverſed, as it had been declared unjuſt even by the tyrant that procured it: but being diſappointed in this expectation, he applied to Auguſtus king of Poland, and ſolicited him to attempt the conqueſt of Livonia from the Swedes; which, he ſaid, might be eaſily effected, as the people were ready to ſhake off their yoke, and the king of Sweden was a child incapable of compelling their ſubjection.

Auguſtus poſſeſſed himſelf of Livonia in conſequence of this propoſal; and afterwards, when Charles XII. entered the province to recover it, Patkul commanded in the Saxon army againſt him. Charles was victorious; and Patkul, ſome time afterwards, being diſguſted at the haughty behaviour of General Fleming, Auguſtus's favourite, entered into the ſervice of the Czar, with whom Auguſtus was in ſtrict alliance, and a little before Charles compelled Auguſtus to abdicate the throne of Poland, and his ſubjects to elect Staniſlaus in his ſtead. The Czar ſent Patkul, with the title of his ambaſſador, into Saxony, to prevail with Auguſtus to meet him at Grodno, that they might confer on the ſtate of their affairs. This conference took place; and immediately afterwards the Czar went from Grodno to quell a rebellion in Aſtracan. As ſoon as the Czar was gone, Auguſtus, to the ſurprize of all Europe, ordered Patkul, who was then at Dreſden, to be ſeized as a ſtate criminal. By this injurious and unprecedented action, Auguſtus at once violated the law of nations, and weakened his own intereſt; for Patkul was not only an ambaſſador, but an ambaſſador from the only power that could afford him protection. The cauſe, however, was this: Patkul had diſcovered that Auguſtus's miniſters were to propoſe a peace to Charles upon any terms; and had therefore formed a deſign to be beforehand with them, and procure a ſeparate peace between Charles and his new maſter the Czar. The deſign of Patkul was diſcovered; and, to prevent its ſucceſs, Auguſtus ventured to ſeize his perſon, aſſuring the Czar that he was a traitor, and had betrayed them both.

Patkul.

Auguſtus was ſoon after reduced to beg a piece of Charles at any rate; and Charles granted it upon certain conditions, one of which was, that he ſhould deliver up Patkul. This condition reduced Auguſtus to a very diſtreſsful dilemma: the Czar, at this very time, reclaimed Patkul as his ambaſſador; and Charles demanded, with threats, that he ſhould be put into his hands. Auguſtus therefore contrived an expedient by which he hoped to ſatisfy both: he ſent ſome guards to deliver Patkul, who was priſoner in the caſtle of Konigſtein, to the Swediſh troops; but by ſecret orders, privately diſpatched, he commanded the governor to let him eſcape. The governor, though he received this order in time, yet diſappointed its intention by his villainy and his avarice. He knew Patkul to be very rich; and having it now in his power to ſuffer him to eſcape with impunity, he demanded of Patkul a large ſum for the favour: Patkul refuſed to buy that liberty which he made no doubt would be gratuitouſly reſtored, in conſequence of the Czar's requiſition and remonſtrance; and, in the mean time, the Swediſh guards arrived with the order for his being delivered up to them. By this party he was firſt carried to Charles's head quarters at Albanſtradt, where he continued three months, bound to a ſtake with a heavy chain of iron. He was then conducted to Caſimir, where Charles ordered him to be tried; and he was by his judges found guilty. His ſentence depended upon the king; and after having been kept a priſoner ſome months, under a guard of Mayerfeldt's regiment, uncertain of his fate, he was, on the 8th of September 1707, towards the evening, delivered into the cuſtody of a regiment of dragoons, commanded by Colonel Nicholas Hielm. On the next day, the 29th, the colonel took the chaplain of his regiment aſide, and telling him that Patkul was to die the next day, ordered him to acquaint him with his fate, and prepare him for it. About this very time he was to have been married to a Saxon lady of great quality, virtue, and beauty; a circumſtance which renders his caſe ſtill more affecting. What followed in conſequence of the colonel's order to the miniſter (A) will be related in his own words.

"Immediately after evening ſervice I went to his priſon, where I found him lying on his bed. The firſt compliments over, I entered upon the melancholy duty of my profeſſion, and turning to the officer who had him in charge, told him the colonel's orders were, that I ſhould be alone with his priſoner. The officer having withdrawn, Patkul graſping both my hands in his, he cried out with moſt affecting anxiety and diſtreſs, My dear paſtor! what are you to declare? what am I to hear? I bring you, replied I, the ſame tidings that the prophet brought to king Hezekiah, *Set thine houſe in order, for thou muſt die.* To morrow by this time thou ſhalt be no longer in the number of the living! At this terrible warning he bowed himſelf upon his bed, and burſt into tears. I attempted to comfort him, by ſaying that he muſt, without all doubt, have often meditated on this ſubject: Yes, cried he, I know, alas! too well, that we muſt all die; but the death prepared for me will be cruel and inſupportable. I aſſured him that the manner of his

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(A) The name of this clergyman was Loreus Hagar.

death was to me totally unknown; but, believing that he would be prepared for it, I was ſure his ſoul would be received into the number of happy ſpirits. Here he roſe up, and folding his hands together, Merciful Jeſus! let me then die the death of the righteous! A little after, with his face inclined to the wall, where ſtood his bed, he broke out into this ſoliloquy: Auguſtus! O Auguſtus, what muſt be thy lot one day! Muſt thou not anſwer for all the crimes thou haſt committed? He then obſerved that he was driven out from his country, by a ſentence againſt his life, pronounced for doing what the king himſelf encouraged him to do, ſaying to him one day in terms of much kindneſs, "Patkul, maintain the rights of your country like a man of honour, and with all the ſpirit you are capable of." That flying into an enemy's country was alſo unavoidable, as the country of an ally would not have afforded him protection; but that he was in Saxony a wretched exile, not a counſellor or adviſer; that before his arrival every thing was already planned, the alliance with Muſcovy ſigned, and the meaſures with Denmark agreed upon. 'My inclinations (ſaid he, after a pauſe) were always to ſerve Sweden, though the contrary opinion has prevailed. The elector of Brandenburg owed his title of *king of Pruſſia* to the ſervices I did him; and when, in recompence, he would have given me a conſiderable ſum of money, I thanked him, and rejected the offer; adding, that the reward I moſt wiſhed for was to regain the king of Sweden's favour by his interceſſion. This he promiſed, and tried every poſſible method to ſucceed, but without ſucceſs. After this I laboured ſo much for the intereſt of the late emperor in his Spaniſh affairs, that I brought about what ſcarce any other man could have effected. The emperor as an acknowledgment gave me an aſſignment for 50,000 crowns, which I humbly laid at his feet, and only implored his imperial majeſty's recommendation of me to my king's favour: this requeſt he immediately granted, and gave his orders accordingly, but in vain. Yet, not to loſe any opportunity, I went to Moſcow while the Swediſh ambaſſadors were at that court; but even the mediation of the Czar had no effect. After that I diſtributed among the Swediſh priſoners at Moſcow at leaſt 100,000 crowns, to ſhow the ardent deſire I had, by all ways, to regain the favour of their ſovereign. Would to heaven I had been equally in earneſt to obtain the grace of God.'—At theſe words another ſhower of tears fell from his eyes, and he remained for ſome moments ſilent, and overwhelmed with grief. I uſed my beſt endeavours to comfort him with the aſſurance that this grace would not be denied him, provided he ſpent the few hours ſtill left in earneſtly imploring it; for the door of heaven's mercy was never ſhut, though that of men might be cruelly ſo. 'This (replied he), this is my conſolation; for thou art God and not man to be angry for ever.' He then inveighed bitterly againſt Auguſtus, and reproached himſelf for having any connection with a wretch who was wholly deſtitute of all faith and honour, an atheiſt, without piety, and without virtue. 'While he was at Warſaw (ſaid he), and heard the king was advancing to attack him, he found himſelf extremely diſtreſſed. He was abſolutely without money, and therefore obliged to diſmiſs ſome of his troops. He had recourſe to my aſſiſtance, and intreated me, for the love of God, to borrow whatever ſum I could. I procured him 400,000 crowns; 50,000 of which, the very next day, he ſquandered on trinkets and jewels, which he gave in preſents to ſome of his women. I told him plainly my thoughts of the matter; and by my importunity prevailed, that the Jews ſhould take back their toys, and return the money they had been paid for them. The ladies were enraged; and he ſwore that I ſhould one time or other ſuffer for what I had done: there indeed he kept his word, would to God he had always done ſo with thoſe he employed!' I now left him for a ſhort time, and at ſeven in the evening I returned; and the officer being retired, he accoſted me with a ſmiling air, and an appearance of much tranquillity, 'Welcome, dear ſir, the weight that lay heavy on my heart is removed, and I already feel a ſenſible change wrought in my mind. I am ready to die: death is more eligible than the ſolitude of a long impriſonment. Would to heaven only that the kind of it were leſs cruel. Can you, my dear ſir, inform me in what manner I am to ſuffer? I anſwered, that it had not been communicated to me; but that I imagined it would paſs over without noiſe, as only the colonel and myſelf had notice of it. 'That (replied he) I eſteem as a favour; but have you ſeen the ſentence? or muſt I die, without being either heard or condemned? My apprehenſions are of being put to intolerable tortures.' I comforted him in the kindeſt manner I could; but he was his own beſt comforter from the Word of God, with which he was particularly acquainted; quoting, among many other paſſages, the following in Greek, *We muſt enter into the kingdom of heaven through many tribulations.* He then called for pen and ink, and intreated me to write down what he ſhould dictate. I did ſo, as follows:

'*Teſtamentum, or my laſt will as to the diſpoſition of my effects after my death.*—I. His majeſty King Auguſtus, having firſt examined his conſcience thoroughly, will be ſo juſt as to pay back to my relations the ſum he owes me; which, being liquidated, will amount to 50,000 crowns; and as my relations are here in the ſervice of Sweden, that monarch will probably obtain it for them.'

"At this he ſaid, let us ſtop here a little; I will quickly return to finiſh this will; but now let us addreſs ourſelves to God by prayer. Prayers being ended, 'Now (cried he) I find myſelf yet better, yet in a quieter frame of mind: Oh! were my death leſs dreadful, with what pleaſure would I expiate my guilt by embracing it!—Yes (cried he, after a pauſe), I have friends in different places, who will weep over my deplorable fate. What will the mother of the king of Pruſſia ſay? What will be the grief of the Counteſs Levolde who attends on her? But what thoughts muſt ariſe in the boſom of *her* to whom my faith is plighted? Unhappy woman! the news of my death will be fatal to her peace of mind. My dear paſtor, may I venture to beg one favour of you?' I aſſured him he might command every ſervice in my power. 'Have the goodneſs then (ſaid he, preſſing my hand), the moment I am no more, to write—Alas! how will you ſet about it! a letter to Madam Einſeidelern, the lady I am promiſed to—Let her know that I die her's; inform her fully of my unhappy fate! Send her my

Patkul.

laſt and eternal farewell! My death is in truth diſgraceful; but my manner of meeting it will, I hope, by heaven's and your aſſiſtance, render it holy and bleſſed. This news will be her only conſolation. Add farther, dear Sir, that I thanked her with my lateſt breath for the ſincere affection ſhe bore me: May ſhe live long and happy: This is my dying wiſh.'—I gave him my hand in promiſe that I would faithfully perform all he deſired.

"Afterwards he took up a book; 'This (ſaid he) is of my own writing. Keep it in remembrance of me, and as a proof of my true regard for religion. I could wiſh it might have the good fortune to be preſented to the king, that he may be convinced with what little foundation I have been accuſed of atheiſm.' Taking it from his hand, I aſſured him that my colonel would not fail to preſent it as ſoon as opportunity offered.

"The reſt of his time was employed in prayer, which he went through with a very fervent devotion. On the 30th of September I was again with him at four in the morning. The moment he heard me he aroſe, and rendering thanks to God, aſſured me he had not ſlept ſo ſoundly for a long time. We went to prayers; and in truth his piety and devout frame of mind were worthy of admiration. About ſix he ſaid he would begin his confeſſion, before the din and clamour of the people without could riſe to diſturb his thoughts. He then kneeled down, and went through his confeſſion in a manner truly edifying. The ſun beginning to appear above the horizon, he looked out of the window, ſaying, *Salve feſta dies!* 'This is my wedding-day. I looked, alas! for another, but this is the happier; for to-day ſhall my ſoul be introduced by her heavenly bridegroom into the aſſembly of the bleſſed!' He then aſked me, whether I yet knew in what way he was to die? I anſwered, that I did not. He conjured me, by the ſacred name of Jeſus, not to forſake him; for that he ſhould find in my company ſome conſolation even in the midſt of tortures. Caſting his eyes on the paper that lay on the table, 'This will (ſaid he) can never be finiſhed.' I aſked him, whether he would put his name to what was already written? 'No, (replied he, with a deep ſigh), I will write that hated name no more. My relations will find their account in another place; ſalute them from me.' He then addreſſed himſelf again to God in prayer, and continued his devotions till the lieutenant entered to conduct him to the coach. He wrapped himſelf up in his cloak, and went forward a great pace, guarded by 100 horſemen. Being arrived at the place of execution, we found it ſurrounded by 300 foot ſoldiers; but at the ſight of the ſtakes and wheels, his horror is not to be deſcribed. Claſping me in his arms, 'Beg of God (he exclaimed) that my ſoul may not be thrown into deſpair amidſt theſe tortures! I comforted, I adjured him, to fix his thoughts on the death of Jeſus Chriſt, who for our ſins was nailed to a croſs.

"Being now on the ſpot where he was to ſuffer, he bid the executioner to do his duty well, and put into his hands ſome money which he got ready for that purpoſe. He then ſtretched himſelf out upon the wheel; and while they were ſtripping him naked, he begged me to pray that God would have mercy on him, and bear up his ſoul in agony. I did ſo; and turning to all the ſpectators, ſaid to them, Brethren, join with me in prayer for this unhappy man. 'Yes (cried he), aſſiſt me all of you with your ſupplications to heaven.' Here the executioner gave him the firſt ſtroke. His cries were terrible: 'O Jeſus! Jeſus! have mercy upon me.' This cruel ſcene was much lengthened out, and of the utmoſt horror; for as the headſman had no ſkill in his buſineſs, the unhappy victim received upwards of 15 ſeveral blows, with each of which were intermixed the moſt piteous groans and invocations of the name of God. At length, after two ſtrokes given on the breaſt, his ſtrength and voice failed him. In a faltering dying tone, he was juſt heard to ſay, 'Cut off my head!' and the executioner ſtill lingering, he himſelf placed his head on the ſcaffold: After four ſtrokes with an hatchet, the head was ſeparated from the body, and the body quartered. Such was the end of the renowned Patkul!"

Patkul, Patmos.

Charles XII. has been very generally and ſeverely cenſured for not pardoning him, and we are not inclined to vindicate the ſovereign. Yet it muſt be remembered, that Patkul was guilty of a much greater crime than that which drew upon him the diſpleaſure of Charles XI. He incited foreign powers to attack his country when under the government of a boy, hoping, as he ſaid himſelf, that it would in ſuch circumſtances become an eaſy conqueſt. He was therefore a rebel of the worſt kind; and where is the abſolute monarch that is ready to pardon ſuch unnatural rebellion? Let it be remembered, too, that Charles, among whoſe faults no other inſtance of cruelty has been numbered, certainly thought that, in ordering the execution of Patkul, he was diſcharging his duty. That monarch, it is known, believed in the poſſibility of diſcovering the philoſopher's ſtone. Patkul, when under ſentence of death, contrived to impoſe ſo far upon the ſenate at Stockholm, as to perſuade them that he had, in their preſence, converted into gold a quantity of baſer metal. An account of this experiment was tranſmitted to the king, accompanied with a petition to his majeſty for the life of ſo valuable a ſubject; but Charles, blending magnanimity with his ſeverity, replied with indignation, that he would not grant to intereſt what he had refuſed to the calls of humanity and the intreaties of friendſhip.

PATMOS (anc. geog.), one of the Sporades (Dionyſius); 30 miles in compaſs (Pliny); concerning which we read very little in authors. It was rendered famous by the exile of St John and the Revelation ſhowed him there. The greateſt part of interpreters think that St John wrote them in the ſame place during the two years of his exile; but others think that he did not commit them to writing till after his return to Epheſus. The iſland of Patmos is between the iſland of Icaria and the promontory of Miletus. Nothing has done it more honour than to have been the place of the baniſhment of St John. It is now called *Patino*, or *Pactino*, or *Patmol*, or *Palmoſa*. Its circuit is five and twenty or thirty miles. It has a city called *Patmos*, with a harbour, and ſome monaſteries of Greek monks. It is at preſent in the hands of the Turks. It is conſiderable for its harbours; but the inhabitants derive little benefit from them, becauſe the corſairs have obliged them to quit the town and retire to a hill on which St John's convent ſtands. This convent is a citadel conſiſting of ſeveral irregular towers, and is a ſubſtantial building ſeated on a very ſteep rock. The whole iſland is very barren, and without wood; however, it abounds with partridges, rabbits, quails, turtles, pigeons, and ſnipes. All their corn does not amount to 1000 barrels in a year. In the whole iſland there are ſcarce 300 men: but there are above 20 women to one man, who expect that all ſtrangers who land in the iſland ſhould carry ſome of them away. To the memory of St John is an hermitage on the ſide of a mountain, where there is a chapel not above eight paces long and five broad. Over head they ſhow a chink in the rock, through which they pretend that the Holy Ghoſt dictated to St John. E. Long. 26. 84. N. Lat. 37. 24.

PATNA, a town of Aſia, in the dominions of the Great Mogul, to the north of the kingdom of Bengal. where the Engliſh have factories for ſaltpetre, borax, and raw ſilk. It is the capital of the province of Bahar, a dependency of Bengal, in the empire of Indoſtan, ſituated in a pleaſant country, 400 miles eaſt of Agra. It extends ſeven miles in length on the banks of the Ganges, and is about half a mile in breadth.—Mr Rennel gives ſtrong reaſons for ſuppoſing it to be the ancient PALIBOTHRA. The town is large and populous, but the houſes are built at a diſtance from each other. E. Long. 85. 40. N. Lat. 45. 25.

PATOMACK, a large river in Virginia, which divides that ſtate from Maryland, riſes in the mountains within a ſmall diſtance of the weſtern waters, and receives in its courſe ſeveral conſiderable rivers, and empties itſelf into Cheſapeak Bay. It is 7½ miles wide at the mouth, 4¼ at Nomony Bay, 1½ at Hallooing point, 1¼ at Alexandria: its ſoundings are 7 fathoms at the mouth, 5 at George's Iſland, 4½ at lower Matchodic, 3 from Swan's point to Alexandria, and thence 10 feet water to the falls. The diſtance from the Capes of Virginia to the termination of the tide water in this river is above 300 miles and it is navigable for ſhips of large burden nearly that diſtance; from thence its navigation was obſtructed by ſeveral falls; but the ſpirited exertions of the company incorporated for opening and improving the navigation of this noble river, have ſurmounted many of the difficulties which obſtructed its navigation, their operations ſtill continue, intending to open the navigation to within a ſhort portage of the Monagahela. The city of Waſhington, intended for the future reſidence of Congreſs, is now building on its banks nearly 300 miles from the ſea. Alexandria and George Town in its vicinity, are places of conſiderable and increaſing trade, and about nine miles below is ſituated Mount Vernon, the beautiful ſeat of General Waſhington. Many elegant ſeats, and delightful ſituations are on both ſides of the river; and it is likely ſoon to become a channel of very extenſive trade, the land on both ſides rapidly increaſing in value.

PATONCE, in heraldry, is a croſs, flory at the ends; from which it differs only in this, that the ends, inſtead of turning down like a fleur-de-lis, are extended ſomewhat in the pattee form. See FLORY.

PATRÆ, a city of Achaia. This place was viſited by Dr Chandler, who gives the following account of it. "It has been often attacked by enemies, taken, and pillaged. It is a conſiderable town, at a diſtance from the ſea, ſituated on the ſide of a hill, which has its ſummit crowned with a ruinous caſtle. This made a brave defence in 1447 againſt Sultan Morat, and held out until the peace was concluded, which firſt rendered the Morea tributary to the Turks. A dry flat before it was once the port, which has been choked with mud. It has now, as in the time of Strabo, only an indifferent road for veſſels. The houſe of Nicholas Paul, Eſq; the Engliſh conſul, ſtood on a part of the wall either of the theatre or the odéum. By a fountain was a fragment of a Latin inſcription. We ſaw alſo a large marble buſt much defaced; and the French conſul ſhowed us a collection of medals. We found nothing remarkable in the citadel. It is a place of ſome trade, and is inhabited by Jews as well as by Turks and Greeks. The latter have ſeveral churches. One is dedicated to St Andrew the apoſtle, who ſuffered martyrdom there, and is of great ſanctity. It had been recently repaired. The ſite by the ſea is ſuppoſed that of the temple of Ceres. By it is a fountain. The air is bad, and the country round about over-run, with the low ſhrub called *glycyrrhiza* or liquorice."

Of its ancient ſtate, the ſame author ſpeaks thus: "Patræ aſſiſted the Ætolians when invaded by the Gauls under Brennus; but afterwards was unfortunate, reduced to extreme poverty, and almoſt abandoned. Auguſtus Cæſar reunited the ſcattered citizens, and made it a Roman colony, ſettling a portion of the troops which obtained the victory of Actium, with other inhabitants from the adjacent places. Patræ reflouriſhed and enjoyed dominion over Naupactus, Œanthéa, and ſeveral cities of Achaia. In the time of Pauſanias, Patræ was adorned with temples and porticoes, a theatre, and an odéum which was ſuperior to any in Greece but that of Atticus Herodes at Athens. In the lower part of the city was a temple of Bacchus Æſymmetes, in which was an image preſerved in a cheſt, and conveyed, it was ſaid, from Troy by Eurypylus; who, on opening it, became diſordered in his ſenſes. By the port were temples; and by the ſea, one of Ceres, with a pleaſant grove and a prophetic fountain of unerring veracity in determining the event of any illneſs."

PATRANA, or PASTRANA, a town of New Caſtile in Spain, with the title of a duchy. It is ſeated between the rivers Tajo and Tajuna, in W. Long. 2. 45. N. Lat. 40. 26.

PATRAS, an ancient and flouriſhing town of European Turkey, in the Morea, capital of a duchy, with a Greek archbiſhop's ſee. It is pretty large and populous; and the Jews, who are one-third part of the inhabitants, have four ſynagogues. There are ſeveral handſome moſques and Greek churches. The Jews carry on a great trade in ſilk, leather, honey, wax, and cheeſe. There are cyprus trees of a prodigious height, and excellent pomegranates, citrons, and oranges. It has been ſeveral times taken and retaken, and is now in the hands of the Turks. It is ſeated in E. Long. 21. 45. N. Lat. 38. 17.

PATRICA, a town of Italy in the territory of the church, and in the Campagna of Rome, towards the ſea-coaſt, and eight miles eaſt of Oſtia. About a mile from this place is a hill called *Monte de Livano*, which ſome have thought to be the ancient Lavinium founded by Æneas.

PATRES CONSCRIPT. See CONSCRIPTI and SENATOR.

PATRIARCH, PATRIARCHA, one of thoſe firſt fathers who lived towards the beginning of the world, and who became famous by their long lines of deſcendants. Abraham, Iſaac, and Jacob, and his twelve ſons, are the patriarchs of the Old Teſtament; Seth, Enoch, &c. were antediluvian patriarchs.

The authority of patriarchal government exiſted in the fathers of families, and their firſt-born after them, exerciſing all kinds of eccleſiaſtical and civil authority in their reſpective houſeholds; and to this government, which laſted till the time of the Iſraelites dwelling in Egypt, ſome have aſcribed an abſolute and deſpotic power, extending even to the puniſhment by death. In proof of this, is produced the curſe pronounced by Noah upon Canaan (Gen. ix. 25.); but it muſt be obſerved, that in this affair Noah ſeems to have acted rather as a prophet than a patriarch. Another inſtance of ſuppoſed deſpotic power is Abraham's turning Hagar and Iſhmael out of his family (Gen. xii. 9, &c.); but this can hardly be thought to furniſh evidence of any ſingular authority veſted in the patriarchs, as ſuch, and peculiar to thoſe ages. The third inſtance brought forward to the ſame purpoſe is that of Jacob's denouncing a curſe upon Simeon and Levi (Gen. xlix. 7.), which is maintained by others to be an inſtance of prophetic inſpiration more than of patriarchal power. The fourth inſtance is that of Judah with regard to Tamar (Gen. xxxviii. 24.); with regard to which it is remarked, that Jacob, the father of Judah, was ſtill living; that Tamar was not one of his own family; and that ſhe had been guilty of adultery, the puniſhment of which was death by burning; and that Judah on this occaſion might ſpeak only as a proſecutor.

On the whole, however, it is difficult to ſay, which of theſe opinions are moſt agreeable to truth. Men who believe the origin of civil government, and the obligation to obedience, to ariſe from a ſuppoſed original contract, either real or implied, will be naturally led to weaken the authority of the patriarchs: and thoſe again who eſteem government to be a divine inſtitution, will be as apt to raiſe that authority to the higheſt pitch that either reaſon or ſcripture will permit them. It cannot be denied, that authority exiſted in fathers, and deſcended to their firſt-born, in the firſt ages of the world; and it is neither unnatural nor improbable to imagine, that the idea of hereditary power and hereditary honours was firſt taken from this circumſtance. But whether authority has deſcended through father and ſon in this way to our times, is a circumſtance that cannot in one inſtance be aſſerted, and can be denied in a thouſand. The real ſource of the dignity and of the authority of modern times ſeems to have been, ſkill in the art of war, and ſucceſs in the conduct of conqueſts.

Jewiſh PATRIARCH, a dignity, reſpecting the origin of which there are a variety of opinions. The learned authors of the Univerſal Hiſtory think, that the firſt appearance and inſtitution of thoſe patriarchs happened under Nerva the ſucceſſor of Domitian. It ſeems probable that the patriarchs were of the Aaronic or Levitical race; the tribe of Judah being at that time too much depreſſed, and too obnoxious to the Romans to be able to aſſume any external power. But of whatever tribe they were, their authority came to be very conſiderable. Their principal buſineſs was to inſtruct the people; and for this purpoſe they inſtituted ſchools in ſeveral cities. And having gained great reputation for their extraordinary learning, zeal, and piety, they might, in time, not only bring a great concourſe of other Jews from other parts, as from Egypt and other weſtern provinces of their diſperſion, but likewiſe prove the means of their patriarchal authority's being acknowledged there. From them they ventured at length to levy a kind of tribute, in order to defray the charges of their dignity, and of the officers (A) under them, whoſe buſineſs it was to carry their orders and deciſions through the other provinces of their diſperſion, and to ſee them punctually executed by all, that ſome ſhadow of union at leaſt might be kept up among the weſtern Jews. They likewiſe nominated the doctors who were to preſide over their ſchools and academies; and theſe were in proceſs of time ſtyled *chiefs* and *princes*, in order to raiſe the credit of that dignity, or to imply the great regard which their diſciples were to pay to them. Theſe chiefs became at length rivals of the patriarchs; and ſome of them poſſeſſed both dignities at once; an uſurpation which cauſed not only great confuſion amongſt them, but oftentimes very violent and bloody conteſts. However, as the Jewiſh Rabbies have trumped up a much older era for this patriarchal dignity, and have given us a ſucceſſion of them down to the fifth century, in which it was aboliſhed, it will not be amiſs to give our readers the ſubſtance of what they have written of the riſe and progreſs of this order of men; and at the ſame time to ſhow them the abſurdity and falſehood of that pretended ſucceſſion to this imaginary dignity.

According to them, the firſt patriarch was Hillel, ſurnamed the *Babylonian*, becauſe he was ſent for from thence to Jeruſalem about 100 years before the ruin of their capital, or 30 years before the birth of Chriſt, to decide a diſpute about the keeping of Eaſter, which on that year fell out on the Sabbath-day; and it was on account of his wiſe deciſion that he was raiſed to that dignity, which continued in his family till the ſaid fifth century. He was likewiſe looked upon as a ſecond Moſes, becauſe he lived like him 40 years in obſcurity, 40 more in great reputation for learning and ſanctity, and 40 more in poſſeſſion of this patriarchal dignity. They make him little inferior to that lawgiver in other of his excellencies, as well as in the great authority he gained over the whole Jewiſh nation. The wonder will be, how Herod the Great, who was ſo jealous of his own power, could ſuffer a ſtranger to be raiſed to ſuch a height of it, barely for having decided a diſpute which muſt in all likelihood have been adjudged by others long before that time.

However, Hillel was ſucceeded by his ſon Simeon, whom many Chriſtians pretend to have been the venerable old perſon of that name, who received the divine infant in his arms. The Jews give him but a

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(A) Theſe were called *Apoſtoli* or *Legati*.

very obſcure patriarchate; though the authors above quoted make him, moreover, chief of the ſanhedrim: and Epiphanius ſays, that the prieſtly tribe hated him ſo much for giving ſo ample a teſtimony to the divine child, that they denied him common burial. But it is hardly credible that St Luke ſhould have ſo careleſsly paſſed over his two-fold dignity, if he had been really poſſeſſed of them, and have given him no higher title than that of a juſt and devout man.

He was ſucceeded by Jochanan, not in right of deſcent, but of his extraordinary merit, which the Rabbies, according to cuſtom, have raiſed to ſo ſurpriſing a height, that, according to them, if the whole heavens were paper, all the trees in the world pens, and all the men writers, they would not ſuffice to pen down all his leſſons. He enjoyed his dignity but two years, according to ſome, or five according to others: and was the perſon who, obſerving the gates of the temple to open of their own accord, cried out, "O temple, temple! why art thou thus moved! We know that thou art to be deſtroyed, ſeeing Zechariah hath foretold it, ſaying, 'Open thy gates, O Lebanus, and let the flames conſume thy cedars." Upon this he is further reported to have complimented Veſpaſian, or rather, as ſome have corrected the ſtory, Titus, with the title of *king*, aſſuring him that it was a royal perſon who was to deſtroy that edifice; on which account they pretend that general gave him leave to remove the ſanhedrim to Japhne.

The Jewiſh writers add, that he likewiſe erected an academy there, which ſubſiſted till the death of Akiba; and was likewiſe the ſeat of the patriarch; and conſiſted of 300 ſchools, or claſſes of ſcholars. Another he erected at Lydda, not far from Japhne, and where the Chriſtians have buried their famed St George. He lived 120 years, and being aſked, what he had done to prolong his life? he gave this wiſe anſwer; I never made water nearer a houſe of prayer than four cubits: I never diſguiſed my name: I have taken care to celebrate all feſtivals: and my mother hath even ſold my head ornaments to buy wine enough to make me merry on ſuch days; and left me at her death 300 hogſheads of it, to ſanctify the Sabbath.—The doctors that flouriſhed in his time were no leſs conſiderable, both for their number and character; particularly the famed Rabbi Chanina, of whom the Bath Col was heard to ſay, that the world was preſerved for the ſake of him; and R. Nicodemus, whom they pretend to have ſtopped the courſe of the ſun, like another Joſhua.

He was ſucceeded by Gamaliel, a man, according to them, of unſufferable pride; and yet of ſo univerſal authority over all the Jews, not only in the weſt, but over the whole world, that the very monarchs ſuffered his laws to be obeyed in their dominions, not one of them offering to obſtruct the execution of them. In his days flouriſhed Samuel the Leſs, who compoſed a prayer full of the bittereſt curſes againſt heretics, by which they mean the Chriſtians; and which are ſtill in uſe to this day. Gamaliel was no leſs an enemy to them; and yet both have been challenged, the former as the celebrated maſter of our great apoſtle, the other as his diſciple in his unconverted ſtate.

Simon II. his ſon and ſucceſſor, was the firſt martyr who died during the ſiege of Jeruſalem. The people ſo regretted his death, that an order was given, inſtead of 10 bumpers of wine, which were uſually drank at the funeral of a ſaint, to drink 13 at his, on account of his martyrdom. Theſe bumpers were in time multiplied, they tell us, to ſuch ſhameful height, that the ſanhedrim was forced to make ſome new regulations to prevent that abuſe.

Theſe are the patriarchs which, the Rabbies tell us, preceded the deſtruction of the temple; and we need no farther confutation of this pretended dignity, than the ſilence of the ſacred hiſtorians, who not only make not the leaſt mention of it, but aſſure us all along that they were the high-prieſts who preſided in the ſanhedrim; and before whom all caſes relating to the Jewiſh religion were brought and decided. It was the high-prieſt who examined and condemned our Saviour; that condemned St Stephen; that forbad the apoſtles to preach in Chriſt's name; and who ſat as judge on the great apoſtle at the head of that ſupreme court. The ſame may be urged from Joſephus, who muſt needs have known and mentioned this pretended dignity, if any ſuch there had been; and yet is ſo far from taking the leaſt notice of it, that, like the evangeliſts, he places the pontiffs alone at the head of all the Jewiſh affairs; and names the high-prieſt Ananias as having the care and direction of the war againſt the Romans;—which is an evident proof that there were then no ſuch patriarchs in being.

To all this let us add, that if there had been any ſuch remarkable ſucceſſion, the Talmudiſts would have preſerved it to future ages: whereas, neither they, nor any of the ancient authors of the Jewiſh church, make any mention of it; but only ſome of their doctors, who have written a conſiderable time after them, a ſet of writers to whom little credit can be given in points of this nature; eſpecially as there are ſuch unſurmountable contradictions between them, as no authors either Jewiſh or Chriſtian have, with all their pains, been hitherto able to reconcile.

Their ſucceſſion, according to the generality of thoſe rabbies, ſtands as follows:

1. Hillel the Babylonian. 2. Simeon the ſon of Hillel. 3. Gamaliel the ſon of Simeon. 4. Simeon II. the ſon of Gamaliel. 5. Gamaliel II. the ſon of Simeon II. 6. Simeon III. the ſon of Gamaliel II. 7. Judah the ſon of Simeon III. 8. Gamaliel III. the ſon of Judah. 9. Judah II. the ſon of Gamaliel III. 10. Hillel II. ſon of Judah II. 11. Judah III. ſon of Hillel II. 12. Hillel III. ſon of Judah III. 13. Gamaliel IV. ſon of Hillel III.

According to Gants Tzemach David, who hath reduced them to 10, they are,

1. Hillel the Babylonian. 2. Simeon the ſon of Hillel. 3. Rabb Gamaliel Rebona. 4. R. Simeon the ſon of Gamaliel. 5. Rabban Gamaliel his ſon. 6. R. Jehudah the prince. 7. Hillel the prince, his ſon. 8. Rabban Gamaliel the Old. 9. Simeon III. 10. R. Judah, Naſſi or prince.

On the whole, it cannot be doubted but that their firſt riſe was in Nerva's time, however much Jewiſh pride may have prompted them to falſify, and to aſſert their origin to have been more ancient than it really was. Nor have the Jews been faithful in giving an account of the authority of theſe men. They have exaggerated their power beyond all bounds, for the purpoſe of repelling the arguments of Chriſtians: for their power was certainly more ſhowy than ſubſtantial. In time, however, they certainly impoſed upon the people; and what power they did poſſeſs (which the Romans only allowed to be in religious matters, or in ſuch as were connected with religion) they exerciſed with great rigour. Their pecuniary demands, in particular, became very exorbitant; and was the cauſe of their ſuppreſſion in the year 429.

Patriarchs, among Chriſtians, are eccleſiaſtical dignitaries, or biſhops, ſo called from their paternal authority in the church. The power of patriarchs was not the ſame in all, but differed according to the different cuſtoms of countries or the pleaſures of kings and councils. Thus the patriarch of Conſtantinople grew to be a patriarch over the patriarchs of Epheſus and Cæſaria, and was called the *œcumenical and univerſal patriarch;* and the patriarch of Alexandria had ſome prerogatives which no other patriarch but himſelf enjoyed, ſuch as the right of conſecrating and approving every ſingle biſhop under his juriſdiction.

The patriarchate has been ever eſteemed the ſupreme dignity in the church: the biſhop had only under him the territory of the city of which he was biſhop; the metropolitan ſuperintended a province; and had for ſuffragans the biſhops of his province; the primate was the chief of what was then called a *dioceſe* (A), and had ſeveral metropolitans under him; and the patriarch had under him ſeveral dioceſes, compoſing one exarchate, and the primates themſelves were under him.

Uſher, Pagi, De Marca, and Morinus, attribute the eſtabliſhment of the grand patriarchates to the apoſtles themſelves; who, in their opinion, according to the deſcription of the world then given by geographers, pitched on the three principal cities in the three parts of the known world; viz. Rome in Europe, Antioch in Aſia, and Alexandria in Africa; and thus formed a trinity of patriarchs. Others maintain that the name patriarch was unknown at the time of the council of Nice; and that for a long time afterwards patriarchs and primates were confounded together, as being all equally chiefs of dioceſes, and equally ſuperior to metropolitans, who were only chiefs of provinces. Hence Socrates gives the title patriarch to all the chiefs of dioceſes, and reckons ten of them. Indeed, it does not appear that the dignity of patriarch was appropriated to the five grand ſees of Rome, Conſtantinople, Alexandria, Antioch, and Jeruſalem, till after the council of Chalcedon in 451; for when the council of Nice regulated the limits and prerogatives of the three patriarchs of Rome, Antioch, and Alexandria, it did not give them the title of patriarchs, though it allowed them the pre-eminence and privileges thereof; thus when the council of Conſtantinople adjudged the ſecond place to the biſhop of Conſtantinople, who till then was only ſuffragan of Heraclea, it ſaid nothing of the patriarchate. Nor is the term *patriarch* found in the decree of the council of Chalcedon, whereby the fifth place is aſſigned to the biſhop of Jeruſalem; nor did theſe five patriarchs govern all the churches.

There were beſides many independent chiefs of dioceſes, who, far from owning the juriſdiction of the grand patriarchs, called themſelves *patriarchs;* ſuch as that of Aquileia; nor was Carthage ever ſubject to the patriarch of Alexandria. Moſheim * imagines that the biſhops, who enjoyed a certain degree of pre-eminence over the reſt of their order, were diſtinguiſhed by the Jewiſh title of patriarchs in the fourth century. The authority of the patriarchs gradually increaſed, till, about the cloſe of the fifth century, all affairs of moment within the compaſs of their patriarchate came before them, either at firſt hand or by appeals from the metropolitans. They conſecrated biſhops; aſſembled yearly in council the clergy of their reſpective diſtricts; pronounced a deciſive judgment in thoſe caſes where accuſations were brought againſt biſhops; and appointed vicars or deputies, clothed with their authority, for the preſervation of order and tranquillity in the remoter provinces. In ſhort, nothing was done without conſulting them; and their decrees were executed with the ſame regularity and reſpect as thoſe of the princes.

It deſerves to be remarked, however, that the authority of the patriarchs was not acknowledged through all the provinces without exception. Several diſtricts, both in the eaſtern and weſtern empires, were exempted from their juriſdiction. The Latin Church had no patriarchs till the ſixth century; and the churches of Gaul, Britain, &c. were never ſubject to the authority of the patriarch of Rome, whoſe authority only extended to the ſuburbiary provinces. There was no primacy, no exarchate

* Eccleſ. Hiſt. vol. I. p. 284.

(A) The word dioceſe was then of a very different import from what it bears now. Under the article Episcopacy, it was obſerved, that the firſt founders of churches regulated their extent and the juriſdiction of their biſhops by the diviſions of the Roman empire into civil juriſdictions. One of theſe diviſions was into provinces and dioceſes. A province compriſed the cities of a whole region ſubjected to the authority of one chief magiſtrate, who reſided in the metropolis or chief city of the province. A dioceſe was a ſtill larger diſtrict, comprehending within it ſeveral provinces, ſubject to the controul of a chief magiſtrate, whoſe reſidence was in the metropolis of the dioceſe. The juriſdiction of the biſhops of the Chriſtian church was eſtabliſhed upon this model. The authority of a private biſhop extended only over the city in which he reſided, together with the adjacent villages and ſurrounding tract of country. The diſtrict was called παροικια, though it comprehended many pariſhes in the modern ſenſe of that word. Under Arcadius and Honorius the empire was divided into thirteen dioceſes: 1. The Oriental dioceſe, containing fifteen provinces; 2. The dioceſe of Egypt, ſix provinces; 3. The Aſiatic dioceſe, ten provinces; 4. The Pontic dioceſe, ten provinces; 5. The dioceſe of Thrace, ſix provinces; 6. The dioceſe of Macedonia, ſix provinces; 7. The dioceſe of Decia, five provinces; 8. The Italic dioceſe, ſeventeen provinces; 9. The dioceſe of Illyricum, ſix provinces; 10. The dioceſe of Africa, ſix provinces; 11. The Spaniſh dioceſe, ſeven provinces; 12. The Gallican dioceſe, ſeventeen provinces; 13. The Britannic dioceſe, five provinces. Each of theſe provinces comprehended many παροικιαι, and each παροικια many modern pariſhes. See *Bingham's Origines Sacræ*, Book ix.

achate nor patriarchate owned here; but the biſhops, with the metropolitans, governed the church in common. Indeed, after the name patriarch became frequent in the weſt, it was attributed to the biſhops of Bourges and Lyons; but it was only in the firſt ſignification, viz. as heads of dioceſes. Du Cange ſays, that there have been ſome abbots who have borne the title of patriarchs.

PATRIARCHAL CROSS, in heraldry, is that where the ſhaft is twice croſſed; the lower arms being longer than the upper ones.

PATRICIAN, a title given, among the ancient Romans, to the deſcendants of the hundred, or, as ſome will have it, of the two hundred firſt ſenators choſen by Romulus; and by him called *patres*, "fathers." Romulus eſtabliſhed this order after the example of the Athenians; who were divided into two claſſes, viz. the ευπατριδας *patricios*, and δημοτικους *populares*. Patricians, therefore, were originally the nobility; in oppoſition to the plebeians. They were the only perſons whom Romulus allowed to aſpire to the magiſtracy; and they exerciſed all the functions of the prieſthood till the year of Rome 495. But the cognizance and character of theſe ancient families being almoſt loſt and extinguiſhed by a long courſe of years, and frequent changes of the empire, a new kind of patricians were afterwards ſet on foot, who had no pretenſions from birth, but whoſe title depended entirely on the emperor's favour. This new patriciate, Zozimus tells us, was erected by Conſtantine, who conferred the quality on his counſellors, not becauſe they were deſcended from the ancient fathers of the ſenate, but becauſe they were the fathers of the republic or of the empire. This dignity in time became the higheſt of the empire. Juſtinian calls it *ſummam dignitatem*. In effect the patricians ſeem to have had the precedence of the *conſulares*, and to have taken place before them in the ſenate; though F. Faber aſſerts the contrary. What confounds the queſtion is, that the two dignities often met in the ſame perſon; becauſe the patriciate was only conferred on thoſe who had gone through the firſt offices of the empire, or had been conſuls. Pope Adrian made Charlemagne take the title of patrician before he aſſumed the quality of emperor; and other popes have given the title to other kings and princes by reaſon of its eminence.

PATRICIAN is alſo a title of honour often conferred on men of the firſt quality in the time of our Anglo-Saxon kings. See THANE.

PATRICIAN Deities, Patricii Dii, in mythology, were Janus, Saturn, the Genius, Pluto, Bacchus, the Sun, the Moon, and the Earth.

PATRICIANS, in eccleſiaſtical writers, were ancient ſectaries, who diſturbed the peace of the church in the beginning of the third century: thus called from their founder *Patricius*, preceptor of a Marcionite called *Symmachus*. His diſtinguiſhing tenet was, that the ſubſtance of the fleſh is not the work of God, but that of the devil; on which account his adherents bore an implacable hatred to their own fleſh; which ſometimes carried them ſo far as to kill themſelves. They were alſo called TATIANITES, and made a branch of the ENCRATITÆ.

PATRICK (St), the apoſtle of Ireland, and ſecond biſhop of that country. He was born April 5th A. D. 373, of a good family, at Kirk Patric near Dumbarton, in what is now called Scotland, but then comprehended under the general name of Britain.—His baptiſmal name *Suceath*, ſignifies, in the Britiſh language, "valiant in war." On ſome inroad of certain exiles from Ireland he was taken priſoner, and carried into that kingdom, where he continued ſix years in the ſervice of Milcho, who had bought him of three others, when Patric acquired the new name of *Cothraig*, or *Ceathar-Tigh*, i. e. *four families*. In this time he made himſelf maſter of the Iriſh language, and at laſt made his eſcape, and returned home on board a ſhip. About two years after, he formed a deſign of converting the Iriſh, either in conſequence of a dream, or of reflection on what he had obſerved during his acquaintance with them. The better to qualify himſelf for this undertaking, he travelled to the continent, where he continued 35 years, purſuing his ſtudies under the direction of his mother's uncle St Martin, biſhop of Tours, who had ordained him deacon; and after his death with St German, biſhop of Auxerre, who ordained him prieſt, and gave him his third name *Mawn* or *Maginim*.

An ancient author, Henricus Antiſſioderenſis, who wrote a book concerning the miracles of St German, conſiders it as the higheſt honour of that prelate to have been the inſtructor of St Patrick: "As the glory of a father ſhines in the government of his ſons, out of the many diſciples in religion who are reported to have been his ſons in Chriſt; ſuffice it briefly to mention one by far the moſt famous, as the ſeries of his actions ſhows, Patrick the particular apoſtle of Ireland, who being under his holy diſcipline 18 years, derived no little knowledge in the inſpired writings from ſuch a ſource. The moſt godly divine pontiff, conſidering him alike diſtinguiſhed in religion, eminent for virtue, and ſtedfaſt in doctrine; and thinking it abſurd to let one of the beſt labourers remain inactive in the Lord's vineyard, recommended him to Celeſtine, Pope of Rome, by his preſbyter Segetius, who was to carry to the apoſtolic ſee a teſtimonial of eccleſiaſtical merit of this excellent man. Approved by his judgment, ſupported by his authority, and confirmed by his bleſſing, he ſet out for Ireland; and being peculiarly deſtined to that people as their apoſtle, inſtructed them at that time by his doctrine and miracles; and now does and will forever diſplay the wonderful power of his apoſtleſhip." Laſtly, Pope Celeſtine conſecrated him biſhop, and gave him his moſt familiar name *Patricius*, expreſſive of his honourable deſcent; and to give luſtre and weight to the commiſſion which he now charged him with to convert the Iriſh. Palladius had been here a year before him on the ſame deſign, but with little ſucceſs: the ſaints Kieran, Ailbe, Declan, and Ibar, were precurſors both to Palladius and Patrick. But the great office of apoſtle of Ireland was reſerved for our prelate, who landed in the country of the Evolein, or at Wicklow, A. D. 441. His firſt convert was Sinell, eighth in deſcent from Cormac king of Leinſter; but not meeting with encouragement, he proceeded to Dublin, and thence to Ulſter, where he founded a church (afterwards the famous abbey of Saul, in the county of Down), remarkable for its poſition, being made out of a barn, and its greateſt length reaching from north to ſouth. After labouring ſeven years indefatigably in his great work, he returned ed to Britain, which he delivered from the hereſies of Pelagius and Arius; engaged ſeveral eminent perſons to aſſiſt him; viſited the Iſle of Man, which he converted in 440, when the biſhopric was founded; and, A. D. 448, returned to the ſee of Armagh (A), which he had founded three years before; and in 13 years more completed the converſion of the whole iſland (B). After giving an account of his commiſſion at Rome, he once more returned hither, and ſpent the remainder of his life between the monaſteries of Armagh and Saul, ſuperintending and enforcing the great plan of doctrine and diſcipline which he had eſtabliſhed. After having eſtabliſhed ſchools, or an academy here, he cloſed his life and miniſtry at Saul abbey, in the 120th year of his age, March 17. A. D. 493, and was buried at Down afterwards, in the ſame grave with St Briget and St Columb, in the ſame place. Reſpecting his burial-place, however, there have been great diſputes; and it has been as great a ſubject of debate with the religious, as Homer's birth-place was formerly among the cities of Greece. Thoſe of Down lay claim to it, on the authority of the following verſes:

Theſe three in Down lie in tomb one,
Briget, Patricius, and Columba pious.

Thoſe of Glaſtenbury in England, from the old monuments of their church: And ſome Scots affirm him to have been both born and buried among them at Glaſgow. His genuine works were collected and printed by Sir James Ware, 1656. His immediate ſucceſſor in this ſee was St Binen or Begnus.

Order of St Patrick, an inſtitution which took place in Ireland in the year 1783. On the fifth of February, in that year, the king ordered letters-patent to be paſſed under the great ſeal of the kingdom of Ireland, for creating a ſociety or brotherhood, to be called *knights of the illuſtrious order of St Patrick*, of which his majeſty, his heirs, and ſucceſſors, ſhall perpetually be ſovereigns, and his majeſty's lieutenant-general and general-governor of Ireland, &c. for the time being, ſhall officiate as grand-maſters; and alſo for appointing Prince Edward, and ſeveral of the prime nobility of Ireland, knights companions of the ſaid illuſtrious order.

PATRICK (Simon), a very learned Engliſh biſhop, was born at Gainſborough in Lincolnſhire in 1626. In 1644 he was admitted into Queen's college, Cambridge, and entered into holy orders. After being for ſome time chaplain to Sir Walter St John, and vicar of the church at Batterſea in Surry, he was preferred to the rectory of St Paul's, Covent-garden, in London, where he continued all the time of the plague in 1665 among his pariſhoners, to their great comfort. In 1668 he publiſhed his *Friendly debate* between a Conformiſt and a Nonconformiſt. This was anſwered by the Diſſenters, whom he had much exaſperated by it; but by his moderation and candour towards them afterwards, they were perfectly reconciled to him, and he brought over many of them to the communion of the eſtabliſhed church. In 1678 he was made dean of Peterborough, where he was much beloved. In 1682, Dr Lewis de Moulin, who had been a hiſtory-profeſſor at Oxford, and written many bitter books againſt the church of England, ſent for Dr Patrick upon his ſick-bed, and made a ſolemn declaration of his regret on that account, which he ſigned, and was publiſhed after his death. During the reign of King James, the dean's behaviour ſhowed that he had nothing more at heart than the proteſtant religion; for which he ventured all that was dear to him, by preaching and writing againſt the errors of the church of Rome. In 1687 he publiſhed a prayer compoſed for that difficult time, when proſecution was expected by all who ſtood firm to their religion. The year after the Revolution, the dean was appointed biſhop of Chicheſter, and was employed with others of the new biſhops to ſettle the affairs of the church in Ireland. In 1691 he was tranſlated to the ſee of Ely, in the room of the deprived Biſhop Turner. He died in 1707, after having publiſhed various works; among which the moſt diſtinguiſhed are his Paraphraſes and Commentaries on the Holy Scriptures, three volumes folio. Theſe, with Lowth on the Proverbs, Arnold on the Apocrypha, and Whitby on the New Teſtament, make a regular continued commentary in Engliſh on all the ſacred books.

PATRIMONY, a right or eſtate inherited by a perſon from his anceſtors.

The term *patrimony* has been alſo given to church-eſtates or revenues; in which ſenſe authors ſtill ſay, the patrimony of the church of Rimini, Milan, &c. The church of Rome hath patrimonies in France, Africa, Sicily, and many other countries. To create the greater reſpect to the eſtates belonging to the church, it was uſual to give their patrimonies the names of the ſaints they held in the higheſt veneration: thus the eſtate of the church of Ravenna was called the *patrimony of St Apollinarius*; that of Milan, the *patrimony* of

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(A) At Armagh St Patrick founded, A. D. 445 or 447, a priory of Auguſtine canons, dedicated to St Peter and St Paul, much enriched by the archbiſhops; reſtored by Imar O Hedegan in the 12th century. It was granted, A. D. 1611, to Sir Toby Caulfield, knight. St Patrick alſo founded there a houſe of canoneſſes of the ſame order, under his ſiſter Lupita, called *Templena firta*, or the "houſe of miracles."

We are told, that Armagh was made a metropolitical ſee in honour of St Patrick; in conſequence of which it was held in the higheſt veneration not only by biſhops and prieſts, but alſo by kings and biſhops, as the venerable Bede informs us.

(B) There is a cave in the county of Donegal or Tir-connel, near the ſource of the Liffey, which, it is pretended was dug by Ulyſſes, in order to hold converſations with infernels. The preſent inhabitants call it *Ellan n' Fradatory*, or the "Iſland of Purgatory, and Patrick's Purgatory." They affirm, with a pious credulity, that St Patrick the apoſtle of Ireland, or ſome abbot of that name, obtained of God by his earneſt prayers, that the pains and torments which await the wicked after this life might be here ſet forth to view, in order the more eaſily to recover the Iriſh from their ſinful ſtate and heatheniſh errors.

of St Ambroſe; and the eſtates of the Roman church were called the *patrimony of St Peter in Abruzzo*, the *patrimony of St Peter in Sicily*, and the like.

What is now called *St Peter's patrimony* is only the duchy of Caſtro, and the territory of Orvietto. See Castro, &c.

PATRIOTISM, a love of one's country, which is one of the nobleſt paſſions that can warm and animate the human breaſt. It includes all the limited and particular affections to our parents, children, friends, neighbours, fellow-citizens, and countrymen. It ought to direct and limit their more confined and partial actions within their proper and natural bounds, and never let them encroach on thoſe ſacred and firſt regards we owe to the great public to which we belong. Were we ſolitary creatures, detached from the reſt of mankind, and without any capacity of comprehending a public intereſt, or without affections leading us to deſire and purſue it, it would not be our duty to mind it, nor criminal to neglect it. But as we are parts of the public ſyſtem, and are not only capable of taking in large views of its intereſts, but by the ſtrongeſt affections connected with it, and prompted to take a ſhare of its concerns, we are under the moſt ſacred ties to proſecute its ſecurity and welfare with the utmoſt ardour, eſpecially in times of public trial.

"Zeal for the public good (ſays Mr Addiſon) is the characteriſtic of a man of honour and a gentleman, and muſt take place of pleaſures, profits, and all other private gratifications: that whoſoever wants this motive, is an open enemy, or an inglorious neuter to mankind, in proportion to the miſapplied advantages with which nature and fortune have bleſſed him." This love of our country does not import an attachment to any particular ſoil, climate, or ſpot of earth, where perhaps we firſt drew our breath, though thoſe natural ideas are often aſſociated with the moral ones; and, like external ſigns or ſymbols, help to aſcertain and bind them; but it imports an affection to that moral ſyſtem or community, which is governed by the ſame laws and magiſtrates, and whoſe ſeveral parts are variouſly connected one with the other, and all united upon the bottom of a common intereſt. Wherever this love of our country prevails in its genuine vigour and extent, it ſwallows up all ſordid and ſelfiſh regards; it conquers the love of eaſe, power, pleaſure, and wealth; nay, when the amiable partialities of friendſhip, gratitude, private affection, or regards to a family, come in competition with it, it will teach us to ſacrifice all, in order to maintain the rights, and promote and defend the honour and happineſs of our country. To purſue therefore our private intereſts in ſubordination to the good of our country; to be examples in it of virtue, and obedient to the laws; to chooſe ſuch repreſentatives as we apprehend to be the beſt friends to its conſtitution and liberties; and if we have the power, to promote ſuch laws as may improve and perfect it; readily to embrace every opportunity for advancing its proſperity; cheerfully to contribute to its defence and ſupport; and, if need be, to die for it:—theſe are among the duties which every man, who has the happineſs to be a member of our free and Proteſtant conſtitution, owes to his country.

The conſtitution of man is ſuch, that the moſt ſelfiſh paſſions, if kept within their proper bounds, have a tendency to promote the public good. There is no paſſion of more general utility than patriotiſm; but its origin may unqueſtionably be termed *ſelfiſh*. The love of one's relations and friends is the moſt natural expanſion of ſelf-love: this affection connects itſelf too with local circumſtances, and ſometimes cannot eaſily be ſeparated from them. It often varies, as relationſhip or place varies; but acquires new power when the whole community becomes its object. It was therefore with ſingular propriety that the poet ſaid, "Self-love and ſocial are the ſame." Under the article Calais we have already given the outlines of the tranſactions of its ſiege by Edward III. during which the inhabitants diſplayed a degree of *patriotiſm* truly wonderful. Hiſtory ſcarcely contains a more diſtinguiſhed inſtance of true patriotic virtue than on this occaſion. We ſhall therefore give a fuller account of this remarkable affair, as one of the beſt examples that can poſſibly be ſelected of the virtue we have been explaining. The inhabitants, under Count Vienne their gallant governor, made an admirable defence againſt a well diſciplined and powerful army. Day after day the Engliſh effected many a breach, which they repeatedly expected to ſtorm by morning; but, when morning appeared, they wondered to behold new ramparts raiſed nightly, erected out of the ruins which the day had made. France had now put her ſickle into her ſecond harveſt ſince Edward with his victorious army ſat down before the town. The eyes of all Europe were intent on the iſſue. The Engliſh made their approaches and attacks without remiſſion; but the citizens were as obſtinate in repelling all their efforts. At length, famine did more for Edward than arms. After the citizens had devoured the lean carcaſes of their half-ſtarved cattle, they tore up old foundations and rubbiſh in ſearch of vermin: they fed on boiled leather, and the weeds of exhauſted gardens; and a morſel of damaged corn was accounted matter of luxury. In this extremity they reſolved to attempt the enemy's camp. They boldly ſallied forth; the Engliſh joined battle; and, after a long and deſperate engagement, Count Vienne was taken priſoner; and the citizens, who ſurvived the ſlaughter, retired within their gates. On the captivity of their governor, the command devolved upon Euſtace Saint Pierre, the mayor of the town, a man of mean birth, but of exalted virtue. Euſtace ſoon found himſelf under the neceſſity of capitulating, and offered to deliver to Edward the city, with all the poſſeſſions and wealth of the inhabitants, provided he permitted them to depart with life and liberty. As Edward had long ſince expected to aſcend the throne of France, he was exaſperated to the laſt degree againſt theſe people, whoſe ſole valour had defeated his warmeſt hopes; he therefore determined to take an exemplary revenge, though he wiſhed to avoid the imputation of cruelty. He anſwered by Sir Walter Mauny, that they all deſerved capital puniſhment, as obſtinate traitors to him, their true and notable ſovereign; that, however, in his wonted clemency, he conſented to pardon the bulk of the plebeians, provided they would deliver up to him ſix of their principal citizens with halters about their necks, as victims of due atonement for that ſpirit of rebellion with which they had inflamed the common people. All the remains of this deſolate city were convened in the great ſquare; and like men arraigned at a tribunal from whence there was no appeal, expect-

Rapin's Hiſt. Eng. Edw. III.

ed with throbbing hearts the ſentence of their conqueror, When Sir Walter had declared his meſſage, conſternation and pale diſmay was impreſſed on every face: each looked upon death as his own inevitable lot; for how ſhould they deſire to be ſaved at the price propoſed? Whom had they to deliver up, ſave parents, brothers, kindred, or valiant neighbours, who had ſo often expoſed their lives in their defence? To a long and dead ſilence, deep ſighs and groans ſucceeded, till Euſtace Saint Pierre aſcending a little eminence, thus addreſſed the aſſembly: "My friends and fellow-citizens, you ſee the condition to which we are reduced; we muſt either ſubmit to the terms of our cruel and enſnaring conqueror, or yield up our tender infants, our wives, and chaſte daughters, to the bloody and brutal luſts of the violating ſoldiery. We well know what that tyrant intends by his ſpecious offers of mercy. It does not ſatiate his vengeance to make us merely miſerable, he would alſo make us criminal; he would make us contemptible; he will grant us life on no condition, ſave that of our being unworthy of it. Look about you, my friends, and fix your eyes on the perſon whom you wiſh to deliver up as the victims of your own ſafety. Which of theſe would you appoint to the rack, the ax, or the halter? Is there any here who has not watched for you, who has not fought for you, who has not bled for you? Who, through the length of this inveterate ſiege, has not ſuffered fatigues and miſeries a thouſand times worſe than death, that you and yours might ſurvive to days of peace and proſperity? Is it your preſervers, then, whom you would deſtine to deſtruction? You will not, you cannot, do it. Juſtice, honour, humanity, make ſuch a treaſon impoſſible. Where then is our reſource? Is there any expedient left, whereby we may avoid guilt and infamy on one hand, or the deſolation and horrors of a ſacked city on the other? There is, my friends, there is one expedient left; a gracious, an excellent, a god-like expedient! Is there any here to whom virtue is dearer than life! Let him offer himſelf an oblation for the ſafety of his people! he ſhall not fail of a bleſſed approbation from that power, who offered up his only Son for the ſalvation of mankind." He ſpoke—but an univerſal ſilence enſued. Each man looked round for the example of that virtue and magnanimity in others, which all wiſhed to approve in themſelves, though they wanted the reſolution. At length Saint Pierre reſumed: "It had been baſe in me, my fellow-citizens, to propoſe any matter of damage to others, which I myſelf had not been willing to undergo in my own perſon. But I held it ungenerous to deprive any man of that preference and eſtimation, which might attend a firſt offer on ſo ſignal an occaſion: for I doubt not but there are many here as ready, nay, more zealous for this martyrdom than I can be, however modeſty and the fear of imputed oſtentation may withhold them from being foremoſt in exhibiting their merits. Indeed the ſtation to which the captivity of Count Vienne has unhappily raiſed me, imports a right to be the firſt in giving my life for your ſakes. I give it freely, I give it cheerfully. Who comes next? Your ſon! exclaimed a youth, not yet come to maturity.—Ah, my child! cried St Pierre; I am then twice ſacrificed.—But no—I have rather begotten thee a ſecond time.—Thy years are few, but full my ſon; the victim of virtue has reached the utmoſt purpoſe and goal of mortality. Who next, my friends? This is the hour of heroes.—Your kinſman, cried John de Aire! Your kinſman, cried James Wiſſant! Your kinſman, cried Peter Wiſſant!—"Ah! (exclaimed Sir Walter Mauny, burſting into tears), why was I not a citizen of Calais?" The ſixth victim was ſtill wanting, but was quickly ſupplied by lot, from numbers who were now emulous of ſo ennobling an example. The keys of the city were then delivered to Sir Walter. He took the ſix priſoners into his cuſtody. He ordered the gates to be opened, and gave charge to his attendants to conduct the remaining citizens with their families through the camp of the Engliſh. Before they departed, however, they deſired permiſſion to take their laſt adieu of their deliverers.—What a parting? what a ſcene! they crowded with their wives and children about St Pierre and his fellow-priſoners. They embraced, they clung around, they fell proſtrate before them. They groaned; they wept aloud; and the joint clamour of their mourning paſſed the gates of the city, and was heard throughout the camp. At length Saint Pierre and his fellow victims appeared under the conduct of Sir Walter and his guard. All the tents of the Engliſh were inſtantly emptied. The ſoldiers poured from all parts, and arranged themſelves on each ſide to behold, to contemplate, to admire this little band of patriots as they paſſed. They murmured their applauſe of that virtue which they could not but revere even in enemies; and they regarded thoſe ropes which they had voluntarily aſſumed about their necks as enſigns of greater dignity than that of the Britiſh Garter. As ſoon as they had reached the royal preſence, "Mauny (ſays the king), are theſe the principal inhabitants of Calais?" "They are (ſays Mauny); they are not only the principal men of Calais, they are the principal men of France, my lord, if virtue has any ſhare in the act of ennobling." "Were they delivered peaceably, (ſays Edward)? Was there no reſiſtance, no commotion among the people?" "Not in the leaſt, my lord. They are ſelf-delivered, ſelf-devoted, and come to offer up their ineſtimable heads as an ample equivalent for the ranſom of thouſands."

The king, who was highly incenſed at the length and difficulty of the ſiege, ordered them to be carried away to immediate execution; nor could all the remonſtrances and intreaties of his courtiers divert him from his cruel purpoſe. But what neither a regard to his own intereſt and honour, what neither the dictates of juſtice, nor the feelings of humanity, could effect, was happily accompliſhed by the more powerful influence of conjugal affection. The queen, who was then big with child, being informed of the particulars reſpecting the ſix victims, flew into her huſband's preſence, threw herſelf on her knees before him, and, with tears in her eyes, beſought him not to ſtain his character with an indelible mark of infamy, by committing ſuch a horrid and barbarous deed. Edward could refuſe nothing to a wife whom he ſo tenderly loved, and eſpecially in her condition; and the queen, not ſatisfied with having ſaved the lives of the ſix burghers, conducted them to her tent, where ſhe applauded their virtue, regaled them with a plentiful repaſt, and having made them a preſent of money and clothes, ſent them back to their fellow-citizens.

The love of their country, and of the public good, ſeems to have been the predominant paſſion of the Spartans. Pedaretus having miſſed the honour of being choſen one of the three hundred who had a certain rank of diſtinction in the city, went home extremely pleaſed and ſatisfied; ſaying, "He was overjoyed there were three hundred men in Sparta more honourable than himſelf."

Plutarch's Life of Lycurgus.

The patriotiſm of the Romans is well known, and has been juſtly admired. We ſhall content ourſelves at preſent with the following example; a zeal and patriotic devotion ſimilar to which is perhaps ſcarcely equalled, and certainly is not exceeded, in hiſtory.

Dion lib. viii p. 570. and Rollin's Rom. Hiſt. v. i. p. 366.

Rome, under the conſuls Cæſo Fabius and T. Virginius, had ſeveral wars to ſuſtain, leſs dangerous than troubleſome, againſt the Æqui, Volſci, and Veientes. To put a ſtop to the incurſions of the laſt, it would have been neceſſary to have eſtabliſhed a good garriſon upon their frontiers to keep them in awe. But the commonwealth, exhauſted of money, and menaced by abundance of other enemies, was not in a condition to provide for ſo many different cares and expences. The family of the Fabii ſhowed a generoſity and love of their country that has been the admiration of all ages. They applied to the ſenate, and by the mouth of the conſul demanded as a favour that they would be pleaſed to transfer the care and expences of the garriſon neceſſary to oppoſe the enterprizes of the Veientes to their houſe, which required an aſſiduous rather than a numerous body, promiſing to ſupport with dignity the honour of the Roman name in that poſt. Every body was charmed with ſo noble and unheard-of an offer; and it was accepted with great acknowledgment. The news ſpread over the whole city and nothing was talked of but the Fabii. Every body praiſed, every body admired and extolled them to the ſkies. "If there were two more ſuch families in Rome," ſaid they, "the one might take upon them the war againſt the Volſci, and the other againſt the Æqui, whilſt the commonwealth remained quiet, and the forces of particulars ſubdued the neighbouring ſtates."

Early the next day the Fabii ſet out, with the conſul at their head, robed and with his inſignia. Never was there ſo ſmall, and at the ſame time ſo illuſtrious, an army ſeen; for which we have the authority of Livy. Three hundred and ſix ſoldiers, all patricians, and of the ſame family, of whom not one but might be judged worthy of commanding an army, marched againſt the Veii full of courage and alacrity, under a captain of their own name, Fabius. They were followed by a body of their friends and clients, animated by the ſame ſpirit and zeal, and actuated only by great and noble views. The whole city flocked to ſee ſo fine a ſight; praiſed thoſe generous ſoldiers in the higheſt terms; and promiſed them conſulſhips, triumphs, and the moſt glorious rewards. As they paſſed before the capital and the other temples, every body implored the gods to take them into their protection; to favour their departure and undertaking, and to afford them a ſpeedy and happy return. But thoſe prayers were not heard. When they arrived near the river Crimera, which is not far from Veii, they built a fort upon a very rough and ſteep mountain for the ſecurity of the troops, which they ſurrounded with a double foſſe, and flanked with ſeveral towers. This ſettlement, which prevented the enemy from cultivating their ground, and ruined their commerce with ſtrangers, incommoded them extremely. The Veientes not finding themſelves ſtrong enough to ruin the fort which the Romans had erected, applied to the Hetrurians, who ſent them very conſiderable aid. In the mean time the Fabii, encouraged by the great ſucceſs of their incurſions into the enemy's country made farther progreſs every day. Their exceſſive boldneſs made the Hetrurians conceive thoughts of laying ambuſcades for them in ſeveral places. During the night they ſeized all the eminences that commanded the plain, and found means to conceal a great number of troops upon them. The next day they diſperſed more cattle about the country than they had done before. The Fabii being apprized that the plains were covered with flocks and herds, and defended by only a very ſmall number of troops, they quitted their fort, leaving in it only a ſufficient number to guard it. The hopes of a great booty quickened their march. They arrived at the place in order of battle; and were preparing to attack the advanced guard of the enemy, when the latter, who had their orders, fled without ſtaying till they were charged. The Fabii, believing themſeves ſecure, ſeized the ſhepherds, and were preparing to drive away the cattle. The Hetrurians then quitted their ſkulking places, and fell upon the Romans from all ſides, who were moſt of them diſperſed in purſuit of their prey. All they could do was to rally immediately; and that they could not effect without great difficulty. They ſoon ſaw themſelves ſurrounded on all ſides, and fought like lions, ſelling their lives very dear. But finding that they could not ſuſtain this kind of combat long, they drew up in a wedge, and advancing with the utmoſt fury and impetuoſity opened themſelves a paſſage through the enemy that led to the ſide of the mountain. When they came thither, they halted, and fought with freſh courage, the enemy leaving them no time to reſpire. As they were upon the higher ground, they defended themſelves with advantage, notwithſtanding their ſmall number; and beating down the enemy, who ſpared no pains in the attack, they made a great ſlaughter of them. But the Veientes having gained the top of the mountain by taking a compaſs, fell ſuddenly upon them, and galled them exceedingly from above with a continual ſhower of darts. The Fabii defended themſelves to their laſt breath, and were all killed to a man. The Roman people were highly affected with the loſs of this illuſtrious band of patriots. The day of their defeat was ranked amongſt their unfortunate days, called *nefaſti*, on which the tribunals were ſhut up, and no public affair could be negociated, or at leaſt concluded. The memory of theſe public ſpirited patricians, who had ſo generouſly ſacrificed their lives and fortunes for the ſervice of the ſtate, could not be too much honoured.

PATRIPASSIANS, PATRIPASSIANI, in church-hiſtory, a Chriſtian ſect, who appeared about the latter end of the ſecond century; ſo called, from their aſcribing the paſſion to the Father; for they aſſerted the unity of God in ſuch a manner as to deſtroy all diſtinctions of perſons, and to make the Father and Son preciſely the ſame; in which they were followed by the Sabellians and others. The author and head of the Patripaſſians was Praxeas, a philoſopher of Phrygia in Aſia. Swedenborg and his followers ſeem to hold the ſame faith.

PATROCLUS, a Grecian chief at the Trojan war. He was the ſon of Menœtius, by Sthenele, whom ſome call *Philomela* or *Polymela*. The murder of Clyſonymus, the ſon of Amphidamas, by accident in the time of his youth, made him fly from Opus, where his father reigned. He went to the court of Peleus king of Phthia. He was cordially received, and contracted the moſt intimate friendſhip with Achilles the king's ſon. When the Greeks went to the Trojan war, Patroclus went with them at the expreſs deſire of his father, who had viſited the court of Peleus; and he accordingly embarked with ten ſhips from Phthia. He was the conſtant companion of Achilles; lodged in the ſame tent; and when he refuſed to appear in the field of battle, becauſe he had been offended by Agamemnon, Patroclus imitated his example, and by his abſence was the cauſe of much evil to the Greeks. At laſt however, Neſtor prevailed on him to return to the war, and Achilles permitted him to appear in his armour. The bravery of Patroclus, together with the terror which the ſight of the arms of Achilles inſpired, ſoon routed the victorious armies of the Trojans, and obliged them to fly to the city for ſafety. He would have broken down the walls; but Apollo, who intereſted himſelf for the Trojans, oppoſed him; and Hector, at the inſtigation of that god, diſmounted from his chariot to attack him as he attempted to ſtrip one of the Trojans whom he had ſlain. This engagement was obſtinate; but Patroclus was at length overpowered by the valour of Hector, and the interpoſition of Apollo. His arms became the property of the conqueror; and Hector would have ſevered his head from his body had not Ajax and Menelaus prevented it. His body was at laſt recovered, and carried to the Grecian camp, where Achilles received it with the loudeſt lamentations. His funerals were obſerved with the greateſt ſolemnity. Achilles ſacrificed near the burning pile twelve young Trojans, four of his horſes, and two of his dogs; and the whole was concluded by the exhibition of funeral games, in which the conquerors were liberally rewarded by Achilles. The death of Patroclus, as deſcribed by Homer, gave riſe to new events. Achilles forgot his reſentment againſt Agamemnon, and entered the field to avenge the fall of his friend; and his anger was gratified only by the ſlaughter of Hector, who had more powerfully kindled his wrath by appearing at the head of the Trojan armies in the armour which had been taken from the body of Patroclus. The patronymic of Actorides is often applied to Patroclus, becauſe Actor was father to Menœtius.

PATROL, in war, a round or march made by the guards or watch in the night time, to obſerve what paſſes in the ſtreets, and to ſecure the peace and tranquillity of a city or camp. The patrol generally conſiſts of a body of five or ſix men, detached from a body on guard, and commanded by a ſerjeant.

They go every hour of the night, from the beating of the tattoo until the reveille: they are to walk in the ſtreets in garriſons, and all over the camp in the field, to prevent diſorders, or any number of people from aſſembling together: they are to ſee the lights in the ſoldiers barracks put out, and to take up all the ſoldiers they find out of their quarters. Sometimes patrols conſiſt of an officer and 30 or 40 men, as well infantry as cavalry; but then the enemy is generally near at hand, and conſequently the danger greater.

PATRON, among the Romans, was an appellation given to a maſter who had freed his ſlave. As ſoon as the relation of maſter expired, that of patron began: for the Romans, in giving their ſlaves their freedom, did not diſpoil themſelves of all rights and privileges in them; the law ſtill ſubjected them to conſiderable ſervices and duties towards their patrons, the neglect of which was very ſeverely puniſhed.

Patron was alſo a name which the people of Rome gave to ſome great man, under whoſe protection they uſually put themſelves; paying him all kinds of honour and reſpect, and denominating themſelves his clients; while the patron, on his ſide, granted them his credit and protection. They were therefore mutually attached and mutually obliged to each other; and by this means, in conſequence of reciprocal ties, all thoſe ſeditions, jealouſies, and animoſities, which are ſometimes the effect of a difference of rank, were prudently avoided: for it was the duty of the patron to adviſe his clients in points of law, to manage their ſuits, to take care of them as of his own children, and ſecure their peace and happineſs. The clients were to aſſiſt their patrons with money on ſeveral occaſions; to ranſom them or their children when taken in war; to contribute to the portions of their daughters; and to defray, in part, the charges of their public employments. They were never to accuſe each other, or take contrary ſides; and if either of them was convicted of having violated this law, the crime was equal to that of treaſon, and any one was allowed to kill the offender with impunity. This patronage was a tie as effectual as any conſanguinity or alliance, and had a wonderful effect towards maintaining union and concord among the people for the ſpace of 600 years; during which time we find no diſſentions nor jealouſies between the patrons and their clients, even in the times of the republic when the populace frequently mutinied againſt thoſe who were moſt powerful in the city.

Patron, in the church of Rome, a ſaint whoſe name a perſon bears, or under whoſe protection he is put, and whom he takes particular care to invoke; or a ſaint in whoſe name a church or order is founded.

Patron, in the canon or common law, is a perſon who, having the advowſon of a parſonage, vicarage, or the like ſpiritual promotion, belonging to his manor, hath on that account the gift and diſpoſition of the benefice, and may preſent to it whenever it becomes vacant. The patron's right of diſpoſing of a benefice originally ariſes either from the patron or his anceſtors, &c. being the founders or builders of the church; from their having given lands for the maintenance thereof; or from the church's being built on their ground; and frequently from all three together.

PATRONAGE, or Advowson, a ſort of incorporeal hereditament, conſiſting in the right of preſentation to a church or eccleſiaſtical benefice. Advowſon, *advocatio*, ſignifies *in clientelam recipere*, the

Blackſtone's Commentaries.

taking into protection; and therefore is ſynonymous with patronage, *patronatus:* and he who has the right of advowſon is called the *patron of the church.* For when lords of manors firſt built churches on their own demeſnes, and appointed the tithes of thoſe manors to be paid to the officiating miniſters, which before were given to the clergy in common (from whence aroſe the diviſion of pariſhes), the lord who thus built a church, and endowed it with glebe or land, had of common right a power annexed of nominating ſuch miniſter as he pleaſed (provided he were canonically qualified) to officiate in that church, of which he was the founder, endower, maintainer, or, in one word, the patron.

Advowſons are either advowſons *appendant*, or advowſons *in groſs*. Lords of manors being originally the only founders, and of courſe the only patrons, of churches, the right of patronage or preſentation, ſo long as it continues annexed to the poſſeſſion of the manor, as ſome have done from the foundation of the church to this day, is called an *advowſon appendant:* and it will paſs, or be conveyed, together with the manor, as incident and appendant thereto, by a grant of the manor only, without adding any other words. But where the property of the advowſon has been once ſeparated from the property of the manor by legal conveyance, it is called an *advowſon in groſs*, or at large, and never can be appendant any more; but it is for the future annexed to the perſon of its owner, and not to his manor or lands.

Advowſons are alſo either *preſentative*, *collative*, or *donative*. An advowſon preſentative, is where the patron hath a right of preſentation to the biſhop or ordinary, and moreover to demand of him to inſtitute his clerk if he finds him canonically qualified: and this is the moſt uſual advowſon. An advowſon collative, is where the biſhop and patron are one and the ſame perſon: in which caſe the biſhop cannot preſent to himſelf; but he does, by the one act of collation, or conferring the benefice, the whole that is done in common caſes, by both preſentation and inſtitution. An advowſon donative, is when the king, or any ſubject by his licence, doth found a church or chapel, and ordains that it ſhall be merely in the gift or diſpoſal of the patron; ſubject to his viſitation only, and not to that of the ordinary; and veſted abſolutely in the clerk by the patron's deed of donation, without preſentation, inſtitution, or induction. This is ſaid to have been anciently the only way of conferring eccleſiaſtical benefices in England; the method of inſtitution by the biſhop not being eſtabliſhed more early than the time of Archbiſhop Becket in the reign of Henry II. and therefore, though pope Alexander III. in a letter to Becket, ſeverely inveighs againſt the *prava conſuetudo*, as he calls it, of inveſtiture conferred by the patron only, this however ſhows what was then the common uſage. Others contend that the claim of the biſhops to inſtitution is as old as the firſt planting of Chriſtianity in this iſland; and in proof of it they allege a letter from the Engliſh nobility to the pope in the reign of Henry the third recorded by Matthew Paris, which ſpeaks of preſentation to the biſhop as a thing immemorial. The truth ſeems to be, that, where the benefice was to be conferred on a mere layman, he was firſt preſented to the biſhop in order to receive ordination, who was at liberty to examine and refuſe him: but where the clerk was already in orders, the living was uſually veſted in him by the ſole donation of the patron; till about the middle of the 12th century, when the pope and his biſhops endeavoured to introduce a kind of feodal dominion over eccleſiaſtical benefices, and, in conſequence of that, began to claim and exerciſe the right of inſtitution univerſally, as a ſpecies of ſpiritual inveſtiture.

However this may be, if, as the law now ſtands, the true patron once waves this privilege of donation, and preſents to the biſhop, and his clerk is admitted and inſtituted, the advowſon is now become for ever preſentative, and ſhall never be donative any more. For theſe exceptions to general rules and common right are ever looked upon by the law in an unfavourable view, and conſtrued as ſtrictly as poſſible. If therefore the patron, in whom ſuch peculiar right reſides, does once give up that right, the law, which loves uniformity, will interpret it to be done with an intention of giving it up for ever; and will therefore reduce it to the ſtandard of other eccleſiaſtical livings. See further, LAW, Part III. Sect. v. N° clix. 5—10.

Arms of PATRONAGE, in heraldry, are thoſe on the top of which are ſome marks of ſubjection and dependence: thus the city of Paris lately bore the fleurs-de-lis in chief, to ſhow her ſubjection to the king; and the cardinals, on the top of their arms, bear thoſe of the pope, who gave them the hat, to ſhow that they are his creatures.

PATRONYMIC, among grammarians, is applied to ſuch names of men or women as are derived from thoſe of parents or anceſtors.

Patronymics are derived, 1. From the father; as Pelides, *i. e.* Achilles the ſon of Peleus. 2. From the mother; as Philyrides, *i. e.* Chiron the ſon of Philyra. 3. From the grandfather on the father's ſide; as Æacides, *i. e.* Achilles the grandſon of Æacus. 4. From the grandfather by the mother's ſide; as Atlantiades, *i. e.* Mercury the grandſon of Atlas. And, 5. From the kings and founders of nations; as Romulidæ, *i. e.* the Romans, from their founder king Romulus.

The termination of Greek and Latin patronymics are chiefly four, viz. *des*, of which we have examples above; *as*, as Thaumantias, *i. e.* Iris the daughter of Thaumas; *is*, as Atlantis, *i. e* Electra the daughter of Atlas; and *ne*, as Nerine, the daughter of Nereus. Of theſe terminations *des* is maſculine; and *as*, *is*, and *ne*, feminine: *des* and *ne* are of the firſt declenſion, *as* and *is* of the the third.

The Ruſſians, in their uſual mode of addreſs, never perfix any title or appellation of reſpect to their names; but perſons of all ranks, even thoſe of the firſt diſtinction, call each other by their Chriſtian names, to which they add a patronymic. Theſe patronymics are formed in ſome caſes by adding Vitch (the ſame as our Fitz, as Fitzherbert, or the ſon of Herbert) to the Chriſtian name of the father; in others by Of or Ef; the former is applied only to perſons of condition, the latter to thoſe of inferior rank. Thus,

Ivan Ivanovitch, Ivan Ivanof, is Ivan the ſon of Ivan; Peter Alexievitch, Peter Alexeef, Peter the ſon of Alexey.

The female patronymic is Eſna or Oſna, as Sophia

Alexeefna, or Sophia the daughter of Alexey; Maria Ivanofna, or Maria the daughter of Ivan.

Great families are alſo in general diſtinguiſhed by a ſurname, as thoſe of Romanof, Galatzin, Sheremetof, &c.

PATROS, mentioned by Jeremiah and Ezekiel, appears from the context to be meant of a part of Egypt. Bochart thinks it denotes the Higher Egypt: the Septuagint tranſlate it the country of *Pathure;* in Pliny we have the *Nomos Phaturites;* in the Thebais; in Ptolemy, *Pathyris*, probably the metropolis. From the Hebrew appellation *Patros* comes the gentilitious name *Pathruſim*, Moſes.

PATRU (Oliver), a counſellor in Parliament, and dean of the French academy, was born at Paris in 1604. He had an excellent faculty both of ſpeaking and writing. Upon his admiſſion into the French academy in 1640, he made an oration of thanks, that gave riſe to the cuſtom of admiſſory ſpeeches, which are ſtill in uſe in that ſociety. Mr de Vaugelas owns himſelf much indebted to him for his aſſiſtance in compoſing his remarks on the French tongue, of which he was by far the greateſt maſter in France; ſo that he was conſulted as an oracle by all the beſt writers of that nation.

Patru was eſtimable for the qualities of his heart, as well as for thoſe of the head: was honeſt, generous, ſincere; and preſerved a gayneſs of character, which no ill fortune could alter or affect. For this famous advocate, in ſpite of all his great talents, lived almoſt in a ſtate of indigence. The love of the belles lettres made him neglect the law; and the barren glory of being an oracle to the beſt French writers had more charms for him, than all the profits of the bar. Hence he became ſo poor, as to be reduced to the neceſſity of ſelling his books, which ſeemed dearer to him than his life; and would actually have ſold them for an under-price, if Boileau had not generouſly advanced him a larger ſum, with this further privilege, that he ſhould have the uſe of them as long as he lived. His death was preceded by a tedious illneſs, during which he received a preſent of 500 crowns from Colbert, as a mark of the eſteem which the king had for him. He died the 16th of January 1681. The prodigious care and exactneſs with which he retouched and finiſhed every thing he wrote, did not permit him to publiſh much. His miſcellaneous works were printed at Paris in 1670, 4to; the third edition of which, in 1714, 4to, was augmented with ſeveral pieces. They conſiſt of Pleadings, Orations, Letters, Lives of ſome of his Friends, Remarks upon the French Language, &c.

PATTANS, PATANS, or AFGHANS, a very warlike race of men, who had been ſubjects of the vaſt empire of Boehara. They revolted under their governor Abſtagi, in the 10th century, and laid the foundation of the empire of Ghizni or Gazna. In the Diſſertation prefixed to Vol. III. of Dow's Hiſtory, we have this account of the Pattans.

"They are divided into diſtinct communities, each of which is governed by a prince, who is conſidered by his ſubjects as the chief of their blood, as well as their ſovereign. They obey him without reluctance, as they derive credit to their family by his greatneſs. They attend him in his wars with the attachment which children have to a parent; and his government, though ſevere, partakes more of the rigid diſcipline of a general than the caprice of a deſpot. Rude, like the face of their country, and fierce and wild as the ſtorms which cover their mountains, they are addicted to incurſions and depredations, and delight in battle and plunder. United firmly to their friends in war, to their enemies faithleſs and cruel, they place juſtice in force, and conceal treachery under the name of addreſs."

The empire, which took its riſe from the revolt of the Pattans, under a ſucceſſion of warlike princes roſe to a ſurpriſing magnitude. In the beginning of the 11th century, it extended from Iſpahan to Bengal, and from the mouths of the Indus to the banks of the Jaxartes, which comprehends at leaſt half of the continent of Aſia. They had fled to the mountains on the borders of Perſia, that they might eſcape the ſword, or avoid ſubmitting to the conquerors of India; and there they formed their ſtate, which the Moguls were never able thoroughly to ſubdue. Indeed they ſometimes exerciſed depredations on the adjacent countries; nor was it poſſible for the Moguls either to prevent it or to extirpate them. They were ſenſible that the climate and ſoil of the delicious plains would only ſerve to rob them of that hardineſs they contracted in the hills to which they were confined; they, therefore, for a long time gave no indications of a deſire to exchange them for more pleaſing abodes, or a more acceſſible ſituation. This enabled them to brave the victorious army of Nadir Shah, whoſe troops they quietly ſuffered to penetrate into Hindoſtan, and waited his return with the ſpoils of that country.—They then haraſſed his army in the ſtraits and defiles of the mountains, and proved themſelves ſuch abſolute maſters of the paſſes, that they forced him to purchaſe from them his paſſage into Perſia.

In the beginning of the preſent century, they had ſpread themſelves over the adjoining province of Kandabar; and ſuch was the imbecility of the Perſian empire at that time, that many other provinces and tributary ſtates were alſo induced to revolt. When the king or ſhah of that time, whoſe name was *Huſſein*, oppoſed the growing power of this warlike people, he was totally defeated, and Iſpahan was beſieged and obliged to ſurrender, after having ſuffered dreadful calamities, to an army conſiſting of only 30,000 men. In conſequence of this, they brought about a revolution in Perſia, and ſubjected it to themſelves. This ſovereignty, however, they only held for ſeven years and 21 days, having fallen a ſacrifice to the enterpriſing ſpirit of Kouli Khan, or Nadir Shah. See PERSIA, and in the Appendiz AFGHANS.

PAU, a town of France, in the province of Gaſcony and territory of Bearne, with a parliament, a mint, and a caſtle. "The city of Pau (ſays Wraxal*) will be for ever memorable in hiſtory, ſince it was the birth-place, of Henry IV. That immortal prince was born in the caſtle, then the uſual reſidence of the kings of Navarre. It ſtands on one of the moſt romantic and ſingular ſpots I have ever ſeen, at the weſt end of the town, upon the brow of a rock which terminates perpendicularly. Below runs the Gave, a river or rather a torrent which riſes in the Pyrenees, and empties itſelf into the Adour. On the other ſide, about two miles

* Tour through France.

miles off, is a ridge of hills covered with vineyards, which produce the famous *Vin de Jorençon*, ſo much admired; and beyond all, at the diſtance of nine leagues appear the Pyrenees themſelves, covering the horizon from eaſt to weſt, and bounding the proſpect. The caſtle, though now in a ſtate of decay, is ſtill habitable; and the apartments are hung with tapeſtry, ſaid to be the work of Jane queen of Navarre, and mother of Henry IV. Gaſton IV. Count de Foix, who married Leonora heireſs of the crown of Navarre, began the edifice in 1464; but his ſucceſſor Henry d'Albret completed and enlarged it about the year 1519, when he made choice of the city of Pau for his reſidence, and where, during the remainder of his reign, he held his little court. In a chamber, which by its ſize was formerly a room of ſtate, is a fine whole length portrait of that Jane queen of Navarre whom I have juſt mentioned. Her dreſs is very ſplendid, and reſembles thoſe in which Queen Elizabeth is uſually painted. Her head dreſs is adorned with pearls; round her neck ſhe wears a ruff; and her arms, which are likewiſe covered with pearls, are concealed by her habit quite down to the wriſt. At her waiſt hangs by a chain a miniature portrait. The fingers of her right hand play on the ſtrings of a guittar; and in her left ſhe holds an embroidered handkerchief. The painter has drawn her as young, yet not in the firſt bloom of youth. Her features are regular, her countenance thin, but rather inclining to long; the eyes hazel, and the eye-brows finely arched. Her noſe is well formed though large, and her mouth pretty. She was a great princeſs, of high ſpirit, and undaunted magnanimity. Her memory is not revered by the French hiſtorians, becauſe ſhe was the protectreſs of the Huguenots and the friend of Cologni; but the actions of her life evince her diſtinguiſhed merit.

"In one of the adjoining chambers, is another portrait of Henry IV. himſelf when a boy; and on the ſecond floor is the apartment in which he was born. The particulars of his birth are in themſelves ſo curious, and as relating to ſo great and good a prince are ſo peculiarly intereſting, that I doubt not you will forgive my enumerating them, even though you ſhould have ſeen them elſewhere.—His mother Jane had already loſt two ſons, the duke de Beaumont and the count de Marle. Henry d'Albret, her father, anxious to ſee an heir to his dominions, enjoined her (when ſhe accompanied her huſband Antony of Bourbon to the wars of Picardy againſt the Spaniards), if ſhe proved with child, to return to Pau, and to lie-in there, as he would himſelf ſuperintend the education of the infant from the moment of its birth. He threatened to diſinherit her if ſhe failed to comply with this injunction. The princeſs, in obedience to the king's command, being in the ninth month of her pregnancy, quitted Compiegne in the end of November, traverſed all France in 15 days, and arrived at Pau, where ſhe was delivered of a ſon on the 13th December 1533. She had always been deſirous to ſee her father's will, which he kept in a golden box; and he promiſed to ſhow it to her, provided ſhe admitted of his being preſent at her delivery, and would during the pains of her labour ſing a ſong in the Bearnois language. Jane had courage enough to perform this unuſual requeſt; and the king being called on the firſt news of her illneſs, ſhe immediately ſung a Bearnois ſong, beginning, 'Notre Dame du bout du pont, aidez moi en cette heure.'—As ſhe finiſhed it, Henry * was born. The king inſtantly performed his promiſe, by giving her the box, together with a golden chain, which he tied about her neck; and taking the infant into his own apartment, began by making him ſwallow ſome drops of wine, and rubbing his lips with a root of garlic. They ſtill ſhow a tortoiſe-ſhell which ſerved him for a cradle, and is preſerved on that account. Several of the ancient ſovereigns of Navarre reſided and died in the caſtle of Pau. François Phœbus, who aſcended the throne in 1479, died here in 1483."

Pau is a handſome city, well built, and contains near 6000 inhabitants. It is a modern place, having owed its exiſtence entirely to the caſtle, and to the reſidence of the kings of Navarre. W. Long. 0. 4. N. Lat. 43. 15.

PAVAN, or Pavane, a grave dance uſed among the Spaniards, and borrowed from them; wherein the performers make a kind of wheel or tail before each other, like that of *pavo*, "a peacock;" from whence the name is derived. The pavane was formerly in great repute; and was danced by gentlemen with cap and ſword; by thoſe of the long robe in their gowns, by princes with their mantles, and by the ladies with their gown tails trailing on the ground. It was called the *grand bal'*, from the ſolemnity with which it was performed. To moderate its gravity, it was uſual to introduce ſeveral flouriſhes, paſſades, capers, &c. by way of epiſodes. Its tablature or ſcore is given at large by Thoinot Arbeau in his Orcheſographia.

PAVETTA, in botany; A genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking under the 47th order, *Stellatæ*. The corolla is monopetalous and funnel-ſhaped above: the ſtigma carved; the berry diſpermous.

PAVIA, an ancient and celebrated town of Italy, in the duchy of Milan, and capital of the Paveſan, with an univerſity and biſhop's ſee. It was anciently called *Ticinum*, from its ſituation on that river, and lies 20 miles to the ſouthward of Milan. It was formerly the capital of the Longobardic kingdom, and is ſtill remarkable for the broadneſs of its ſtreets, the beauty and richneſs of ſome of its churches, and for its univerſity, founded by Charlemagne, and for ſeveral other literary inſtitutions. Here is a biſhop's ſee, which was once the richeſt in Italy, but is now dependent on the pope; and upon the whole the city is gone to decay, its trade being ruined through the exactions of the government. The few objects within it worth the public attention belong to the clergy or monks; and the church and convent of the Carthuſians are inexpreſſibly noble, the court of the convent being one of the fineſt in the world, and ſurrounded by a portico ſupported by pillars, the whole a mile in circumference. It is defended by ſtrong walls, large ditches, good ramparts, excellent baſtions, and a bridge over the river Taſin. In the centre of the town is a ſtrong caſtle, where the duke of Milan was wont to reſide. There are a great number of magnificent caſtles, and ſome colleges. It was taken by the duke of Savoy in 1706; by the

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* See Hen. IV. King of France.

French in 1733; by the French and Spaniards in 1745; but retaken by the Auſtrians in 1746, E. Long. 9. 5. N. Lat. 45. 10.

PAVILION, in architecture, ſignifies a kind of turret or building, uſually inſulated, and contained under a ſingle roof; ſometimes ſquare and ſometimes in form of a dome: thus called from the reſemblance of its roof to a tent.

Pavilions are ſometimes alſo projecting pieces, in the front of a building, marking the middle thereof; ſometimes the pavilion flanks a corner, in which caſe it is called *an angular pavilion.* The Louvre is flanked with four pavilions; the pavilions are uſually higher than the reſt of the building. There are pavilions built in gardens, commonly called *ſummer-houſes, pleaſure houſes,* &c. Some caſtles or forts conſiſt only of a ſingle pavilion.

Pavilion, in military affairs, ſignifies a tent raiſed on poſts, to lodge under in the ſummer-time.

Pavilion, is alſo ſometimes applied to flags, colours, enſigns, ſtandards, banners, &c.

Pavilion, in heraldry, denotes a covering in form of a tent, which inveſts or wraps up the armories of divers kings and ſovereigns, depending only on God and their ſword.

The pavilion conſiſts of two parts; the top, which is the chapeau, or coronet; and the curtain, which makes the mantle.

None but ſovereign monarchs, according to the French heralds, may bear the pavilion entire, and in all its parts. Thoſe who are elective, or have any dependence, ſay the heralds, muſt take off the head, and retain nothing but the curtains.

Pavilions, among jewellers, the underſides and corners of the brilliants, lying between the girdle and the collet.

PAVING, the conſtruction of ground-floors, ſtreets, or highways, in ſuch a manner that they may be conveniently walked upon. In Britain, the pavement of the grand ſtreets, &c. are uſually of flint, or rubble-ſtone; courts, ſtables, kitchens, halls, churches, &c. are paved with tiles, bricks, flags, or fire-ſtone; ſometimes with a kind of free-ſtone and rag-ſtone.

In ſome ſtreets, *e. gr.* of Venice, the pavement is of brick: churches ſometimes are paved with marble, and ſometimes with moſaic work, as the church of St Mark at Venice. In France, the public roads, ſtreets, courts, &c. are all paved with gres or grit, a kind of free-ſtone.

In Amſterdam and the chief cities of Holland, they call their brick pavement the *burgher-maſters pavement,* to diſtinguiſh it from the ſtone or flint pavement, which uſually takes up the middle of the ſtreet, and which ſerves for carriages; the brick which borders it being deſtined for the paſſage of the people on foot.

Pavements of free-ſtone, flint, and flags, in ſtreets, &c. are laid dry, *i. e.* in a bed of ſand; thoſe of courts, ſtables, ground-rooms, &c. are laid in a mortar of lime and ſand; or in lime and cement, eſpecially if there be vaults or cellars underneath. Some maſons, after laying a floor dry, eſpecially of brick, ſpread a thin mortar over it; ſweeping it backwards and forwards to fill up the joints. The ſeveral kinds of pavement are as various as the materials of which they are compoſed and whence they derive the name by which they are diſtinguiſhed; as,

1. *Pebble-paving,* which is done with ſtones collected from the ſea-beach, moſtly brought from the iſlands of Guernſey and Jerſey: they are very durable, indeed the moſt ſo of any ſtone uſed for this purpoſe. They are uſed of various ſizes, but thoſe which are from ſix to nine inches deep, are eſteemed the moſt ſerviceable. When they are about three inches deep, they are denominated *bolders* or *bow'ers;* theſe are uſed for paving court-yards, and other places not accuſtomed to receive carriages with heavy weights; when laid in geometrical figures, they have a very pleaſing appearance.

2. *Rag-paving* was much uſed in London, but is very inferior to the pebbles; it is dug in the vicinity of Maidſtone in Kent, from which it has the name of *Kentiſh rag-ſtone;* there are ſquared ſtones of this material for paving coach-tracks and foot-ways.

3. *Purbeck pitchens;* ſquare ſtones uſed in foot-ways; they are brought from the iſland of Purbeck, and alſo frequently uſed in court-yards; they are in general from ſix to ten inches ſquare, and about five inches deep.

4. *Squared paving,* for diſtinction by ſome called *Scotch paving,* becauſe the firſt of this kind paved in the manner that has been and continues to be paved, came from Scotland; the firſt was a clear cloſe ſtone, called *blue whynn,* which is now diſuſed, becauſe it has been found inferior to others ſince introduced in the order they are hereafter placed.

5. *Granite,* a hard material, brought alſo from Scotland, of a reddiſh colour, very ſuperior to the blue whynn quarry, and at preſent very commonly uſed in London.

6. *Guernſey,* which is the beſt, and very much in uſe; it is the ſame ſtone with the pebble before ſpoken of, but broken with iron hammers, and ſquared to any dimenſions required of a priſmoidical figure, ſet with its ſmalleſt baſe downwards. The whole of the foregoing paving ſhould be bedded and paved in ſmall gravel.

7. *Purbeck-paving,* for foot-ways, is in general got in large ſurfaces about 2½ inches thick; the blue ſort is the hardeſt and the beſt of this kind of paving,

8. *Yorkſhire paving,* is an exceeding good material for the ſame purpoſe, and is got of almoſt any dimenſions of the ſame thickneſs as the Purbeck. This ſtone will not admit the wet to paſs through it, nor is it affected by the froſt.

9. *Ryegate,* or *fire-ſtone paving,* is uſed for hearths, ſtoves, ovens, and ſuch places as are liable to great heat, which does not affect the ſtone if kept dry.

10. *Newcaſtle flags,* are ſtones about two feet ſquare, and 1½ or two inches thick; they anſwer very well for paving out-offices: they are ſomewhat like the Yorkſhire.

11. *Portland paving,* with ſtone from the iſland of Portland; this is ſometimes ornamented with black marble dots.

12. *Swedland paving,* is a black ſlate dug in Leiceſterſhire, and looks well for paving halls, or in party-coloured paving.

13. *Marble paving,* is moſtly variegated with different marbles, ſometimes inlaid in moſaic.

14. *Flat brick paving,* done with brick laid in ſand,

mortar, or groute, as when liquid lime is poured into the joints.

15. *Brick-on-edge paving*, done with brick laid edgewiſe in the ſame manner.

16. Bricks are alſo laid flat or edgewiſe in herring-bone.

17. Bricks are alſo ſometimes ſet endwiſe in ſand, mortar, or groute.

18. Paving is alſo performed with paving bricks.

19. With ten inch tiles.

20. With foot tiles.

21. With clinkers for ſtables and outer offices.

22. With the bones of animals, for gardens, &c.

And, 23. We have knob-paving, with large gravel-ſtones, for porticoes, garden-ſeats, &c.

Pavements of churches, &c. frequently conſiſt of ſtones of ſeveral colours; chiefly black and white, and of ſeveral forms, but chiefly ſquares and lozenges, artfully diſpoſed. Indeed, there needs no great variety of colours to make a ſurpriſing diverſity of figures and arrangements. M. Truchet, in the Memoirs of the French Academy, has ſhown by the rules of combination, that two ſquare-ſtones, divided diagonally into two colours, may be joined together chequerwiſe 64 different ways: which appears ſurpriſing enough: ſince two letters or figures can only be combined two ways.

The reaſon is, that letters only change their ſituation with regard to the firſt and ſecond, the top and bottom remaining the ſame, but in the arrangement of theſe ſtones, each admits of four ſeveral ſituations, in each whereof the other ſquare may be changed 16 times, which gives 64 combinations.

Indeed, from a farther examination of theſe 64 combinations, he found there were only 32 different figures, each figure being repeated twice in the ſame ſituation, though in a different combination; ſo that the two only differed from each other by the tranſpoſition of the dark and light parts.

PAUL, formerly named SAUL, was of the tribe of Benjamin, a native of Tarſus in Cilicia, a Phariſee by profeſſion; firſt a perſecutor of the church, and afterwards a diſciple of Jeſus Chriſt, and apoſtle of the Gentiles. It is thought he was born about two years before our Saviour, ſuppoſing that he lived 68 years, as we read in a homily which is in the ſixth volume of St Chryſoſtom's works. He was a Roman citizen (As xxii. 27, 28.), becauſe Auguſtus had given the freedom of the city to all the freemen of Tarſus, in conſideration of their firm adherence to his intereſts. His parents ſent him early to Jeruſalem, where he ſtudied the law at the feet of Gamaliel a famous doctor (*id.* xxii. 3.) He made very great progreſs in his ſtudies, and his life was always blameleſs before men; being very zealous for the whole obſervation of the law of Moſes (*id.* xxvi. 4, 5.) But his zeal carried him too far; he perſecuted the church, and inſulted Jeſus Chriſt in his members (1 Tim. i. 13.); and when the protomartyr St Stephen was ſtoned, Saul was not only conſenting to his death, but he even ſtood by and took care of the clothes of thoſe that ſtoned him (Acts vii. 58, 59.) This happened in the 33d year of the common era, ſome time after our Saviour's death.

At the time of the perſecution that was raiſed againſt the church, after the death of St Stephen, Saul was one of thoſe that ſhowed moſt violence in diſtreſſing the believers (Gal. i. 13. and Acts xxvi. 11.) He entered into their houſes, and drew out by force both men and women, loaded them with chains, and ſent them to priſon (Acts viii. 3. and xxii. 4.) He even entered into the ſynagogues, where he cauſed thoſe to be beaten with rods that believed in Jeſus Chriſt, compelling them to blaſpheme the name of the Lord. And having got credentials from the high prieſt Caiaphas, and the elders of the Jews, to the chief Jews of Damaſcus, with power to bring to Jeruſalem all the Chriſtians he ſhould find there, he went away full of threats, and breathing nothing but blood (Acts ix. 1, 2, 3, &c.) But as he was upon the road, and now drawing near to Damaſcus, all on a ſudden about noon, he perceived a great light to come from heaven, which encompaſſed him and all thoſe that were with him. This ſplendor threw them on the ground; and Saul heard a voice that ſaid to him, "Saul, Saul, why perſecuteſt thou me?" It was Jeſus Chriſt that ſpoke to him. To whom Saul anſwered, "Who art thou, Lord?" And the Lord replied to him, "I am Jeſus of Nazareth whom thou perſecuteſt; it is hard for thee to kick againſt the pricks." Saul, all in conſternation, aſked, "Lord, what is it that thou wouldſt have me do?" Jeſus bid him ariſe and go to Damaſcus, where the will of the Lord would be revealed to him.

Saul then roſe from the ground, and felt that he was deprived of ſight; but his companions led him by the hand, and brought him to Damaſcus, where he continued three days blind, and without taking any nouriſhment. He lodged at the houſe of a Jew named Judas. On the third day, the Lord commanded a diſciple of his, named Ananias, to go to find out Saul, to lay his hands upon him, and to cure his blindneſs. And as Ananias made excuſes, ſaying, that this man was one of the moſt violent perſecutors of the church, the Lord ſaid to him, Go and find him, becauſe this man is an inſtrument that I have choſen, to carry my name before the Gentiles, before kings, and before the children of Iſrael; for I will ſhow him how many things he muſt ſuffer for my name. Ananias went therefore, and found Saul, laid his hand upon him, and reſtored him to his ſight; then riſing, he was baptized, and filled with the Holy Ghoſt. After this he continued ſome days with the diſciples that were at Damaſcus, preaching in the ſynagogues, and proving that Jeſus was the Meſſiah (A).

From Damaſcus he went to Arabia (Gal. i. 17,), probably

(A) The converſion of ſuch a man, at ſuch a time, and by ſuch means, furniſhes one of the moſt complete proofs that have ever been given of the divine origin of our holy religion. That Saul, from being a zealous perſecutor of the diſciples of Chriſt, became all at once a diſciple himſelf, is a fact which cannot be controverted without overturning the credit of all hiſtory. He muſt therefore have been converted in the mira-culous probably into the neighbourhood of Damaſcus, being then under the government of Aretas king of Arabia; and having remained there for a little while, he returned to Damaſcus, where he began again to preach the goſpel. The Jews could not bear to ſee the progreſs that the goſpel made here; and ſo reſolved to put him to death: and they gained to their ſide the governor of Damaſcus, who was to apprehend him, and to deliver him to them. Of this Saul had early notice; and knowing that the gates of the city were guarded night and day to prevent him from making his eſcape, he was let down over the wall in a baſket. And coming to Jeruſalem to ſee Peter (Gal. i. 38.), the diſciples were afraid to have any correſpondence with him, not believing him to be a convert. But Barnabas having brought him to the apoſtles, Saul related to them the manner of his converſion, and all that had followed in conſequence of it. Then he began to preach both to the Jews and Gentiles; and ſpoke to them with ſuch ſtrength of argument, that not being able to withſtand him in reaſoning, they reſolved to kill him. For this reaſon, the brethren brought him to Cæſarea of Paleſtine, from whence he came, probably by ſea, into his own country Tarſus in Cilicia.

There he continued about five or ſix years, from the year of Chriſt 37 to the year 43; when Barnabas coming to Antioch by the order of the apoſtles, and there having found many Chriſtians, went to Tarſus to ſee Saul, and brought him with him to Antioch (Acts xi. 20, 25, 26.); where they continued together a whole year, preaching to and inſtructing the faithful. During this time, there happened a great famine in Judea (*id. ib.* 27, 28, &c.), and the Chriſtians of Antioch having made ſome collections to aſſiſt their brethren at Jeruſalem, they made choice of Paul and Barnabas to go thither with their offering. They arrived there in the year of Chriſt 44; and having acquitted themſelves of their commiſſion, they returned again to Antioch. They had not been there long before God warned them by the prophets he had in this church, that he had appointed them to carry his word into other places. Then the church betook themſelves to faſting and praying, and the prophets Simeon, Lucius, and Manaen, laid their hands on

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culous manner in which he himſelf ſaid he was, and of courſe the Chriſtian religion be a divine revelation; or he muſt have been either an impoſtor, an enthuſiaſt, or a dupe to the fraud of others. There is not another alternative poſſible.

If he was an impoſtor, who declared what he knew to be falſe, he muſt have been induced to act that part by ſome motive: (See MIRACLE). But the only conceivable motives for religious impoſture are, the hopes of advancing one's temporal intereſt, credit, or power; or the proſpect of gratifying ſome paſſion or appetite under the authority of the new religion. That none of theſe could be St Paul's motive for profeſſing the faith of Chriſt crucified, is plain from the ſtate of Judaiſm and Chriſtianity at the period of his forſaking the former and embracing the latter faith. Thoſe whom he left were the diſpoſers of wealth, of dignity, of power, in Judea: thoſe to whom he went were indigent men, oppreſſed, and kept from all means of improving their fortunes. The certain conſequence therefore of his taking the part of Chriſtianity was the loſs not only of all that he poſſeſſed, but of all hopes of acquiring more; whereas, by continuing to perſecute the Chriſtians, he had hopes riſing almoſt to a certainty of making his fortune by the favour of thoſe who were at the head of the Jewiſh ſtate, to whom nothing could ſo much recommend him as the zeal which he had ſhown in that perſecution. As to credit or reputation, could the ſcholar of Gamaliel hope to gain either by becoming a teacher in a college of fiſhermen? Could he flatter himſelf, that the doctrines which he taught would, either in or out of Judea, do him honour, when he knew that "they were to the Jews a ſtumbling block, and to the Greeks fooliſhneſs?" Was it then the love of power that induced him to make this great change? Power! over whom? over a flock of ſheep whom he himſelf had aſſiſted to deſtroy, and whoſe very Shepherd had lately been murdered! Perhaps it was with the view of gratifying ſome licentious paſſion, under the authority of the new religion, that he commenced a teacher of that religion! This cannot be alleged; for his writings breathe nothing but the ſtricteſt morality, obedience to magiſtrates, order, and government, with the utmoſt abhorrence of all licentiouſneſs, idleneſs, or looſe behaviour, under the cloke of religion. We nowhere read in his works, that ſaints are above moral ordinances; that dominion is founded in grace; that monarchy is deſpotiſm which ought to be aboliſhed; that the fortunes of the rich ought to be divided among the poor; that there is no difference in moral actions; that any impulſes of the mind are to direct us againſt the light of our reaſon and the laws of nature; or any of thoſe wicked tenets by which the peace of ſociety has been often diſturbed, and the rules of morality often broken, by men pretending to act under the ſanction of divine revelation. He makes no diſtinctions like the impoſtor of Arabia in favour of himſelf; nor does any part of his life, either before or after his converſion to Chriſtianity, bear any mark of a libertine diſpoſition. As among the Jews, ſo among the Chriſtians, his converſation and manners were blameleſs.—It has been ſometimes objected to the other apoſtles, by thoſe who were reſolved not to credit their teſtimony, that, having been deeply engaged with Jeſus during his life, they were obliged, for the ſupport of their own credit, and from having gone too far to return, to continue the ſame profeſſions after his death; but this can by no means be ſaid of St Paul. On the contrary, whatever force there may be in that way of reaſoning, it all tends to convince us, that St Paul muſt *naturally* have continued a Jew, and an enemy to Chriſt Jeſus. If *they* were engaged on one ſide, *he* was as ſtrongly engaged on the other. If ſhame withheld them from changing ſides, much more ought it to have ſtopped him; who, from his ſuperior education, muſt have been vaſtly more ſenſible to that kind of ſhame than the mean and illiterate fiſhermen of Galilee. The only other difference them, and ſent them to preach whither the Holy Ghoſt ſhould conduct them. And it was probably about this time, that is, about the year of Chriſt 44, that Paul being rapt up into the third heaven, ſaw there ineffable things, and which were above the comprehenſion of man (2 Cor. xii. 2, 3, 4, and Acts xiii. 4. 5, 6, &c.)

Saul and Barnabas went firſt into Cyprus, where they began to preach in the ſynagogues of the Jews. When they had gone over the whole iſland, they there found a Jewiſh magician called Bar-jeſus, who was with the proconſul Sergius Paulus; and who reſiſted them, and endeavoured to prevent the proconſul from embracing Chriſtianity: whereupon St Paul ſtruck him with blindneſs; by which miracle the proconſul, being an eye-witneſs of it, was converted to the Chriſtian faith.

From this converſion, which happened at the city of Paphos, in the year of Chriſt 45, many think, that the apoſtle firſt began to bear the name of *Paul*, which St Luke always gives him afterwards, as is ſuppoſed in memory of his converting Sergius Paulus. Some believe that he changed his name upon his own converſion; and Chryſoſtom will have this change to take place at his ordination, when he received his miſſion at Antioch; while others ſay, he took the name *Paul* only when he began to preach to the Gentiles: and, finally, ſeveral are of opinion, that he went by the names of both *Saul* and *Paul*, like many other Jews who had one Hebrew name and another Greek or Latin one.

From the iſle of Cyprus, St Paul and his company went to Perga in Pamphylia, where John Mark left them, to return to Jeruſalem: but making no ſtay at Perga, they came to Antioch in Piſidia; where going into the ſynagogue, and being deſired to ſpeak, St Paul made them a long diſcourſe, by which he ſhowed, that Jeſus Chriſt was the Meſſiah foretold by the prophets, and declared by John the Baptiſt; that he had been unjuſtly put to death by the malice and jealouſy of the Jews; and that he roſe again the third day. They heard him very attentively; and he was deſired to diſcourſe

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was, that *they*, by quitting their Maſter after his death, might have preſerved themſelves; whereas *he*, by quitting the Jews, and taking up the croſs of Chriſt, certainly brought on his own deſtruction.

As St Paul was not an impoſtor, ſo it is plain he was not an enthuſiaſt. Heat of temper, melancholy, ignorance, and vanity, are the ingredients of which enthuſiaſm is compoſed; but from all theſe, except the firſt, the apoſtle appears to have been wholly free. That he had great fervour of zeal, both when a Jew and when a Chriſtian, in maintaining what he thought to be right, cannot be denied; but he was at all times ſo much maſter of his temper, as, in matters of indifference, to "become all things to all men," with the moſt pliant condeſcenſion, bending his notions and manners to theirs, as far as his duty to God would permit; a conduct compatible neither with the ſtiffneſs of a bigot nor with the violent impulſes of fanatical deluſion. That he was not melancholy, is plain from his conduct in embracing every method which prudence could ſuggeſt to eſcape danger and ſhun perſecution, when he could do it without betraying the duty of his office or the honour of his God. A melancholy enthuſiaſt courts perſecution; and when he cannot obtain it, afflicts himſelf with abſurd penances: but the holineſs of St Paul conſiſted only in the ſimplicity of a godly life, and in the unwearied performance of his apoſtolical duties. That he was ignorant, no man will allege who is not groſsly ignorant himſelf; for he appears to have been maſter not only of the Jewiſh learning, but alſo of the Greek philoſophy, and to have been very converſant even with the Greek poets. That he was not credulous, is plain from his having reſiſted the evidence of all the miracles performed on earth by Chriſt, as well as thoſe that were afterward worked by the apoſtles; to the fame of which, as he lived in Jeruſalem, he could not poſſibly have been a ſtranger. And that he was as free from vanity as any man that ever lived, may be gathered from all that we ſee in his writings, or know of his life. He repreſents himſelf as the leaſt of the apoſtles, and not meet to be called an apoſtle. He ſays that he is the chief of ſinners; and he prefers, in the ſtrongeſt terms, univerſal benevolence to faith, and prophecy, and miracles, and all the gifts and graces with which he could be endowed. Is this the language of vanity or enthuſiaſm? Did ever fanatic prefer virtue to his own religious opinions, to Illuminations of the ſpirit, and even to the merit of martyrdom?

Having thus ſhown that St Paul was neither an impoſtor nor an enthuſiaſt, it remains only to be inquired, whether he was deceived by the fraud of others: but this inquiry needs not be long, for who was to deceive him? A few illiterate fiſhermen of Galilee? It was *morally* impoſſible for ſuch men to conceive the thought of turning the moſt enlightened of their opponents, and the cruelleſt of their perſecutors, into an apoſtle, and to do this by a fraud in the very inſtant of his greateſt fury againſt them and their Lord. But could they have been ſo extravagant as to conceive ſuch a thought, it was *phyſically* impoſſible for them to execute it in the manner in which we find his converſion to have been affected. Could they produce a light in the air, which at mid-day was brighter than the ſun? Could they make Saul hear words from out of that light which were not heard by the reſt of the company? Could they make him blind for three days after that viſion, and then make ſcales fall off from his eyes, and reſtore him to ſight by a word? Or, could they make him and thoſe who travelled with him believe, that all theſe things had happened, if they had not happened? Moſt unqueſtionably no fraud was equal to all this.

Since then St Paul was neither an impoſtor, an enthuſiaſt, nor deceived by the fraud of others, it follows, that his converſion was miraculous, and that the Chriſtian religion is a divine revelation. See *Lyttleton's Obſervations on the Converſion of St Paul;* a treatiſe to which it has been truly ſaid, that infidelity has never been able to fabricate a ſpecious anſwer, and of which this note is a very ſhort and imperfect abridgement.

courſe again on the ſame ſubject the next ſabbath-day; and ſeveral, both Jews and Gentiles, followed them, to receive particular inſtructions more at leiſure. On the Sabbath-day following, almoſt all the city met together to hear the word of God: but the Jews, ſeeing the concourſe of people, were moved with envy at it; oppoſed, with blaſphemies, what St Paul ſaid; and not being able to bear the happy progreſs of the goſpel in this country, they raiſed a perſecution againſt the two apoſtles: whereupon Paul and Barnabas, ſhaking off the duſt upon their feet againſt them, came from Antioch in Piſidia to Iconium. Being come thither, they preached in their ſynagogue, and converted a great number, both of Jews and Gentiles: and God confirmed their commiſſion by a great number of miracles (Acts xiv. 1. 2, &c.). In the mean time, the unbelieving Jews, having incenſed the Gentiles againſt Paul and Barnabas, and threatening to ſtone them, they were obliged to retire to Lyſtra and Derbe, cities of Lycaonia, where they preached the goſpel. At Lyſtra, there was a man who had been lame from his mother's womb. The man fixing his eyes on St Paul, the apoſtle bid him riſe, and ſtand upon his feet: whereupon he preſently roſe up, and walked; the people, ſeeing this miracle, cried out, that the gods were deſcended among them in the ſhape of men. They called Barnabas *Jupiter*, and Paul *Mercury*, becauſe of his eloquence, and being the chief ſpeaker. The prieſt of Jupiter brought alſo garlands and bulls before the gate, to offer ſacrifices to them: but Paul and Barnabas tearing their clothes, and caſting themſelves into the middle of the multitude, cried out to them, Friends, what do you do? we are men as well as yourſelves: and we are preaching to you to turn away from theſe vain ſuperſtitions, and to worſhip only the true God, who has made heaven and earth. But whatever they could ſay, they had much ado to reſtrain them from offering ſacrifices to them.

In the mean time, ſome Jews of Antioch in Piſidia and of Iconium coming to Lyſtra, animated the people againſt the apoſtles. They ſtoned Paul, and drew him out of the city, thinking him to be dead, But the diſciples gathering together about him, he roſe up among them, entered again into the city, and the day after left it with Barnabas to go to Derbe. And having here preached the goſpel alſo, they returned to Lyſtra, to Iconium, and to Antioch of Piſidia. Paſſing throughout Piſidia, they came to Pamphylia, and having preached the word of God at Perga, they went down into Attalia. From hence they ſet ſail for Antioch in Syria, from whence they had departed a year before. Being arrived there, they aſſembled the church together, and told them the great things God had done by their means, and how he had opened to the Gentiles a door of ſalvation; and here they continued a good while with the diſciples.

St Luke does not inform us of the actions of St Paul from the 45th year of Chriſt to the time of the council at Jeruſalem, which was held in the 50th year of Chriſt. There is great likelihood that it was during this interval that St Paul preached the goſpel from Jeruſalem to Illyricum, as he informs us in his epiſtle to the Romans (xv. 19.); and this without making any ſtay in thoſe places where others had preached before him. He does not acquaint us with the particulars of theſe journeys, nor with the ſucceſs of his preaching; but he ſays in general, that he had ſuffered more labours than any other, and had endured more priſons. He was often very near death itſelf, ſometimes upon the water and ſometimes among theives. He run great dangers, ſometimes from the Jews and ſometimes among falſe brethren and perverſe Chriſtians; he was expoſed to great hazards, as well in the cities as in the deſerts: he ſuffered hunger, thirſt, nakedneſs, cold, faſtings, watchings (2 Cor. xi. 23—27.), and the fatigues inſeparable from long journeys, which were undertaken without any proſpect of human ſuccour; in this very different from the good fortune of others who lived by the goſpel, who received ſubſiſtence from thoſe to whom they preached it, and who were accompanied always by religious women, who miniſtered to them in their neceſſary occaſions. He made it a point of honour to preach gratis, working with his hands that he might not be chargeable to any one (1 Cor. ix. 1—15.); for he had learned a trade, as was uſual among the Jews, which trade was to make tents of leather for the uſe of thoſe that go to war (Acts xviii. 3.

St Paul and St Barnabas were at Antioch when ſome perſons coming from Judea (Acts xv 1, 2, &c.) pretended to teach, that there was no ſalvation without circumciſion, and without the obſervation of the other legal ceremonies. Epiphanius and Philaſter ſay, that he that maintained this was Cerinthus and his followers. Paul and Barnabas withſtood theſe new doctors; and it was agreed to ſend a deputation to the apoſtles and elders at Jeruſalem about this queſtion. Paul and Barnabas were deputed; and being arrived at Jeruſalem, they reported to the apoſtles the ſubject of their commiſſion. Some of the Phariſees that had embraced the faith, aſſerted, that the Gentiles that were converted ought to receive circumciſion, and to obſerve the reſt of the law. But the apoſtles and elders aſſembled to examine into this matter, it was by them decreed, that the Gentiles, who were converted to Chriſtianity, ſhould not be obliged to ſubmit to the yoke of the law, but only to avoid idolatry, fornication, and the eating of things ſtrangled, and blood.

St Paul and St Barnabas were then ſent back to Antioch with letters from the apoſtles, which contained the deciſion of the queſtion, and the reſolution of that auguſt aſſembly. The apoſtles alſo deputed Jude ſurnamed *Barſabas* and Silas, who were principal brethren, to go to Antioch with Paul and Barnabas to give their teſtimony alſo of what had been decreed at Jeruſalem. Being arrived at Antioch, they aſſembled the faithful, read to them the apoſtles letter, and acquainted them, that it had been reſolved to diſcharge them from the yoke of the ceremonial law. Some time after this, St Peter coming to Antioch and joining himſelf to the converted Gentiles, he lived with them without ſcruple; but ſome brethren happening to arrive there from Jeruſalem, he ſeparated himſelf from the Gentile converts, and did no longer eat with them: for which conduct St Paul publicly cenſured him (Gal. ii. 11—16.) St Paul (*id.* ii. 2, 3, &c.) in the ſame journey to Jeruſalem declared openly to the faithful there the doctrine he preached among the Gentiles; and beſides, diſcourſed of it in private among the chief of them in preſence of Barnabas and Titus.

St Peter, St James, and St John, with whom he had theſe converſations, could find nothing either to be added or amended in ſo pure and ſo ſound a doctrine and demeanour. They ſaw with joy the grace that God had given him; they acknowledged that he had been appointed the apoſtle of the Gentiles, as St Peter had been of the circumciſion. They concluded that Paul and Barnabas ſhould continue to preach among the Gentiles; and only recommended to them to take care concerning the collections for the poor; that is to ſay, to exhort the converted Chriſtians among the Gentiles, to aſſiſt the faithful brethren in Judea, who were in neceſſity; whether it were becauſe they had ſold and diſtributed their goods, or becauſe they had been taken away from them (Heb. x. 54.)

After Paul and Barnabas had continued ſome days at Antioch, St Paul propoſed to Barnabas to return and viſit the brethren through all the cities wherein they had planted the goſpel, to ſee in what condition they were. Barnabas conſented to the propoſal; but inſiſted upon taking John Mark along with them. This was oppoſed by Paul, which produced a ſeparation between them. Barnabas and John Mark went together to Cyprus; and St Paul, making choice of Silas, croſſed over Syria and Cicilia, and came to Derbe, and afterwards to Lyſtra (Acts xvi. 1, 2, &c.) Here they found a diſciple called *Timothy*, whom St Paul took with him, and circumciſed him that he might not offend the Jews of that country. When therefore they had gone over the provinces of Lycaonia, Phrygia, and Galatia, the Holy Ghoſt would not allow them to preach the goſpel in the proconſular Aſia, which contained Ionia, Æolia, and Lydia. They therefore went on to Myſia, and coming to Troas, St Paul had a viſion in the night. A man, habited like a Macedonian, preſented himſelf before him, and ſaid, Paſs into Macedonia and come and ſuccour us. Immediately he ſet out on this journey, not doubting but that God had called him into this country.

Embarking therefore at Troas, they ſailed to Neapolis. Thence they came to Philippi, where upon the ſabbath-day they went near the river ſide, where the Jews had a place of devotion, and where they found ſome religious women, among whom was Lydia, who was converted and baptized, and invited the apoſtle and his company to lodge at her houſe. Another day, as they went to the ſame place of devotion, they happened to meet a maid ſervant poſſeſſed with a ſpirit of divination, who followed St Paul and his company, crying out, that theſe men were the ſervants of the moſt high God, who declared to the world the way of ſalvation. This ſhe did for ſeveral days together; at laſt St Paul, turning himſelf towards her, ſaid to the ſpirit, I command thee in the name of Jeſus Chriſt to come out of the body of this woman: upon which it immediately left her. But the maſters of this damſel who made much money by her, drew Paul and Silas before the magiſtrates, and accuſed them of attempting to introduce a new religion into the city. For this the magiſtrates ordered them to be whipt with rods upon the back and ſhoulders, and afterwards ſent them to priſon.

Towards midnight, as Paul and Silas were ſinging hymns and praiſes to God, on a ſudden there was a great earthquake, ſo that the foundations of the priſon were ſhaken, and all the doors flew open at the ſame time, and the fetters of the priſoners burſt aſunder. The gaoler being awakened at this noiſe, and ſeeing all the doors open, he drew his ſword with an intention to kill himſelf imagining that all the priſoners had made their eſcape. But Paul cried out to him, that he ſhould do himſelf no miſchief, for they were all ſafe. Then the goaler entering and finding all the priſoners there, he brought out Paul and Silas from this place, aſking them what he muſt do to be ſaved? Paul and Silas inſtructing him and all his family, gave them baptiſm. After this the gaoler ſet before them ſomething to eat; and when the morning was come, the magiſtrates ſent him word that he might releaſe his priſoners, and let them go about their buſineſs. But Paul returned this anſwer to the magiſtrates; Ye have publicly whipped us with rods, being Roman citizens; ye have thrown us into priſon; and now ye would privately diſmiſs us: But it ſhall not be ſo, for you yourſelves ſhall come to fetch us out. The magiſtrates hearing that they were Roman citizens, came to excuſe themſelves; and having brought them out of priſon, they deſired them to depart out of their city. Paul and Silas went firſt to the houſe of Lydia, where having viſited and comforted the brethren, they departed from Philippi.

Then paſſing through Amphipolis and Apollonia, they came to Theſſalonica the capital city of Macedonia, where the Jews had a ſynagogue (Acts xvii. 1, &c.) Paul entered therein, according to his cuſtom, and there preached the goſpel to them for three Sabbath days ſucceſſively. Some Jews and ſeveral proſelytes believed in Jeſus Chriſt, and united themſelves to Paul and Silas: but the greateſt part of the Jews being led away by a falſe zeal, raiſed a tumult in the city, and went to the houſe of Jaſon, where St Paul lodged. But not finding him there, they took Jaſon and led him before the magiſtrates, where they accuſed him of harbouring in his houſe people that were diſobedient to the ordinances of the emperor, and who affirmed that there was another king beſides him, one Jeſus whom they preached up. But Jaſon having given ſecurity to anſwer for the people who were accuſed, he was diſmiſſed to his own houſe: and the night following the brethren conducted Paul and Silas out of the city, who went to Berea, where they began to preach in the ſynagogue. The Jews of Berea heard them gladly, and many of them were converted; as alſo ſeveral of the Gentiles and many women of diſtinction that were not Jeweſſes.

The Jews of Theſſalonica being informed that Paul and Silas were at Berea, came thither and animated the mob againſt them; ſo that St Paul was forced to withdraw, leaving Silas and Timothy at Berea to finiſh the work he had ſo happily begun. Thoſe who conducted St Paul embarked along with him, and brought him as far as Athens (Theod. in 1 Theſſal.), where he arrived in the fifty-ſecond year of Jeſus Chriſt. As ſoon as he was got thither, he ſent back thoſe that had brought him, with orders to tell Silas and Timothy, that he deſired them to follow him to Athens as ſoon as poſſible. In the mean time, he went into a ſynagogue of the Jews, and preached to them as often as he had opportunity; and diſputing with the philoſophers who were frequent in that place, they at laſt brought him before the Areopagus, accuſing him of introducing a new religion. St Paul being come before the judges, pleaded in his own defence, that among other marks of ſuperſtition which he had found in that city, he had obſerved an altar inſcribed, "To the unknown God." It was therefore this God whom they confeſſed that they knew not, that he came to make known to them. Afterwards he ſpoke to them of God the creator of heaven and earth, of the ſuperintendence of a providence, of the laſt judgment, and of the reſurrection of the dead. But after they had heard of the reſurrection, ſome made ſcorn of him, and others deſired to hear him another time. However ſome of them embraced the Chriſtian faith, of which number was Dionyſius a ſenator of the Areopagus, and a woman called *Damaris*, and ſeveral others with them.

St Timothy came from Berea to Athens according to the requeſt of St Paul, and informed him of the perſecution with which the Chriſtians of Theſſalonica were then afflicted. This obliged the apoſtle to ſend him into Macedonia, that he might comfort them and keep them ſtedfaſt (1 Theſſal. iii. 1, 2, &c.) After this St Paul left Athens and went to Corinth, where he lodged with one Aquila a Jew, and by trade a tentmaker (Acts xviii. 1, 2, &c.) With this Aquila the apoſtle worked, as being of the ſame trade himſelf. But, however, he did not neglect the preaching of the goſpel, which he performed every day in the ſynagogue; ſhowing both to the Jews and Gentiles that Jeſus was the Meſſiah. There he made ſeveral converts; and he tells us himſelf (1 Cor. i. 14—17. and xvi. 15.) that he baptized Stephanus and his whole houſe, with Criſpus and Gaius. About the ſame time Silas and Timothy came to Corinth, and acquainted him with the good ſtate of the faithful at Theſſalonica: and ſoon after this, he wrote his firſt epiſtle to the Theſſalonians, which is the firſt of all the epiſtles that he wrote; and not long after he wrote his ſecond epiſtle to that church.

St Paul, now finding himſelf encouraged by the preſence of Silas and Timothy, went on with the work of his miniſtry with new ardour, declaring and proving that Jeſus Chriſt was the true Meſſiah. But the Jews oppoſing him with blaſphemous and opprobrious words, he ſhook his clothes at them, and ſaid, "Your blood be upon your own head; from henceforth I ſhall go to the Gentiles." He then quitted the houſe of Aquila, and went to lodge with one Titus Juſtus, who was originally a Gentile, but one that feared God. In the mean time the Lord appeared to St Paul in a viſion, told him, that in Corinth he had much people; and this was the reaſon why the apoſtle continued there eight months.

But Gallio the pro-conſul of Achaia being at Corinth, the Jews of that city roſe up againſt Paul and carried him before Gallio, accuſing him of attempting to introduce a new religion among them: however, Gallio ſent them away, telling them he would not meddle with diſputes that were foreign to his office. Paul continued ſome time longer at Corinth; but at laſt he ſet out for Jeruſalem, where he had a mind to be preſent at the feaſt of Pentecoſt. Before he went on ſhipboard, he cut off his hair at Cenchrea, becauſe he had completed his vow of Nazariteſhip, in which he had engaged himſelf. He arrived at Epheſus with Aquila and Priſcilla, from whence he went to Cæſarea of Paleſtine, and thence to Jeruſalem. Here having performed his devotions, he came to Antioch, where he ſtayed ſome time; and then paſſing from thence, he made a progreſs through all the churches of Galatia and Phrygia ſucceſſively; and having gone over the higher provinces of Aſia, he returned to Epheſus, where he abode three years; that is, from the year of Chriſt 54 to the year 57 (Acts xix. 1, 2, &c.)

St Paul having arrived at Epheſus, he found there ſome diſciples that had been initiated by Apollos, who had only baptized them with the baptiſm of John. St Paul inſtructed them, baptized them with the baptiſm of Jeſus Chriſt, and laid his hands on them; whereupon they received the Holy Ghoſt, the gifts of languages and of prophecy. The apoſtle afterwards went into the ſynagogue, and preached to the Jews for three months, endeavouring to convince them that Jeſus Chriſt was the Meſſiah: but as he found them very obſtinate, he ſeparated himſelf from them, and taught daily in the ſchool of one Tyrannus. He performed there ſeveral miracles, inſomuch, that the linen that had but touched his body, being afterwards applied to the ſick, they were preſently cured of their diſeaſes, or delivered from the devils that poſſeſſed them. He alſo ſuffered much there, as well from the Jews as from the Gentiles; and he himſelf informs us (1 Cor. xv. 31, 32.), that after the manner of men he fought with beaſts at Epheſus; that is to ſay, that he was expoſed to wild beaſts in the amphitheatre, ſo that it was expected he ſhould have been devoured by them; but God miraculouſly delivered him: though ſome are of opinion, that the fight here mentioned by St Paul was nothing elſe but the ſcuffle he had with Demetrius the ſilver-ſmith and his companions, who were diſappointed in their attempt of putting the apoſtle to death. It was during his abode at Epheſus that the apoſtle wrote his epiſtle to the Galatians.

After this St Paul propoſed, at the inſtigation of the Holy Ghoſt, to paſs through Macedonia and Achaia, and afterwards to go to Jeruſalem, ſaying, that after he had been there, he muſt alſo ſee Rome; and having ſent Timothy and Eraſtus before to Macedonia, he tarried ſome time in Aſia. During this time, he received intelligence that domeſtic troubles had riſen in the church of Corinth, and that abuſes had begun to creep in; which made him reſolve to write his firſt epiſtle to that church.

Soon after this, taking leave of the diſciples, he departed for Macedonia (Acts xx. 1. 2. &c.). He embarked at Troas, took Timothy with him, and together paſſed into Macedonia (2 Cor. ii. 12. and vii. 5—15.). Titus came thither to him, and acquainted him with the good effects that his letter had produced among the Corinthians; and told him, that the collections that had been made by the church of Corinth for the faithful in Paleſtine were now ready; which engaged Paul to write a ſecond letter to the Corinthians. St Paul, having paſſed through Macedonia, came into Greece or Achaia, and there continued three months. He viſited the faithful of Corinth;

and having received their alms, as he was upon the point of returning into Macedonia, he wrote his epiſtle to the Romans.

At laſt he left Greece, and came into Macedonia, in the year of Chriſt 58, intending to be at Jeruſalem at the feaſt of Pentecoſt. He ſtaid ſome time at Philippi, and there celebrated the feaſt of the paſſover. From hence he embarked and came to Troas, where he continued a week. On the firſt day of the week the diſciples being aſſembled to break bread, as St Paul was to depart the day following, he made a diſcourſe to them which held till midnight. During this time a young man called Eutychus, happening to ſit in a window and fall aſleep, fell down three ſtories high, and was killed by the fall. St Paul came down to him, and embraced him, and reſtored him to life again. Then he went up again, broke bread and eat it, and continued his diſcourſe till day-break, at which time he departed. Thoſe of his company took ſhip at Troas; but as for himſelf he went on foot as far as Aſſos, otherwiſe called *Apollonia*, and then embarked along with them at Mitylene. From hence he came to Miletus, whither the elders of the church of Epheſus came to ſee him; for he had not time to go to them, becauſe he was deſirous of being at Jeruſalem at the feaſt of Pentecoſt.

When theſe elders were arrived at Miletus, St Paul diſcourſed with them, and told them that he was going to Jeruſalem without certainly knowing what ſhould happen to him; however he did not doubt but that he had much to ſuffer there, ſince in all cities the Holy Ghoſt had given him to underſtand, that chains and afflictions waited for him at Jeruſalem. Nevertheleſs, he declared to them, that all this did not terrify him, provided he could but fulfil his miniſtry. After having exorted them to patience, and having prayed along with them, he went on board, going ſtraight to Coos, then to Rhodes, and thence to Patara (Acts xxi. 1, 2, &c.), where finding a ſhip that was bound for Phœnicia, they went on board and arrived ſafe at Tyre. Here they made a ſtop for ſeven days, and then going on, they arrived at Ptolemais, and thence at Cæſarea, where they found Philip the evangeliſt, who was one of the ſeven deacons. While St Paul was there, the prophet Agabus arrived there alſo from Judea; and having taken St Paul's girdle, he bound his own hands and feet with it, ſaying, "Thus ſhall the Jews of Jeruſalem bind the man that owns this girdle, and ſhall deliver him up to the Gentiles." But St Paul's conſtancy was not ſhaken by all theſe predictions, and he told them, that he was ready, not only to ſuffer bonds, but death itſelf, for the name of Chriſt.

When he was come to Jeruſalem, the brethren received him with joy; and the day following he went to ſee St James the leſs, biſhop of Jeruſalem, at whoſe houſe all the elders aſſembled. Paul gave them an account of what God had done among the Gentiles by his miniſtry. Then St James informed him, that the converted Jews were ſtrangely prejudiced againſt him, becauſe they were informed he taught the Jews that lived among the Gentiles and out of Paleſtine, that they ought to renounce the law of Moſes, and no longer circumciſe their children. Therefore, continued St James, we muſt aſſemble them here together, where you may ſpeak to them yourſelf, and undeceive them. Moreover do this, that your actions may verify your words: join yourſelf to four men that are here, and who have taken upon them a vow of Nazariteſhip; and that you may ſhare in the merit of their action, contribute to the charge of their purification, and purify yourſelf alſo, that you may offer with them the offerings and ſacrifices ordained for the purification of a Nazarite. See NAZARITE.

St Paul exactly followed this advice of St James, and on the next day went into the temple, where he declared to the prieſts, that in ſeven days theſe four Nazarites would complete their vow of Nazariteſhip; and that he would contribute his ſhare of the charges. But towards the end of theſe ſeven days, the Jews of Aſia having ſeen him in the temple, moved all the people againſt him, laid hold of him, and cried out, "Help, ye Iſraelites, this is he that teaches every where againſt the law, and againſt the temple, and has brought Gentiles into the temple, and profaned this holy place." At the ſame time they laid hold on him, ſhut the gates of the temple, and would have killed him, had not Lyſias the tribune of the Roman garriſon there run to his reſcue, taken him out of their hands, and brought him into the citadel. St Paul being upon the ſteps, deſired the tribune to ſuffer him to ſpeak to the people, who followed him thither in a great multitude. The tribune permitted him, and St Paul, making a ſign with his hand, made a ſpeech in Hebrew (Acts xxii.), and related to them the manner of his converſion, and his miſſion from God to go and preach to the Gentiles. At his mentioning the Gentiles, the Jews began to cry out, "Away with this wicked fellow out of the world, for he is not worthy to live."

Immediately the tribune made him come into the caſtle, and ordered that he ſhould be examined by whipping him, in order to make him confeſs the matter why the Jews were ſo incenſed againſt him. Being now bound, he ſaid to the tribune, "Is it lawful for you to whip a Roman citizen before you hear him?" The tribune hearing this, cauſed him to be unbound, and calling together the prieſts and the ſenate of the Jews, he brought Paul before them, that he might know the occaſion of this tumult of the people. Then Paul began to ſpeak to them to this purpoſe, (Acts xxiii.): "Brethren, I have lived in all good conſcience before God until this day." At which words, Ananias, ſon of Nebedeus, who was the chief-prieſt, ordered the by-ſtanders to give him a blow in the face. At which St Paul ſaid to him, "God ſhall ſmite thee, thou whited wall; for ſitteſt thou to judge me after the law, and commandeſt me to be ſmitten contrary to the law?" Thoſe that were preſent ſaid to him, "Revileſt thou God's high-prieſt?" St Paul excuſed himſelf by ſaying, that he did not know he was the high-prieſt, "For it is written, thou ſhalt not ſpeak evil of the ruler of thy people." Then perceiving that part of the aſſembly were Sadducees and part Phariſees, he cried out, "Brethren, I am a Phariſee, the ſon of a Phariſee; of the hope and reſurrection of the dead I am called in queſtion."

Then the aſſembly being divided in intereſts and opinions, and the clamour increaſing more and more, the tribune ordered the ſoldiers to fetch him away out of the aſſembly, and bring him into the caſtle. The following night the Lord appeared to Paul, and ſaid to him, "Take courage, for as you have borne teſtimony of me at Jeruſalem, ſo muſt you alſo at Rome." The day following, more than 40 Jews engaged themſelves by an oath, not to eat or drink till they had killed Paul. They came therefore, and made known their deſign to the prieſts and chiefs of the people ſaying to them, "To-morrow cauſe Paul to appear before you, as if you would inquire more accurately into his affair, and before he can come to you, we will lie in wait for him and kill him." But St Paul, being informed of this conſpiracy by his ſiſter's ſon, acquainted the tribune with it; who gave orders that the night following he ſhould be ſent to Cæſarea, to Felix the Governor, who had his ordinary reſidence there. Felix having received letters from Lyſius and being informed that St Paul was of Cilicia, he told him he would hear him when his accuſers ſhould arrive.

Five Days after, Annanias the high prieſt and ſome of the ſenators came to Cæſarea, bringing with them Tertullus the orator, to plead againſt Paul. Tertullus accuſed him of being a ſeditious perſon, a diſturber of the public peace; one who had put himſelf at the head of a ſect of Nazarenes, and who made no ſcruple even to profane the temple, (*id.* xxiv.) But St Paul eaſily refuted theſe calumnies, and defied his accuſers to prove any of the articles they had exhibited againſt him: he ended his diſcourſe by ſaying, "That for the doctrine of the reſurrection from the dead, his adverſaries would have him condemned." Felix put off the further hearing of this cauſe till another time; and, ſome days afterwards, came himſelf with his wife Druſilla to hear Paul: and being in hopes that the apoſtle would purchaſe his freedom with a ſum of money, he uſed him well, often ſent for him, and had frequent converſations with him.

Two years having paſſed thus away, Felix made way for his ſucceſſor Portius Feſtus; but being willing to oblige the Jews, he left Paul in priſon. Feſtus being come to Jeruſalem, the chief prieſts deſired to ſend for Paul, with a deſign to fall upon him by the way. But Feſtus told them, they might come to Cæſarea, where he would do them juſtice. Hither the Jews came, and accuſed Paul of ſeveral crimes, of which they were able to prove nothing, (*id.* xxv.) Feſtus then propoſed to the apoſtle to go to Jeruſalem, and be tried there; but he anſwered, "That he was now at the emperor's tribunal, where he ought to be tried; and that he appealed to Cæſar;" whereupon Feſtus, having conferred with his council, told him, that therefore to Cæſar he ſhould go.

Some days after, King Agrippa and his wife Berenice coming to Cæſarea, deſired to hear Paul; who pleaded his cauſe with ſuch ability, that Agrippa exclaimed, "Almoſt thou perſuadeſt me to be a Chriſtian." See Agrippa.

As ſoon, therefore, as it was reſolved to ſend Paul into Italy, he was put on board a ſhip at Adramyttium, a city of Myſia; and having paſſed over the ſeas of Cilicia and Pamphylia, the arrived at Myra in Lycia, where having found a ſhip that was bound for Italy, they went on board, (*id.* xxvii.) But the ſeaſon being far advanced (for it was at leaſt the latter end of September), and the wind proving contrary, they with much difficulty arrived at the Fair Haven, a port in the iſle of Crete. St Paul adviſed them to winter there: however, others were of opinion they had better go to Phenice, another harbour of the ſame iſland; but as they were going thither, the wind drove them upon a little iſland callled *Clauda*, where the mariners, fearing to ſtrike upon ſome bank of ſand, they lowered their maſt, and ſurrendered themſelves to the mercy of the waves. Three days after this, they threw overboard the tackling of the ſhip. Neither ſun nor ſtars had appeared now for 14 days. In this extreme danger an angel appeared to St Paul, and aſſured him, that God had given him the lives of all that were in the ſhip with him; which were in all 276 ſouls. St Paul told them of his viſion, exhorted them to take courage, and promiſed them that they ſhould all come alive into an iſland; and that the veſſel only ſhould be loſt. On the 14th night the ſeamen caſt out the lead, and thought by their ſounding that they approached near to ſome land. They were attempting to ſave themſelves by going into the boat; but St Paul told the centurion and the ſoldiers, that except the ſailors continued in the ſhip, their lives could not be ſaved. Then the ſoldiers cut the ropes of the boat, and let her drive. About day break, St Paul perſuaded them to take ſome nouriſhment, aſſuring them that not a hair of their heads ſhould periſh. After his example, they took ſome food, and when they had eat, they lightened their veſſel, by throwing the corn into the ſea. Day being come, they perceived a ſhore, where they reſolved, if poſſible, to bring the ſhip to. But the veſſel having ſtruck againſt a neck of land that run out into the ſea, ſo that the head remained fixed, and the ſtern was expoſed to the mercy of the waves: the ſoldiers, fearing leſt any of the priſoners, ſhould make their eſcape by ſwimming, were for putting them all to the ſword. But the centurion would not ſuffer them, being willing to ſave Paul; and he commanded thoſe that could ſwim to throw themſelves firſt out of the veſſel: and the reſt got planks, ſo that all of them came ſafe to ſhore. Then they found that the iſland was called *Melita* or *Malta;* the inhabitants of which received them with great humanity, (Acts xxvii. 1, 2, 3, &c.)

They being all very wet and cold, a great fire was lighted to dry them; and Paul having gathered up a handful of ſticks, and put them upon the fire, a viper leaped out of the fire, and took hold of his hand. Then the barbarous people ſaid to one another, "Without doubt this man is a murderer; and though he has been ſaved from the ſhipwreck, yet divine vengeance ſtill purſues him, and will not ſuffer him to live." But Paul, ſhaking the viper into the fire, received no injury from it. The people, ſeeing this, changed their opinion of him, and took him for a god; which opinion of theirs was more confirmed, by his curing the father of Publius, the chief man of the iſland, of a fever and bloody flux. After this miracle, they all brought out their ſick to him, and they were healed. See Melita.

At the end of three months they embarked again; and arrived, firſt at Syracuſe, then at Rhegium, and laſtly at Puteoli. Here St Paul found ſome Chriſtians, who detained him for ſeven days; then he ſet out for Rome. The brethren of this city, having been informed

formed of St Paul's arrival came out to meet him as far as Appii-forum, and the Three Taverns. And when he was come to Rome, he was allowed to dwell where he pleaſed, having a ſoldier to guard him, who was joined to him with a chain. Three days afterwards, St Paul deſired the chief of the Jews there to come to him. He related to them in what manner he had been ſeized in the temple of Jeruſalem, and the neceſſity he was under of appealing to Cæſar. The Jews told him, that as yet they had received no information about his affair; and, as for Chriſtianity, they knew nothing of it, but only that it was ſpoken againſt everywhere; however, that they ſhould be very willing to have ſome account of that doctrine from him. A day was appointed for this purpoſe; when St Paul preached to them concerning the kingdom of God, endeavouring to convince them from Moſes and the prophets, that Jeſus was the Meſſiah. Some of them believed what he had ſaid to them, while others diſbelieved; ſo that they returned from him divided among themſelves.

Paul dwelt for two whole years at Rome, from the year of Chriſt 61 to the year 63, in a lodging that he hired; where he received all that came to him, preaching the kingdom of God, and the religion of Jeſus Chriſt, without any interruption.

Hitherto we have had the Acts of the Apoſtles for our guide, in compiling the hiſtory of St Paul; what we ſhall add hereafter, will be moſtly taken from his own Epiſtles. His captivity did not a little contribute to the advancement of religion; for he converted ſeveral perſons even of the emperor's court, (Philip. i. 12—18. and iv. 22.) The Chriſtians of Philippi, in Macedonia, hearing that St Paul was a priſoner at Rome, ſent Epaphroditus their biſhop to him, to bring him money, and otherwiſe to aſſiſt him in their name, (Phil. ii. 25.) Epaphroditus fell ſick at Rome; and when he went back to Macedonia, the apoſtle ſent by him his Epiſtle to the Philippians.

It is not known by what means St Paul was delivered from his priſon, and diſcharged from the accuſation of the Jews. There is great probability that they durſt not appear againſt him before the Emperor, as not having ſufficient proof of what they laid to his charge. However that may be, it is certain that he was ſet at liberty, after having been two years a priſoner at Rome. He wrote alſo, during this impriſonment, his Epiſtles to Philemon and the Coloſſians.

He was ſtill in the city of Rome, or at leaſt in Italy, when he wrote his Epiſtle to the Hebrews. St Paul, having got out of priſon, went over Italy; and, according to ſome of the fathers, paſſed into Spain; then into Judea; went to Epheſus, and there left Timothy (Heb. xiii. 24. and 1 Tim. i. 3.); preached in Crete, and fixed there Titus, to take care to cultivate the church he had planted in that place. Probably he might alſo viſit the Philippians, according to the promiſe he had made them, (Phil. i. 23, 26. and ii. 24.); and it is believed, that it was from Macedonia that he wrote the Firſt Epiſtle to Timothy.—Some time after, he wrote to Titus, whom he had left in Crete; he deſires him to come to Nicopolis, from whence probably, he ſent this letter. The year following, that is, the 65th year of the Chriſtian era, the apoſtle went into Aſia, and came to Troas, (2 Tim. iv. 13.) Thence he went to viſit Timothy at Epheſus, and from that to Miletus, (2 Tim. iv. 20.) Laſtly he went to Rome; and St Chryſoſtom ſays, that it was reported, that having converted a cup-bearer and a concubine of Nero, this ſo provoked the Emperor, that he cauſed St Paul to be apprehended, and clapped into priſon. It was in this laſt place of confinement that he wrote his Second Epiſtle to Timothy, which Chryſoſtom looks upon as the apoſtle's laſt teſtament. See TIMOTHY and TITUS.

This great apoſtle at laſt conſummated his martyrdom, the 29th of June, in the 66th year of Jeſus Chriſt by having his head cut off, at a place called the *Salvian waters*. He was buried on the way of Oſtium, and a magnificent church was built over his tomb, which is in being to this day. *Calmet's Dict.* &c.

PAUL (St), *Cave or Grotto of*, in the iſland of Malta, where St Paul and his company took ſhelter from the rains when the viper faſtened on his arm. Upon this ſpot there is a church built by the famed Alof de Vignacourt, grand maſter of the order, in the year 1606, a very handſome though but a ſmall, ſtructure. On the altar piece is a curious painting, repreſenting the apoſtle ſhaking off the viper, ſurrounded with men, women, and children, in attitudes of admiration and ſurpriſe, and in the Old Malteſe garb; and the whole very well executed. On the top of the painting is the following inſcription:

Vipera ignis acta calore fruſtra Pauli
Manum invadit; is inſulæ benedicens
Anguibus & herbis adimit omne virus.
M. DC. V.

PAUL, firſt biſhop of Narbonne, or Sergius Paulus the proconſul converted and made biſhop by St Paul, was deſcended from one of the beſt families of Rome. It is ſaid the Apoſtle called himſelf *Paul*, from his name. The Spaniards will have him to be their apoſtle, which is not improbable; and it is ſaid he died a martyr at Narbonne.

PAUL V. by birth a Roman, was firſt clerk of the chamber, and afterwards nuncio to Clement VIII. in Spain, who honoured him with a Cardinal's hat. He was advanced to the papal chair the 16th of May 1605, after Leo XI. The ancient quarrel between the ſecular and eccleſiaſtical juriſdictions, which in former times had occaſioned ſo much bloodſhed, revived in the reign of this pontiff. The ſenate of Venice had condemned by two decrees, 1. The new foundations of monaſteries made without their concurrence. 2 The alienation of the eſtates both eccleſiaſtical and ſecular. The firſt decree paſſed in 1603, and the ſecond in 1605. About the ſame time a canon and abbot, accuſed of rapine and murder, were arreſted by order of the ſenate, and delivered over to the ſecular court; a circumſtance which could not fail to give offence to the court of Rome. Clement VIII. thought it proper to diſſemble or take no notice of the affair; but Paul V. who had managed the Genoeſe upon a ſimilar occaſion, flattered himſelf with the hopes that the Venetians would be equally pliant. However, he was diſappointed; for the ſenate maintained that they held their power to make laws of God only; and therefore they refuſed to revoke their decrees and deliver up the eccleſiaſtical priſoners into the hands of the nuncio, as the pope demanded. Paul, provoked at this behaviour, excommunicated the doge and ſenate; and threatened to put the whole ſtate under an interdict, if ſatiſfaction was not given him, within the ſpace of 24 hours. The ſenate did no more than proteſt againſt this menace, and forbid the publication of it throughout their dominions. A number of pamphlets, from both ſides, ſoon announced the animoſity of the two parties. The Capuchins, the Thealins, and Jeſuits were the only religious orders who obſerved the interdict. The ſenate ſhipped them all off for Rome, and the Jeſuits were baniſhed for ever. Meantime his holineſs was preparing to make the refractory republic ſubmit to his ſpiritual tyranny by force of arms. He levied troops againſt the Venetians; but he ſoon found his deſign baulked, as the cauſe of the Venetians appeared to be the common cauſe of all princes. He had recourſe therefore, to Henry IV. to ſettle the differences; and this prince had all the honour of bringing about a reconciliation between the contending parties. His ambaſſadors at Rome and Venice began the negociation, and Cardinal de Joyeuſe finiſhed it in 1607. It was agreed upon, that this cardinal, ſhould declare at his entry into the ſenate, that the cenſures of the church were to be taken off, or that he would remove them; and that the doge ſhould at the ſame time ſurrender to him the deeds of revocation and proteſt. It was alſo ſtipulated, that all the religious who were baniſhed, except the Jeſuits, ſhould be reſtored to their former privileges. In fine, the Venetians promiſed to ſend an ambaſſador extraordinary to Rome, in order to thank the pope for the favour he had done them; but they would not allow the legate to ſpeak of his holineſs granting them abſolution. Paul was wiſe enough to overlook the whole matter, but endeavoured to put an end to another diſpute, which had been long agitated in the congregations *de auxiliis*. He cauſed it to be intimated in form to the diſputants and counſellors, that, as the congregations were now diſſolved, it was his expreſs order that the contending parties ſhould no longer continue to cenſure one another. Some authors have affirmed that Paul V. had drawn out a bull againſt the doctrine of Molina, which only wanted to be promulged; but for this fact there appears to be no other evidence than the draught of this bull, which we meet with in the end of the hiſtory of the above-mentioned congregations. Paul was ſtrongly ſolicited, but in vain, to make *the immaculate conception of the holy virgin*, an article of faith. He contented himſelf with barely forbidding the contrary doctrine to be publicly taught, that he might not offend the Dominicans, who at that time, maintained that ſhe was conceived, like other human creatures, in original ſin. His holineſs afterwards applied himſelf to the embelliſhing of Rome, and was at great pains to collect the works of the moſt eminent painters and engravers. Rome is indebted to him for its moſt beautiful fountains, eſpecially that where the water ſpouts out from an antique vaſe taken from the thermæ or hot-baths of Veſpaſian, and that which they call *aqua Paola*, an ancient work of Auguſtus, reſtored by Paul V. He brought water into it by an aqueduct 35 miles in length, after the example of Sixtus V. He completed the frontiſpiece of St Peter, and the magnificent palace of Mount Cavallo. He applied himſelf in a particular manner to the recovering and repairing ancient monuments, which he made to advance, as much as the nature of them would admit, the honour of Chriſtianity; as appears from an elegant inſcription placed upon a column of porphyry, taken from the temple of Peace, and bearing a beautiful ſtatue of the Virgin, at the ſide of the church of St Mary the elder:

"Impura falſi templa
Quondam numinis
Jubente moeſta perſerebam Cæſare:
Nunc læta veri
Perferens matrem Dei
Te, Paule, nullis obticebo ſæculis."

His pontificate was honoured with ſeveral illuſtrious embaſſies. The kings of Japan, Congo, and other Indian princes, ſent ambaſſadors to him. He took care to ſupply them with miſſionaries, and to found biſhopricks in theſe countries newly brought over to the faith. He ſhowed the ſame attention to the Maronites and other eaſtern Chriſtians. He ſent legates to different othordox princes, both to teſtify his eſteem for them, and to confirm them in their zeal for religion. He died the 28th of January 1621, aged 69; after having confirmed the French Oratory, the Urſulines, the Order of Charity, and ſome other inſtitutions. Bold in his claims, but of narrow views, he diſtinguiſhed himſelf more by his piety and and knowledge than by his politics. It has been remarked, that he never paſſed a ſingle day of his popedom without celebrating maſs. He enjoined all the religious in the proſecution of their ſtudies to have regular profeſſors for Latin, Greek, Hebrew, and Arabic; if there were any among themſelves properly qualified; or if that was not the caſe, to take the aſſiſtance of laymen for that purpoſe, until there were ſome of their own order who had learning enough to inſtruct their brethren. It was very difficult to carry this decree into execution; and indeed it was always very imperfectly obſerved.

Paul (Father), whoſe name, before he entered into the monaſtic life, was Peter Sarpi, was born at Venice, Auguſt 14. 1552. His father followed merchandiſe but with ſo little ſucceſs, that at his death he left his family very ill provided for: but under the care of a mother whoſe piety was likely to bring the bleſſing of providence upon them, and whoſe wiſe conduct ſupplied the want of fortune by advantages of greater value. Happily for young Sarpi ſhe had a brother, maſter of a celebrated ſchool, under whoſe direction he was placed by her. Here he loſt no time, but cultivated his abilities, naturally of the firſt rate, with unwearied application. He was born for ſtudy, having a natural averſion to pleaſure and gaiety, and a memory ſo tenacious that he could repeat 30 verſes upon once hearing them. Proportionable to his capacity was his progreſs in literature: at 13, having made himſelf maſter of ſchool learning, he turned his ſtudies to philoſophy and the mathematics, and entered upon logic under Capella of Cremona, who, though a celebrated maſter of that ſcience, confeſſed himſelf in a very little time unable to give his pupil any farther inſtructions.

As Capella was of the order of the Servites, his ſcholar was induced by his acquaintance with him to engage in the ſame profeſſion, though his uncle and his mother repreſented to him the hardſhips and auſterities of that kind of life, and adviſed him with great zeal againſt it. But he was ſteady in his reſolutions, and in 1566 took the habit of the order, being then only in his 14th year, a time of life in moſt perſons very improper for ſuch engagements, but in him attended with ſuch maturity of thought, and ſuch a ſettled temper, that he never ſeemed to regret the choice he then made, and which he confirmed by a ſolem public profeſſion in 1572.

At a general chapter of the Servites held at Mantua, Paul (for ſo we ſhall now call him) being then only 20 years old, diſtinguiſhed himſelf ſo much in a public diſputation by his genius and learning, that William duke of Mantua, a great patron of letters, ſolicited the conſent of his ſuperiors to retain him at his court, and not only made him public profeſſor of divinity in the cathedral, and reader of caſuiſtical divinity and canon law in that city, but honoured him with many proofs of his eſteem. But father Paul finding a court life not agreeable to his temper, quitted it two years afterwards, and retired to his beloved privacies, being then not only acquainted with the Latin, Greek, Hebrew, and Chaldee languages, but with philoſophy, the mathematics, cannon and civil law, all parts of natural philoſophy, and chemiſtry itſelf; for his application was unintermitted, his head clear, his apprehenſion quick, and his memory retentive.

Being made a prieſt at 22, he was diſtinguiſhed by the illuſtrious Cardinal Borromeo with his confidence, and employed by him on many occaſions, not without the envy of perſons of leſs merit, who were ſo far exaſperated as to lay a charge againſt him before the Inquiſition for denying that the Trinity could be proved from the firſt chapter of Geneſis; but the accuſation was too ridiculous to be taken notice of. After this he paſſed ſucceſſively through the dignities of his order, of which he was choſen provincial for the province of Venice at 26 years of age; and diſcharged this poſt with ſuch honour, that in 1579 he was appointed, with two others, to draw up new regulations and ſtatutes for his order. This he executed with great ſucceſs; and when his office of provincial was expired, he retired for three years to the ſtudy of natural and experimental philoſophy and anatomy, in which he is ſaid to have made ſome uſeful diſcoveries. In the intervals of his employment he applyed himſelf to his ſtudies with ſo extenſive a capacity, as left no branch of knowledge untouched. By him Acquapendente, the great anatomiſt, confeſſes that he was informed how viſion is performed; and there are proofs that he was not a ſtranger to the circulation of the blood. He frequently converſed upon aſtronomy with mathematicians, upon anatomy with ſurgeons, upon medicine with phyſicians, and with chemiſts upon the analyſis of metals, not as a ſuperficial inquirer, but as a complete maſter. He was then choſen procurator general of his order; and during his reſidence at Rome was greatly eſteemed by Pope Sixtus V. and contracted an intimate friendſhip with Cardinal Bellarmine and other eminent perſons.

But the hours of repoſe, that he employed ſo well, were interrupted by a new information in the Inquiſition; where a former acquaintance produced a letter written by him in cyphers, in which he ſaid, "that he deteſted the court of Rome, and that no preferment was obtained there but by diſhoneſt means." This accuſation, however dangerous, was paſſed over on account of his great reputation; but made ſuch impreſſions on that court, that he was afterwards denied a biſhopric by Clement VIII. After theſe difficulties were ſurmounted, F. Paul again retired to his ſolitude; where he appears, by ſome writings drawn up by him at that time, to have turned his attention more to improvements in piety than learning. Such was the care with which he read the ſcriptures, that, it being his cuſtom to draw a line under any paſſage which he intended more nicely to conſider, there was not a ſingle word in his New Teſtament but was underlined. The ſame marks of attention appeared in his Old Teſtament, Pſalter, and Breviary.

But the moſt active ſcene of his life began about the year 1615; when Pope Paul V, exaſperated by ſome decrees of the ſenate of Venice that interfered with the pretended rights of the church, laid the whole ſtate under an interdict. The ſenate, filled with indignation at this treatment, forbad the biſhops to receive or publiſh the pope's bull: and, convening the rectors of the churches, commanded them to celebrate divine ſervice in the accuſtomed manner, with which moſt of them readily complied: but the Jeſuits and ſome others refuſing, were by a ſolemn edict expelled the ſtate. Both parties having proceeded to extremities, employed their ableſt writers to defend their meaſures. On the pope's ſide, among others, Cardinal Bellarmine entered the liſts, and, with his confederate authors, defended the papal claims with much ſcurility of expreſſion, and very ſophiſtical reaſonings; which were confuted by the Venetian apologiſts in much more decent language, and with much greater ſolidity of argument. On this occaſion F. Paul was moſt eminently diſtinguiſhed by his Defence of the Rights of the ſupreme Magiſtrate, his Treatiſe of Excommunication, tranſlated from Gerſon, with an Apology, and other writings; for which he was cited before the Inquiſition at Rome; but it may be eaſily imagined that he did not obey the ſummons.

The Venetian writers, whatever might be the abilities of their adverſaries, were at leaſt ſuperior to them in the juſtice of their cauſe. The propoſitions maintained on the ſide of Rome were theſe: That the Pope is inveſted with all the authority of heaven and earth: that all princes are his vaſſals, and that he may annul their laws at pleaſure; that kings may appeal to him, as he is temporal monarch of the whole earth; that he can diſcharge ſubjects from their oaths of allegiance, and make it their duty to take up arms againſt their ſovereign; that he may depoſe kings without any fault committed by them, if the good of the church requires it; that the clergy are exempt from all tribute to kings, and are not accountable to them even in caſes of high-treaſon; that the pope cannot err; that his deciſions are to be received and obeyed on pain of ſin, though all the world ſhould judge them to be falſe; that the pope is God upon earth; that his ſentence and that of God are the ſame: and that to call his power in queſtion is to call in queſtion the power of God: maxims equally ſhocking, weak, pernicious and abſurd; which did not require the abilities or learning of F. Paul to demonſtrate their falſehood and deſtructive tendency. It may be eaſily imagined that ſuch principles were quickly overthrown, and that no court but that of Rome, thought it for its intereſt to favour them. The pope, therefore, finding his authors confuted and his cauſe abandoned, was willing to conclude the affair by treaty; which, by the mediation of Henry IV. of France, was accommodated upon terms very much to the honour of the Venetians. But the defenders of the Venetian rights were, though comprehended in the treaty, excluded by the Romans from the benefit of it: ſome upon different pretences, were impriſoned; ſome ſent to the galleys; and all debarred from preferment. But their malice was chiefly aimed againſt F. Paul, who ſoon found the effects of it; for as he was going one night to his convent, about ſix months after the accommodation, he was attacked by five ruffians armed with ſtilettoes, who gave him no leſs than fifteen ſtabs, three of which wounded him in ſuch a manner that he was left for dead. The murderers fled for refuge to the nuncio, and were afterwards received into the pope's dominions: but were purſued by divine juſtice, and all, except one man who died in priſon, periſhed by violent deaths.

This, and other attempts upon his life, obliged him to confine himſelf to his convent, where he engaged in writing the Hiſtory of the Council of Trent; a work unequalled for the judicious diſpoſition of the matter, and artful texture of the narration; commended by Dr Burnet as the completeſt model of hiſtorical writing; and celebrated by Mr Wotton as equivalent to any production of antiquity; in which the reader finds "liberty without licentiouſneſs, piety without hypocriſy, freedom of ſpeech without neglect of decency, ſeverity without rigour, and extenſive learning without oſtentation."

In this, and other works of leſs conſequence, he ſpent the remaining part of his life to the beginning of the year 1622, when he was ſeized with a cold and fever, which he neglected till it became incurable. He languiſhed more than twelve months, which he ſpent almoſt wholly in a preparation for his paſſage into eternity; and among his prayers and aſpirations was often heard to repeat, Lord! now let thy ſervant depart in peace." On Sunday the eighth of January of the next year, he roſe, weak as he was, to maſs, and went to take his repaſt with the reſt; but on Monday was ſeized with a weakneſs that threatened immediate death; and on Thurſday prepared for his change, by receiving the viaticum, with ſuch marks of devotion as equally melted and edified the beholders. Through the whole courſe of his illneſs to the laſt hour of his life, he was conſulted by the ſenate in public affairs, and returned anſwers in his greateſt weakneſs with ſuch preſence of mind as could only ariſe from the conſciouſneſs of innocence.

On Saturday the day of his death, he had the paſſion of our bleſſed Saviour read to him out of St John's goſpel, as on every other day of that week, and ſpoke of the mercy of his Redeemer, and his confidence in his merits. As his end evidently approached, the brethren of the convent came to pronounce the laſt prayers, with which he could only join in his thoughts, being able to pronounce no more than theſe words, *Eſto perpetuo*, "Mayeſt thou laſt for ever:" which was underſtood to be a prayer for the proſperity of his country. Thus died F. Paul, in the 71ſt year of his age; hated by the Romans as their moſt formidable enemy, and honoured by all the learned for his abilities, and by the good for his integrity. His deteſtation of the corruption of the Roman church appears in all his writings, but particularly in this memorable paſſage of one of his letters: "There is nothing more eſſential than to ruin the reputation of the Jeſuits. By the ruin of the Jeſuits, Rome will be ruined; and if Rome is ruined, religion will reform of itſelf." He appears, by many paſſages of his life, to have had a high eſteem of the church of England; and his friend F. Fulgentio, who had adopted all his notions, made no ſcruple of adminiſtering to Dr Duncombe, an Engliſh gentlemen that fell ſick at Venice, the communion in both kinds, according to the Common Prayer which he had with him in Italian. He was buried with great pomp at the public charge, and a magnificent monument was erected to his memory.

Paul, in ſea language, is a ſhort bar of wood or iron, fixed cloſe to the capſtern or windlas of a ſhip, to prevent theſe engines from rolling back or giving way when they are employed to heave in the cable, or otherwiſe charged with any great effort.

PAULIANISTS, Paulianistæ, a ſect of heretics, ſo called from their founder Paulus Samoſatenus a native of Samoſata, elected biſhop of Antioch in 262. His doctrine ſeems to have amounted to this: that the Son and the Holy Ghoſt exiſt in God in the ſame manner as the faculties of reaſon and activity do in man: that Chriſt was born a mere man; but that the reaſon or wiſdom of the Father deſcended into him, and by him wrought miracles upon earth, and inſtructed the nations; and, finally, that on account of this union of the Divine Word with the man Jeſus, Chriſt might, though improperly, be called God. It is alſo ſaid, that he did not baptize in the name of the Father and the Son, &c.; for which reaſon the council of Nice ordered thoſe baptiſed by him to be rebaptized.

Being condemned by Dionyſius Alexandrinus in a council, he abjured his errors, to avoid depoſition but ſoon after he reſumed them, and was actually depoſed by another council in 269.——He may be conſidered as the father of the modern Socinians; and his errors are ſeverely condemned by the council of Nice, whoſe creed differs a little from that now uſed, under the ſame name, in the church of England. The creed agreed upon by the Nicene fathers, with a view to the errors of Paulus Samoſatenus, concludes thus: τους δε λεγοντας ην ποτε ουκ ην, και πριν γεννηθηναι, ουκ ην, &c. τουτους αναθεματιζει ἡ καθολικη καὶ αποστολικη εκκλησια.—"But thoſe who ſay he was when he was not, and was not before he was born, the catholic and apoſtolic church anathematizes." To thoſe who have any veneration for the council of Nice this muſt appear a very ſevere, and perhaps not unjuſt, cenſure of the modern Hutchinſonians as well as of the Socinians.

PAULICIANS, a branch of the ancient Manichees, ſo called from their founder, one Paulus, an Armenian, in the ſeventh century; who, with his brother John, both of Samoſata, formed this ſect: though others are of opinion, that they were thus called from another Paul, an Armenian by birth, who lived under the reign of Juſtinian II. In the ſeventh century a zealot called Conſtantine revived this drooping ſect, which had ſuffered much from the violence of its adverſaries, and was ready to expire under the ſeverity of the imperial edicts, and the zeal with which they were carried into execution. The Paulicians, however, by their number, and the countenance of the emperor Nicephorus, became formidable to all the Eaſt.

But the cruel rage of perſecution, which had for ſome years been ſuſpended, broke forth with redoubled violence under the reigns of Michael Curopalates and Leo the Armenian, who inflicted capital puniſhment on ſuch of the Paulicians as refuſed to return into the boſom of the church. The empreſs Theodora, tutoreſs of the emperor Michael, in 845, would oblige them either to be converted or to quit the empire: upon which ſeveral of them were put to death, and more retired among the Saracens; but they were neither all exterminated nor baniſhed.

Upon this they entered into a league with the Saracens; and chooſing for their chief an officer of the greateſt reſolution and valour, whoſe name was Carbeas, they declared againſt the Greeks a war which was carried on for fifty years with the greateſt vehemence and fury. During theſe commotions, ſome Paulicians, towards the concluſion of this century, ſpread abroad their doctrines among the Bulgarians: many of them, either from a principle of zeal for the propagation of their opinions, or from a natural deſire of flying from the perſecution which they ſuffered under the Grecian yoke, retired, about the cloſe of the eleventh century, from Bulgaria and Thrace, and formed ſettlements in other countries. Their firſt migration was into Italy; whence, in proceſs of time, they ſent colonies into almoſt all the other provinces of Europe, and formed gradually a conſiderable number of religious aſſemblies, who adhered to their doctrine, and who were afterwards perſecuted with the utmoſt vehemence by the Roman pontiffs In Italy they were called *Patarini*, from a certain place called Pataria, being a part of the city of Milan, where they held their aſſemblies; and *Cathari* or *Gazaria* from Gazaria, or the Leſſer Tartary. In France they were called *Albigenſes*, though their faith differed widely from that of the Albigenſes whom Proteſtant writers generally vindicate. (See Albigenses). The firſt religious aſſembly the Paulicians had formed in Europe is ſaid to have been diſcovered at Orleans in 1017, under the reign of Robert, when many of them were condemned to be burnt alive. The ancient Paulicians, according to Photius, expreſſed the utmoſt abhorrence of Manes and his doctrine. The Greek writers compriſe their errors under the ſix following particulars: 1. They denied that this inferior and viſible world is the production of the ſupreme Being; and they diſtinguiſh the Creator of the world and of human bodies from the moſt high God who dwells in the heavens: and hence ſome have been led to conceive that they were a branch of the Gnoſtics rather than of the Manichæans. 2. They treated contemptuouſly the Virgin Mary; or, according to the uſual manner of ſpeaking among the Greeks, they refuſed to adore and worſhip her. 3. They refuſed to celebrate the inſtitution of the Lord's ſupper. 4. They loaded the croſs of Chriſt with contempt and reproach; by which we are only to underſtand, that they refuſed to follow the abſurd and ſuperſtitious practice of the Greeks, who paid to the pretended wood of the croſs a certain ſort of religious homage. 5. They rejected, after the example of the greateſt part of the Gnoſtics, the books of the Old Teſtament; and looked upon the writers of that ſacred hiſtory as inſpired by the Creator of this world, and not by the ſupreme God. 6. They excluded preſbyters and elders from all part in the adminiſtration of the church.

PAULINA, a Roman Lady, wife of Saturnius governor of Syria, in the reign of the emperor Tiberius. Her conjugal peace was diſturbed, and violence was offered to her virtue, by a young man named Mundus, who fell in love with her, and had cauſed her to come to the temple of Iſis by means of the prieſts of that goddeſs, who declared that Anubis wiſhed to communicate to her ſome thing of moment. Saturninus complained to the emperor of the violence which had been offered to his wife; and the temple of Iſis was overturned, and Mundus baniſhed, &c.—There was beſides a *Paulina*, wife of the philoſopher Seneca. She attempted to kill herſelf when Nero had ordered her huſband to die. The emperor, however, prevented her; and ſhe lived ſome few years after in the greateſt melancholy.

PAULINA, in botany: A genus of the trigynia order, belonging to the octandria claſs of plants; and in the natural method ranking under the 23d order, *Trihilatæ*. Its characters are theſe: the flower has a permanent empalement, compoſed of four ſmall oval leaves; it has four oblong oval petals, twice the ſize of the empalement; and eight ſhort ſtamina with a turbinated germen, having three ſhort ſlender ſtyles, crowned by ſpreading ſtigmas: the germen turns to a large three-cornered capſule with three cells, each containing one almoſt oval ſeed. Linnæus reckons ſeven, and Miller nine, ſpecies, natives of the Weſt Indies.

PAULINUS, a biſhop who flouriſhed in the early part of the 7th century. He was the apoſtle of Yorkſhire, having been the firſt archbiſhop of York. This dignity ſeems to have been conferred on him about the year 626. He built a church at Almonbury, and dedicated it to St Alban, where he preached to and converted the Brigantes. Camden mentions a croſs at Dewſborough, which had been erected to him with this inſcription, *Paulinus hic prædicavit et celebravit.* York was ſo ſmall about this time, that there was not ſo much as a ſmall church in it in which King Edwin could be baptized. Conſtantius is ſaid to have made it a biſhopric. Pope Honorius made it a metropolitan ſee. We are told that Paulinus baptized in the river Swale, in one day, 10,000 men, beſides women and children on the firſt converſion of the Saxons to Chriſtianity, beſides many at Halynoge. At Walſtone, in Northumberland, he baptized Segbert king of the Eaſt Saxons. Bede ſays, "Paulinus coming with the king and queen to the royal manor called *Ad-Gebrin* (now Yeverin), ſtaid there 36 days with them, employed in the duties of catechizing and baptizing. In all this time he did nothing from morning to night but inſtruct the people, who flocked to him from all the villages and places, in the doctrine of Chriſt and ſalvation; and, after they were inſtructed, baptizing them

Paul.

them in the neighbouring river Glen." According to the ſame Bede, "he preached the word in the province of Lindiſſi; and firſt converted the governor of the city of Lindocollina, whoſe name was Blecca, with all his family. In this city he built a ſtone church of exquiſite workmanſhip, whoſe roof being ruined by long neglect or the violence of the enemy, only the walls are now ſtanding." He is alſo ſaid to have founded a collegiate church of prebends near Southwell in Nottinghamſhire, dedicated to the Virgin Mary. This church he is ſaid to have built when he baptized the Coritani in the Trent.

PAULO (Marco), a celebrated traveller, was ſon to Nicholas Paulo, a Venetian, who went with his brother Matthew, about the year 1255, to Conſtantinople, in the reign of Baudoin II. Nicholas, at his departure, left his wife big with child; and ſhe brought to the world the famous Marco Paulo, the ſubject of this memoir. The two Venetians, having taken leave of the emperor, croſſed the Black Sea, and travelled into Armenia; whence they paſſed over land to the court of Barka, one of the greateſt lords of Tartary, who loaded them with honours. This prince having been defeated by one of his neighbours, Nicholas and Matthew made the beſt of their way through the deſerts, and arrived at the city where Kublai, grand khan of the Tartars, reſided. Kublai was entertained with the account which they gave him of the European manners and cuſtoms; and appointed them ambaſſadors to the pope, in order to demand of his holineſs a hundred miſſionaries. They came accordingly to Italy, obtained from the Roman pontiff two Dominicans, the one an Italian the other an Aſiatic, and carried along with them young Marco, for whom Kublai expreſſed a ſingular affection. This young man, having learned the different dialects of Tartary, was employed in embaſſies which gave him the opportunity of traverſing Tartary, China, and other eaſtern countries. At length, after a reſidence of ſeventeen years at the court of the grand khan, the three Venetians returned to their own country in the year 1295, with immenſe fortunes. A ſhort time after his return, Marco ſerving his country at ſea againſt the Genoeſe, his galley, in a great naval engagement was ſunk, and himſelf taken priſoner, and carried to Genoa. He remained there many years in confinement; and, as well to amuſe his melancholy as to gratify thoſe who deſired it from him, he ſent for his notes from Venice, and compoſed the hiſtory of his own and his father's voyages in Italian, under this title, *Delle Maraviglie del mondo da lui vidute*, &c.; the firſt edition of which appeared at Venice, in 8vo, 1496. His work was tranſlated into different languages, and inſerted in various collections. The editions moſt eſteemed are the Latin one publiſhed by Andrew Muller at Cologne, in 4to, 1671; and that in French, to be found in the collection of voyages publiſhed by Bergeron, at the Hague, 1735, in 2 vols. 4to. In the writings of Marco Paulo, there are ſome things true and others highly incredible. It is indeed difficult to believe, that as ſoon as the grand khan was informed of the arrival of two Venetian merchants who were come to ſell theriaca (or treacle) at his court, he ſent before them an eſcort of 40,000 men, and afterwards diſpatched theſe Venetian ambaſſadors to the Pope, to beſeech his holineſs to ſend him a hundred miſſionaries. It is equally difficult to believe that the pope, who doubtleſs had an ardent zeal for the propagation of the faith, inſtead of a hundred, ſhould have ſent him only two miſſionaries. There are therefore ſome errors and exaggerations in Marco Paulo's narrative; but many other things which were afterwards verified, and which have been of ſervice to ſucceeding travellers, prove that in ſeveral reſpects his relation is valuable. He not only gave better accounts of China than had been before received; but likewiſe furniſhed a deſcription of Japan, of many of the iſlands of the Eaſt Indies, of Madagaſcar, and the coaſts of Africa; ſo that from his work it might be eaſily collected, that a direct paſſage by ſea to the Indies was not only poſſible but practicable. It may be worth while to add, that, in the opinion of the authors of the Univerſal Hiſtory, what he wrote from his own knowledge is both curious and true, ſo that where he has erred his father and uncle muſt have deceived him.

Paulus, Pavo.

PAULUS ÆMILIUS. See *Æmilius Paulus*.

PAVO, the PEACOCK, in ornithology; a genus belonging to the order of gallinæ. The head is covered with feathers which bend backwards; the feathers of the tail are very long, and beautifully variegated with eyes of different colours. Latham enumerates eight ſpecies:

Latham's Synopſis of Birds.

1. The criſtatus, or common peacock of Engliſh authors, has a compreſſed creſt and ſolitary ſpurs.—It is about the ſize of a common Turkey; the length from the tip of the bill to the end of the tail being three feet eight inches. The bill is nearly two inches long, and is of a brown colour. The irides are yellow. On the crown there is a ſort of creſt, compoſed of 24 feathers, which are not webbed except at the ends, which are gilded green. The ſhafts are of a whitiſh colour; and the head, neck, and breaſt, are of a green gold colour. Over the eye there is a ſtreak of white, and beneath there is the ſame. The back and rump are of a green gold colour, gloſſed over with copper: the feathers are diſtinct, and lie over each other like ſhells. "Above the tail ſprings an inimitable ſet of long beautiful feathers, adorned with a variegated eye at the end of each; theſe reach conſiderably beyond the tail; and the longeſt of them in many birds are four feet and an half in length. This beautiful train, or tail as it is falſely called, may be expanded quite to a perpendicular upwards at the will of the bird. The true tail is hid beneath this group of feathers, and conſiſts of 18 grey brown feathers, one foot and a half long, marked on the ſides with rufous grey: the ſcapulars and leſſer wing coverts are reddiſh cream-colour, variegated with black: the middle coverts deep blue, gloſſed with green gold: the greateſt and baſtard wing rufous: the quills are alſo rufous; ſome of them variegated with rufous, blackiſh, and green: the belly and vent are greeniſh black: the thighs yellowiſh: the legs ſtout; thoſe of the *male* furniſhed with a ſtrong ſpur three quarters of an inch in length; the colour of them grey brown."

The female is rather leſs than the male. The train is very ſhort, being much ſhorter than the tail, and ſcarcely longer than its coverts; neither are the feathers furniſhed with eyes. The creſt on the head is ſimilar to that on the head of the male: the ſides of the head have a greater portion of white: the throat and neck are green: the reſt of the body and wings are cinereous brown: the breaſt is fringed with white: the bill is the ſame: the irides are lead-colour: the legs are as in the male; but the ſpur is generally wanting, though in ſome birds a rudiment of one is ſeen. In ſome male birds, all the wing coverts and ſcapulars are of a fine deep blue green, very gloſſy; but the outer edge of the wing and quills are of the common colour.

This bird, now ſo common in Europe, is of eaſtern origin, being a native of India. They are found wild in the iſlands of Ceylon and Java in the Eaſt Indies, and at St Helena, at Barbuda, and other Weſt India iſlands. They are not natural to China; but they are found in many places of Aſia and Africa. They are, however, nowhere ſo large or ſo fine as in India, in the neighbourhood of the Ganges, from whence, by degrees, they have ſpread into all parts, increaſing in a wild ſtate in the warmer climes; but wanting ſome care in the colder regions. In Britain this bird does not come to its full plumage till the third year. The female lays five or ſix greyiſh white eggs; in hot climates 20, the ſize of thoſe of a turkey. Theſe, if let alone, ſhe lays in ſome ſecret place, at a diſtance from the uſual reſort, to prevent their being broken by the male, which he is apt to do if he find them. The time of ſitting is from 27 to 30 days. The young may be fed with curd, chopped leeks, barley-meal, &c. moiſtened; and are fond of graſhoppers, and ſome other inſects. In five or ſix months they will feed as the old ones, on wheat and barley, with what elſe they can pick up in the circuit of their confinement. They ſeemt o prefer the moſt elevated places to rooſt on during night; ſuch as high trees, tops of houſes, and the like. Their cry is loud and inharmonious; a perfect contraſt to their external beauty. They are caught in India, by carrying lights to the trees where they rooſt, and having painted repreſentations of the bird preſented to them at the ſame time; when they put out the neck to look at the figure, the ſportſman ſlips a nooſe over the head, and ſecures his game (A). In moſt ages they have been eſteemed as a ſalutary food. Hortenſius gave the example at Rome, where it was carried to the higheſt luxury, and ſold dear (B): and a young pea-fowl is thought a dainty even in the preſent times.

The life of this bird is reckoned by ſome at about 25 years; by others 100.

2. The variegated peacock, is nothing elſe but a mixed breed between the common and white peacock; and of courſe varies very conſiderably in colour.

3. The white peacock is, as its name imports, entirely white, not excepting even the eyes of the train, which it is nevertheleſs eaſy to trace out. This variety is in Latham's opinion more common in England than elſewhere. We are informed by the ſame author, that two inſtances have occurred to him of the females of this ſpecies having the external marks of the plumage of the male.

4. The pavo muticus is about the ſize of the creſted peacock; but the bill is larger and aſh-coloured: the irides are yellow, and round the eyes is red; on the top of the head is an upright creſt four inches long, and ſhaped ſomewhat like an ear of corn. The colour is green mixed with blue. The top of the neck and head are greeniſh, marked with ſpots of blue, which have a ſtreak of white down the middle of each: the back is greeniſh blue: the breaſt is blue and green gold mixed: the belly, ſides, and thighs are aſh-colour, marked with black ſpots, ſtreaked with white on the belly: the wing coverts and ſecondaries are not unlike the back: the greater quills are green, tranſverſely barred with black lines, but growing yellowiſh towards the ends where they are black: the upper tail coverts are fewer than thoſe of the common peacock, but much longer than the tail; they are of a cheſnut brown, with white ſhafts, and have at the end of each a large ſpot gilded in the middle, then blue, and ſurrounded with green: the legs are aſh-coloured, and not furniſhed with ſpurs, or they have been overlooked by thoſe who have ſeen them.

The female is ſmaller than the male; and differs in having the belly quite black, and the upper tail coverts much ſhorter: the tail is green, edged with blue, and white ſhafts. It inhabits Japan, and is only known to Europe by means of a painting, ſent by the emperor of Japan to the pope.

So beautiful a ſpecies of birds as the peacock could not long remain a ſtranger in the more diſtant parts in which they were produced; for ſo early as the days of Solomon, we find, among the articles imported in his Tarſhiſh navies, apes, and peacocks. A monarch ſo converſant in all branches of natural hiſtory, "who ſpoke of trees from the cedar of Lebanon, even unto the hyſſop that ſpringeth out of the wall; who ſpoke alſo of beaſts and of fowl," would certainly not neglect furniſhing his officers with inſtructions for collecting every curioſity in the countries they voyaged to, which gave him a knowledge that diſtinguiſhed him from all the princes of his time. Ælian relates, that they were brought into Greece from ſome barbarous country; and that they were held in ſuch high eſteem, that a male and female were valued at Athens at 1000 drachmæ, or 32l. 5s. 10d. Their next ſtep might be to Samos; where they were preſerved about the temple of Juno, being the birds ſacred to that goddeſs; and Gellius, in his *Noctes Atticæ*, c. 16. commends the excellency of the Samian peacocks. It is therefore probable, that they were brought there originally for the purpoſes of ſuperſtition, and afterwards cultivated for the uſes of luxury. We are alſo told, when Alexander was in India, he found

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(A) Tavernier's Travels, vol. iii. p. 57. The inhabitants of the mountains on both ſides of the Ganges catch them with a birdlime, prepared from the milky juice of two ſorts of trees (*ficus religioſa & Indica.*—Lin.), boiled with oils into a conſiſtence; which proves ſufficiently tenacious to entangle them, or the largeſt birds.—*Phil. Tranſ.* vol. lxxi. p. 376.

(B) They muſt have been in plenty notwithſtanding, or the emperor Vitellius could not have got ſufficient for his large diſh, called the *Buckler of Minerva*, which, hiſtory ſays, was filled with the livers of ſcari, tongues of flamingoes, and brains of pheaſants and peacocks.

found vaſt numbers of wild ones on the banks of the Hyarotis; and was ſo ſtruck with their beauty, as to appoint a ſevere puniſhment on any perſon that killed them.

Peacocks creſts, in ancient times, were among the ornaments of the kings of England. Ernald de Aclent was fined to king John in 140 palfries, with ſackbuts, lorains, gilt ſpurs, and peacocks creſts, ſuch as would be for his credit. See plate CCCLXXXI.

5. The pavo bicalcaratus, is larger than the common pheaſant. The bill is black, but from the noſtrils to the tip of the upper mandible red. The irides are yellow. The feathers on the crown of the head are ſufficiently long to form a creſt, of a dull brown colour. The ſpace between the bill and eyes is naked, with a few ſcattered hairs: the ſides of the head are white: the neck is bright brown, ſtriated acroſs with duſky brown: the upper parts of the back, ſcapulars, and wing coverts, are dull brown, dotted with paler brown and yellowiſh; beſides which, each feather is marked near the end with a roundiſh large ſpot of a gilded purple colour, changing into blue and green in different lights: the lower part of the back and rump are dotted with white: all the under parts are brown, ſtriated tranſverſely with black; the quills are duſky, the ſecondaries are marked with the ſame ſpot as the reſt of the wing: the upper tail coverts are longer than the tail, and each marked at the end with a ſpot like the wing feathers, each of which is ſurrounded firſt with a circle of black, and ultimately with an orange one; the legs and claws are brown, and on the back part of each leg are two ſpurs, one above the other.

The female is a third ſmaller than the male. The head, neck, and under parts are brown; the head ſmooth: the upper parts are alſo brown, and the feathers marked with a dull blue ſpot, ſurrounded with dirty orange: the feathers which cover the tail are ſimilar; but marked at the end with an obſcure dull oval ſpot of blue: the legs have no ſpurs.

This ſpecies is of Chineſe origin, and ſome of them have been brought from China to England alive, and have been for ſome time in the poſſeſſion of Mr James Monro. The male is now in the Leverian Muſeum, in the fineſt preſervation.

Sonnerat obſerves, that the bird from whence his deſcription was taken had two ſpurs on one leg, and three on the other. This muſt ſurely be a *luſus naturæ*; eſpecially as he ſays, it is the ſame as that in *Edw.* pl. 67.

6. The pavo tibetanus, is about the ſize of a pintado, being about two feet and nearly two inches long. The bill is above an inch and a half long, and cinereous: the irides are yellow: the head neck and under parts are aſh coloured, marked with blackiſh lines: the wing coverts, back and rump, are grey, with ſmall white dots; beſides which, on the wing coverts and back are large round ſpots of a fine blue, changing in different lights to violet and green gold: the quills and upper tail coverts are alſo grey, marked with blackiſh lines; the quills have two round blue ſpots on each, like thoſe of the coverts: on the outer webs, and on each tail feather, there are four of the ſame, two on each ſide of the web; the middle coverts are the longeſt, the others ſhorten by degrees: the legs are grey, furniſhed with two ſpurs behind, like the laſt ſpecies: the claws are blackiſh. This ſpecies inhabits the kingdom of Thibet. The Chineſe give it the name of *Chin-tchien-Khi*.

Pavo, in ichthyology. See *Peacock-fiſh*.

Pavo, in aſtronomy, a conſtellation in the ſouthern hemiſphere, unknown to the ancients, and not viſible in our latitude. It conſiſts of 14 ſtars, of which the names and ſituations are as follow:

	Signs.	Longit.			Latitude. South.			Magnitude.
		°	′	″	°	′	″	
The eye of the peacock	♑	[illegible]	0	3	36	11	18	2
In the breaſt		24	41	51	46	56	21	3
In the right wing		18	41	38	45	52	34	3
In the middle		3	42	28	44	29	8	3
In the root of the tail, firſt		3	53	24	44	6	13	5
5.								
ſecond		2	42	11	41	37	9	5
third		3	55	22	39	3	23	4
fourth		5	11	3	37	10	46	6
fifth		0	49	34	38	54	14	5
ſixth	♐	29	39	17	38	3	36	4
10.								
ſeventh		27	22	54	40	9	28	5
laſt		24	7	44	41	28	2	4
In the right foot	♑	1	22	11	48	6	3	4
In the left foot		9	43	7	50	49	7	4

See Astronomy, n° 406.

PAVOR, a Roman deity, whoſe worſhip was introduced by Tullus Hoſtilius, who, in a panic, vowed a ſhrine to him, and one to Pallor, *Paleneſs*; and therefore they are found on the coins of that family.

PAURÆDASTYLÆ, in natural hiſtory, the name of a genus of perfect cryſtals with double pyramids, and no intermediate column, compoſed of 12 planes, or two hexangular pyramids joined baſe to baſe.

PAUSANIA, in Grecian antiquity, a feſtival in which were ſolemn games, wherein nobody contended but free-born Spartans; in honour of Pauſanias the Spartan general, under whom the Greeks overcame the Perſians in the famous battle of Platæa.

PAUSANIUS, a Spartan king and general, who ſignaliſed himſelf at the battle of Platæa againſt the Perſians. The Greeks, very ſenſible of his ſervices, rewarded his merit with a tenth of the ſpoils taken from the Perſians. He was afterwards appointed to command the Spartan armies, and he extended his conqueſts in Aſia: but the haughtineſs of his behaviour created him many enemies; and the Athenians ſoon obtained a ſuperiority in the affairs of Greece.—Pauſanius, diſſatisfied with his countrymen, offered to betray Greece to the Perſians, if he received in marriage as the reward of his perfidy the daughter of their king. His intrigues were diſcovered by means of a young man who was intruſted with his letters to Perſia, and who refuſed to go, on recollecting that ſuch as had been employed in that office before had never returned. The letters were given to the Ephori of Sparta, and the perfidy of Pauſanias was thus diſcovered. He fled for ſafety to a temple of Minerva: and as the ſanctity of the place ſcreened him from the violence of his purſuers, the ſacred building was ſurrounded with heaps of ſtones, the firſt of which was carried there by the indignant mother of the unhappy man. He was ſtarved, to death in the temple, and died about 474 years before the Chriſtian era. There was a feſtival and ſolemn games inſtituted to his honour, in which only free-born Spartans contended. There was alſo an oration ſpoken in his praiſe, in which his actions were celebrated, particularly the battle of Platæa, and the defeat of Mardonius. See Pausanias.

Pausanias, a learned Greek hiſtorian and orator in the ſecond century, under the reign of Antoninus the philoſopher, was the diſciple of Herodus Atticus. He lived for a long time in Greece: and afterwards went to Rome, where he died at a great age. He wrote an excellent deſcription of Greece, in ten books; in which we find not only the ſituation of places, but the antiquities of Greece, and every thing moſt curious and worthy of knowledge. Abbe Gedoin has given a French tranſlation of it, in 2 vols 4to

PAUSE, a ſtop or ceſſation in ſpeaking, ſinging, playing, or the like. One uſe of pointing in grammar is to make proper pauſes, in certain places.—There is a pauſe in the middle of each verſe; in an hemiſtich, it is called a *reſt* or *repoſe*. See Poetry, and Reading.

PAW, in the manege. A horſe is ſaid to paw the ground, when, his leg being either tired or painful, he does not reſt it upon the ground, and fears to hurt himſelf as he walks.

PAWN, a pledge or gage for ſurety of payment of money lent, It is ſaid to be derived *a pugno, quia res quæ pignori dantur, pugno vel manu traduntur.* The party that pawns goods hath a general property in them; they cannot be forfeited by the party that hath them in pawn for any offence of his, nor be taken in execution for his debt; neither may they otherwiſe be put in execution till the debt for which they are pawned is ſatisfied.

If the pawn is laid up, and the pawnee robbed, he is not anſwerable; though if the pawnee uſe the thing, as a jewel, watch, &c. that will not be the worſe for wearing, which he may do, it is at his peril; and if he is robbed, he is anſwerable to the owner, as the uſing occaſioned the loſs, &c.

If the pawn is of ſuch a nature that the keeping is a charge to the pawnee, as a cow or a horſe, &c. he may milk the one and ride the other, and this ſhall go in recompence for his keeping.

Things which will grow the worſe by uſing, as apparel, &c. he may not uſe.

PEA, in botany. See Pisum.

PEACE (*Temple of*), a celebrated temple at Rome, which was conſumed by fire A. D. 191; produced, as ſome writers ſuppoſe, by a ſlight earthquake, for no thunder was heard at the time. Dio Caſſius, however, ſuppoſes that it began in the adjoining houſes. Be that as it will, the temple, with all the ſurrounding buildings, were reduced to aſhes. That magnificent ſtructure had been raiſed by Veſpaſian after the deſtruction of Jeruſalem, and enriched with the ſpoils and ornaments of the temple of the Jews. The ancients ſpeak of it as one of the moſt ſtately buildings in Rome. There men of learning uſed to hold their aſſemblies, and lodge their writings, as many others depoſited their jewels, and whatever elſe they eſteemed of great value. It was likewiſe made uſe of as a kind of magazine for the ſpices that were bought by the Roman merchants out of Egypt and Arabia; ſo that many rich perſons were reduced to beggary, all their valuable effects and treaſures being conſumed in one night, with the temple.

PEACH, in botany. See Amygdalus.

PEACOCK, in ornithology See Pavo.

Peacock Fiſh. Pinna ani radiis 55, *caudali falcata.* The body of this fiſh is of various colours; the fin of the anus has 55 ſtreaks, and its tail is in the form of a creſcent. The head is without ſcales; it is brown upon the upper part, yellow above the eyes, and of a ſilver colour on the ſides. The back is round, and adorned with beautiful blue ſtreaks in a ſerpentine form; and the belly bright as ſilver. The fins of the breaſt are round, and, like thoſe of the belly, have a yellow ground with a grey border; that of the back is of a violet colour; that of the anus is ſtraw coloured; and, laſtly, that of the tail is yellow on the ſides, red towards the middle, and bordered with a deep blue. We are as yet ignorant of its length.

There is a variety of this fiſh found only in the Indian ſeas, and therefore called the *Indian peacock fiſh*; which is thus deſcribed in the language of Linnæus: *Pavo pinna caudali forcipata; ſpinis dorſalibus* 14: *ocello cæruleo pone oculos.* It has the fin of its tail forked; 14 ſharp points or prickles on the back, with a round blue ſtreak behind the eyes.

The body of this fiſh is of an elliptical form; the head is covered with ſcales to the tip of the ſnout; the two jaws are armed with long and ſharp teeth; the ball of the eye is black, and the iris of a white colour, with a mixture of green. At the inſertion of the fins of the belly is found a bony ſubſtance. The head, back, and ſides, are of a yellow colour, more or leſs deep, and covered with lines or ſtreaks of ſky blue. Theſe colours are ſo agreeably mixed, that they reſemble the elegance of the peacock's tail.

PEAK of Derbyshire, a chain of very high mountains in the county of Derby in England, famous for the mines they contain, and for their remarkable caverns. The moſt remarkable of theſe are Pool's hole and Elden-hole. The former is a cave at the foot of a high hill called *Coitmoſs*, ſo narrow at the entrance that paſſengers are obliged to creep on all fours; but it ſoon opens to a conſiderable height, extending to above a quarter of a mile, with a roof ſomewhat reſembling that of an ancient cathedral. By the petrifying water continually dropping in many parts of the cave are formed a variety of curious figures and repreſentations of the works both of nature and art. There is a column here as clear as alabaſter, which is called *The Queen of Scots Pillar*, becauſe Queen Mary is ſaid to have proceeded thus far when ſhe viſited the cavern. It ſeems the curioſity of that princeſs had led her thus far into this dark abode; and indeed there are few travellers who care to venture farther; but others determined to ſee the end of all, have gone beyond it After ſliding down the rock a little way, is found the dreary cavity turned upwards: following its courſe, and climbing from crag to crag, the traveller arrives at a great height, till the rock, cloſing over his head

Peak.

on all ſides, puts an end to any farther ſubterraneous journey. Juſt at turning to deſcend, the attention is caught by a chaſm, in which is ſeen a candle glimmering at a vaſt depth underneath. The guides ſay, that the light is at a place near Mary Queen of Scots pillar, and no leſs than 80 yards below. It appears frightfully deep indeed to look down; but perhaps does not meaſure any thing like what it is ſaid to do. If a piſtol is fired by the Queen of Scots pillar, it will make a report as loud as a cannon. Near the extremity, there is a hollow in the roof, called the *Needle's Eye;* in which if a candle is placed, it will repreſent a ſtar in the firmament to thoſe who are below. At a little diſtance from this cave is a ſmall clear ſtream conſiſting of hot and cold water, ſo near each other, that the finger and thumb of the ſame hand may be put, the one into the hot water and the other into the cold.

Elden-hole is a dreadful chaſm in the ſide of a mountain; which, before the latter part of the laſt century, was thought to be altogether unfathomable. In the time of Queen Elizabeth, a poor man was let down into it for 200 yards; but he was drawn up in a frenzy, and ſoon after died. In 1682, it was examined by Captain Collins, and in 1699 by Captain Sturmy, who publiſhed their accounts in the Philoſophical Tranſactions. The latter deſcended by ropes fixed at the top of an old lead-ore pit, four fathoms almoſt perpendicular, and from thence three fathoms, more obliquely between two great rocks. At the bottom of this he found an entrance into a very ſpacious cavern, from whence he deſcended along with a miner for 25 fathoms perpendicular. At laſt they came to a great river or water, which he found to be 20 fathoms broad and eight fathoms deep. The miner who accompanied him, inſiſted that this water ebbed and flowed with the ſea; but the Captain diſproved this aſſertion, by remaining in the place from three hours flood or two hours ebb, during which time there was no alteration in the height of the water. As they walked by the ſide of this water, they obſerved a hollow in the rock ſome feet above them The miner went into this place, which was the mouth of anothern cavern: and walked for about 17 paces in it, till he juſt loſt ſight of the Captain. He then called to him, that he had found a rich mine; but immediately after came running out and crying that he had ſeen an evil ſpirit; neither could any perſuaſions induce him to return. The floor of theſe caverns is a kind of white ſtone enamelled with lead ore, and the roofs are encruſted with ſhining ſpar. On his return from this ſubterraneous journey, Captain Sturmy was ſeized with a violent headach, which after continuing four days terminated in a fever, of which he died in a ſhort time.

Several years ago this cavern was viſited by the late Mr James Ferguſon: who tells us, that it conſiſts of two hollows one over another: but that the mouth of the lowermoſt is now ſtopped up by planks of timber laid acroſs it, on which is a heap of ſtones thrown in at the upper mouth with a deſign to fill up the cavern entirely; which, however, will probably be never accompliſhed on account of its vaſt ſize.

Peak of Teneriffe. See TENERIFFE.

Pean ‖ Pearce.

PEAN, in heraldry, is when the field of a coat of arms is ſable, and the powderings or.

PEAR, in botany. See PYRUS.

Pear-Glaſs. See *VITREA Lacrymia.*

PEARCE (Dr), lord biſhop of Rocheſter, was the ſon of a diſtiller in High Holborn. He married Miſs Adams, the daughter of a diſtiller in the ſame neighbourhood, with a conſiderable fortune, who lived with him 52 years in the higheſt degree of connubial happineſs. He had his education in Weſtminſter ſchool, where he was diſtinguiſhed by his merit, and elected one of the king's ſcholars. In 1710, when he was 20 years old, he was elected to Trinity College, Cambridge. During the firſt years of reſidence at the univerſity, he ſometimes amuſed himſelf with lighter compoſitions, ſome of which are inſerted in the Guardian and Spectator. In 1716, he publiſhed his edition of *Cicero de Oratore*, and, at the deſire of a friend, luckily dedicated it to Lord Chief Juſtice Parker (afterwards Earl of Macclesfield), to whom he was a ſtranger. This incident laid the foundation of his future fortune: for Lord Parker ſoon recommended him to Dr Bentley, Maſter of Trinity, to be made one of the fellows; and the doctor conſented to it on this condition, that his lordſhip would promiſe to *unmake* him again as ſoon as it lay in his power to give him a living. In 1717 Mr Pearce was ordained at the age of 27; having taken time enough, as he thought, to attain a ſufficient knowledge of the ſacred office. In 1718, Lord Parker was appointed chancellor, and invited Mr Pearce to live with him in his houſe as chaplain. In 1719, he was inſtituted into the rectory of Stapleford Abbots, in Eſſex; and in 1720, into that of St Bartholomew, behind the Royal exchange, worth 400 l. *per annum.* In 1723, the lord chancellor preſented him to St Martin's in the Fields. His Majeſty, who was then at Hanover, was applied to in favour of St Claget who was then along with him; and the doctor actually kiſſed hands upon the occaſion: but the chancellor, upon the king's return, diſputed the point and was permitted to preſent Mr Pearce. Mr Pearce ſoon attracted the notice and eſteem of perſons in the higheſt ſtations and of the greateſt abilities. Beſide Lord Parker, he could reckon among his patrons or friends, Lord Macclesfield, Mr Pulteney (afterwards Earl of Bath), archbiſhop Potter, Lord Hardwicke, Sir Iſaac Newton, and other illuſtrious perſonages.—In 1724, the degree of doctor of divinity was conferred on him by archbiſhop Wake. The ſame year he dedicated to his patron, the earl of Macclesfield, his edition of *Longinus on the Sublime*, with a new Latin verſion and notes.

When the church of St Martin's was rebuilt, Dr Pearce preached a ſermon at the conſecration, which he afterwards printed, and accompanied with an Eſſay on the origin and progreſs of temples, traced from the rude ſtones which were firſt uſed for altars to the noble ſtructure of Solomon, which he conſiders as the firſt temple completely covered. His obſervations on that building which is called the *Temple of Dagon* removes part of the difficulty which preſents itſelf in the narration of the manner in which Samſon deſtroyed it.

The deanery of Wincheſter becoming vacant, Dr

Pearce was appointed dean in 1739; and in the year 1744 he was elected prolocutor of the lower houſe of convocation for the biſhop of Canterbury. His friends now began to think of him for the epiſcopal dignity; but Mr Dean's language rather declined it. However, after ſeveral difficulties had been ſtarted and removed, he conſented to accept the biſhopric of Bangor, and promiſed Lord Hardwicke to do it with a good grace. He accordingly made proper acknowledgments of the royal goodneſs, and was conſecrated Feb. 12. 1748. Upon the declining ſtate of health of Dr Wilcocks, biſhop of Rocheſter, the biſhop of Bangor was ſeveral times applied to by archbiſhop Herring to accept of Rocheſter, and the deanry of Weſtminſter, in exchange for Bangor; but the Biſhop then firſt ſignified his deſire to obtain leave to reſign and retire to a private life. His lordſhip, however, upon being preſſed, ſuffered himſelf to be prevailed upon.—"My Lord (ſaid he to the Duke of Newcaſtle), your grace offers theſe dignities to me in ſo generous and friendly a manner, that I promiſe you to accept them." Upon the death of Biſhop Wilcocks he was accordingly promoted to the ſee of Rocheſter and deanery of Weſtminſter in 1756. Biſhop Sherlock died 1761, and Lord Bath offered his intereſt for getting the Biſhop of Rocheſter appointed to ſucceed him in the dioceſe of London; but the biſhop told his lordſhip, that he had determined never to be biſhop of London or archbiſhop of Canterbury.

In the year 1763, his lordſhip being 73 years old, and finding himſelf leſs fit for the buſineſs of his ſtations as biſhop and dean, informed his friend Lord Bath of his intention to reſign both, and live in a retired manner upon his private fortune. Lord Bath undertook to acquaint his majeſty; who named a day and hour, when the biſhop was admitted alone into the cloſet. He told the king, that he wiſhed to have ſome interval between the fatigues of buſineſs and eternity; and deſired his majeſty to conſult proper perſons about the propriety and legality of his reſignation. In about two months the king informed him, that Lord Mansfield ſaw no objection; and that Lord Northington, who had been doubtful, on farther conſideration thought that the requeſt might be complied with. Unfortunately for the biſhop, Lord Bath applied for Biſhop Newton to ſucceed. This alarmed the miniſtry, who thought that no dignities ſhould be obtained but through their hands. They therefore oppoſed the reſignation; and his majeſty was informed that the biſhops diſliked the deſign. His majeſty ſent to him again; and at a third audience told him, that he muſt think no more of reſigning. The biſhop replied, "Sir, I am all duty and ſubmiſſion;" and then retired.

In 1768 he obtained leave to reſign the deanery; in 1773, he loſt his lady; and after ſome months of lingering decay, he died at Little Ealing, June 29. 1774.

This eminent prelate diſtinguiſhed himſelf in every part of his life by the virtues proper to his ſtation. His literary abilities, and application to ſacred and philological learning, appear by his works; the principal of which are, A letter to the clergy of the church of England, on occaſion of the biſhop of Rocheſter's commitment to the Tower, 2d edit. 1722. Miracles of Jeſus vindicated, 1727 and 1728. A review of the text of Milton, 1733. Two letters againſt Dr Middleton, occaſioned by the Doctor's letter to Waterland, on the publication of his treatiſe, intitled, *Scripture Vindicated*, 3 edit. 1752. And ſince his death, a commentary with notes on the four Evangeliſts and the Acts of the Apoſtles, together with a new tranſlation of St Paul's firſt Epiſtle to the Corinthians, with a paraphraſe and notes, have been publiſhed, with his life prefixed, from original MSS. in 2 vols 4to.

The following character of this excellent biſhop was publiſhed in the Gentleman's Magazine for 1775, and was written, as we are told, by a contemporary and friend. "The world has not loſt for many years a more reſpectable member of ſociety than the late Dr Pearce; nor the clergy a more pious and learned prelate. In his younger days, before he became a graduate, he publiſhed that excellent edition of Longinus, ſtill admired and quoted by the beſt critics. What is ſaid of Longinus himſelf by our excellent Engliſh poet, is as applicable to the editor; 'He is himſelf the great ſublime he draws;' for very few of his order ever arrived to that perfection in eloquence, for which he was ſo juſtly celebrated. His diction was ſimple, nervous, and flowing; his ſentiments were juſt and ſublime; more ſublime than the heathen critic, in proportion to the ſuperior ſublimity of the Chriſtian revelation. Yet he was never puffed up with the general applauſes of the world, but of an humble deportment, reſembling the meek Jeſus as far as the weakneſs of human nature can reſemble a character without ſin. His countenance was always placid, and diſplayed the benevolence of his heart, if his extenſive charity had not proved it to a demonſtration. His thirſt of knowledge prompted him to a very ſtudious life, and that rendered both his complexion and conſtitution delicate; yet it held out by the bleſſing of Providence beyond the 85th year of his age; which is the more extraordinary, conſidering the midnight lamp had caſt a paleneſs over his complexion; yet with all his learning and knowledge, his humility and modeſty reſtrained him from many publications, which the world may hope for from his executors; one particularly in divinity, which has been the object of his contemplation for many years paſt. With a view to complete that work, and to retire from the buſtle of the world, he ſtruggled ſo hard to reſign his biſhopric, &c. After poſſeſſing the eſteem and veneration of all who knew him for a long ſeries of years, either as rector of a very large pariſh, or as a dignitary of the church, he has left the world in tears; and gone to receive the infinite reward of his piety and virtue."

PEARCH, in ichthyology. See Perca.

The pearch affords good ſport for the angler. The beſt time for their biting is when the ſpring is over, and before the heats of ſummer come on. At this time they are very greedy; and the angler with good management, may take at one ſtanding all that are in the hole, be they ever ſo many.

The proper baits are a minow or young frog; but the worm called the *brandling*, well ſcoured, is alſo excellent at all times of the year. When the pearch bites, he ſhould always have a great deal of time allowed him to ſwallow the bait.

The pearch will bite all day long, if the weather be cloudy; but the beſt time is from eight to ten in the morning, and from three till ſix in the afternoon.

The perch is very abſtemious in winter, and will ſeldom bite in this ſeaſon of the year; if he does at all, it is in the middle of the day: at which time indeed all fiſh bite beſt at that ſeaſon.

If the bait be a minow, which is the bait that affords moſt diverſion to the angler, it muſt be faſtened to the hook alive, by putting the hook through the upper lip or back-fin; it muſt be kept at about mid-water, and the float muſt be a quill and a cork, that the minow alone may not be able to ſink it.

The line muſt be of ſilk, and ſtrong; and the hook armed with a ſmall and fine wire, that if a pike ſhould take the bait, as is not unfrequently the caſe, he may be taken. The way to carry the minows or ſmall gudgeons alive for baits is this: A tin-pot is to be provided, with holes in the lid, and filled with water; and the fiſh being put in this, the water is to be changed once in a quarter of an hour by the holes, without taking off the lid at any time, except when the bait is to be taken out.

A ſmall caſting net, made for theſe little fiſh, ſhould be taken out with the pearch-tackle; and one or two caſts of this will take baits enough for the day, without any farther trouble. When the bait is a frog, the hook is to be faſtened to the upper parts of the leg. The beſt place for the fiſhing for pearch is in the turn of the water near ſome gravelly ſcour. A place of this kind being pitched upon, it ſhould be baited over night with lobworms chopped to pieces; and in the morning, on going to it, the depth is to be regularly plumbed, and then the hook is to be baited with the worm or other bait; and as it drags along, the pearch will ſoon ſeize upon it.

PEARCH-Glue, the name of a kind of glue, of remarkable ſtrength and purity, made from the ſkins of pearches.

PEARL, in natural hiſtory, a hard, white, ſhining body, uſually roundiſh, found in a teſtaceous fiſh reſembling an oyſter.

Pearls, though eſteemed of the number of gems by our jewellers, and highly valued not only at this time but in all ages, proceed only from a diſtemper in the creature that produces them, analogous to the bezoars and other ſtony concretions in ſeveral animals of other kinds.

The fiſh in which theſe are uſually produced is the Eaſt Indian pearl oyſter, as it is commonly called. Beſides this ſhell there are many others that are found to produce pearls; as the common oyſter, the muſcle, and ſeveral others; the pearls of which are often very good, but thoſe of the true Indian berberi, or pearl-oyſter, are in general ſuperior to all. The ſmall or ſeed-pearls, alſo called, *ounce pearls*, from their being ſold by the ounce and not by tale, are vaſtly the moſt numerous and common: but, as in diamonds, among the multitudes of ſmall ones, there are ſmaller numbers and larger found, ſo in pearls there are larger and larger kinds; but as they increaſe in ſize, they are proportionably leſs frequent; and this is one reaſon of their great price. We have Scotch pearls frequently as big as a little tare, ſome as big as a large pea, and ſome few of the ſize of a horſe-bean; but theſe are uſually of a bad ſhape, and of little value in proportion to their weight. Philip II. of Spain had a pearl perfect in its ſhape and colour, and of the ſize of a pigeon's egg. The fineſt, and what is called the true ſhape of the pearl, is a perfect round; but if pearls of a conſiderable ſize are of the ſhape of a pear, as is not unfrequently the caſe, they are not leſs valued, as they ſerve for ear-rings and other ornaments. Their colour ought to be a pure white; and that not a dead and lifeleſs, but a clear and brilliant one: they muſt be perfectly free from any foulneſs, ſpot, or ſtain; and their ſurfaces muſt be naturally ſmooth and gloſſy, for they bring their natural poliſh with them, which art is not able to improve.

All pearls are formed of the matter of the ſhell, and conſiſt of a number of coats ſpread with perfect regularity one over another, in the manner of the ſeveral coats of an onion; or like the ſeveral ſtrata of the ſtones found in the bladders or ſtomachs of animals, only much thinner.

Manner of Fiſhing for PEARLS in the Eaſt Indies.—There are two ſeaſons for pearl-fiſhing: the firſt is in March and April, and the laſt in Auguſt and September: and the more rain there falls in the year, the more plentiful are theſe fiſheries. At the beginning of the ſeaſon there are ſometimes 250 barks on the banks; the larger barks have two divers, and the ſmaller one. As ſoon as the barks arrive at the place where the fiſh lie, and have caſt anchor, each diver binds a ſtone, ſix inches thick and a foot long, under his body; which ſerves him as a ballaſt, prevents his being driven away by the motion of the water, and enables him to walk more ſteadily under the water. They alſo tie another very heavy ſtone to one foot, by which they are very ſpeedily ſent to the bottom of the ſea; and as the oyſters are uſually firmly faſtened to the rocks, they arm their hands with leather mittens, to prevent their being wounded in pulling them violently off; but this taſk ſome perform with an iron rake. In the laſt place, each diver carries down with him a large net in the manner of a ſack, tied to his neck by a long cord, the other end of which is faſtened to the ſide of the bark. This net is to hold the oyſters gathered from the rock, and the cord is to pull up the diver when his bag is full, or when he wants air.

In this equipage he ſometimes precipitates himſelf ſixty feet under water, and as he has no time to loſe, he no ſooner arrives at the bottom than he begins to run from ſide to ſide, tearing up all the oyſters he meets with, and cramming them into his budget.

At whatever depth the divers are, the light is ſo great, that they eaſily ſee whatever paſſes in the ſea; and, to their great conſternation, ſometimes perceive monſtrous fiſhes, from which all their addreſs in mudding the water &c. will not always ſave them, but they unhappily become their prey: and of all the dangers of the fiſhery, this is one of the greateſt and moſt uſual. The beſt divers will keep under water near half an hour, and the reſt do not ſtay leſs than a quarter. During this time they hold their breath without the uſe of oils or any other liquors; only acquiring the habit by long practice. When they find themſelves ſtraitened, they pull the rope to which the bag is faſtened, and hold faſt by it with both hands: when thoſe in the bark, taking the ſignal, heave them up into the air, and unload them of their fiſh; which is ſometimes 500 oyſters, and ſometimes not above 50. Some of the divers need a moment's reſpite to recover breath: others jump in again inſtantly, continuing this violent exerciſe without intermiſſion for ſeveral hours.

On the ſhore they unload their barks, and lay their oyſters in an infinite number of little pits dug in the ſand four or five feet ſquare, raiſing heaps of ſand over them to the height of a man; and in this condition they are left till the rain, wind and ſun, have obliged them to open, which ſoon kills them: upon this the fleſh rots and dries, and the pearls, thus diſengaged, fall into the pit on their taking out the ſhells. After clearing the pits of the groſſer filth, they ſift the ſand ſeveral times in order to find the pearl; but whatever care they take they always loſe a great many. After cleaning and drying the pearls they are paſſed through a kind of ſieve, according to their ſizes; the ſmalleſt are then ſold as ſeed-pearls, and the reſt put up to auction, and ſold to the higheſt bidder.

Though thoſe ornaments are met with in all quarters of the globe, the moſt eſteemed have always been thoſe of Aſia, and the eaſt coaſt of Africa. In the kingdom of Madura, which lies on the eaſt of Malabar, there are many pearl fiſheries. Tutukurin or Tutucorin is the principal, if not the only, city on the fiſhery coaſt. At the time the Portugueſe were maſters in theſe parts, the taking of oyſters in the ſtraits betwixt the iſland of Ceylon and the continent, was ſtyled by way of excellence, the *fiſhery*, and very deſervedly; for though ſome prefer the pearls taken near the iſland of Baharen in the Perſian gulf, and thoſe likewiſe found on the coaſt of China at Hainan, yet it might be very eaſily proved, from the compariſon of the annual amount of thoſe fiſheries within this period, that they were very ſeldom ſuperior to this of which we are ſpeaking. It was one of the wiſeſt points in the Portugueſe policy, that, though they were really in poſſeſſion of this beneficial commerce, yet they choſe to diſſemble it, and took all imaginable precautions in order to make the natives believe that they were perfectly free, and that their interpoſition was not ſo much the effect of authority as of good-will; it was for this reaſon that they never pretended to erect any fort either at Tutucorin or at Calipatnam, two towns upon the continent, from whence moſt of the fiſhers and their barks came, and that they ſuffered the ancient cuſtoms to take place.

Mod.Univ. Hiſt.

The ſeaſon of the fiſhery was the latter end of April or beginning of May, ſometimes ſooner, ſometimes later, according to the weather. The direction of it was left entirely to the ſovereign of the country, called the *naik;* and the Portugueſe, in quality of the protectors of the ſea, ſent two frigates to defend the fiſhing-veſſels from the Malabar and Maldive pirates. The time which this pearl-fiſhing laſted was about a fortnight, of the beginning of which the naik gave public notice; and, the day being come, there repaired to the place aſſigned ſeveral thouſands of people of all ſexes and ages, and an indefinite number of fiſhing veſſels, and divers from five or ſix hundred to a thouſand or more. Upon a ſignal given the boats put to ſea; and, having choſen their proper ſtations, the divers plunged and brought up the oyſters in little baſkets upon their heads; with which the boats being ſufficiently laden, they were carried on ſhore, where the people who remained there for that purpoſe buried them in the ſand, till, by the heat of the ſun, the fiſh was corrupted and conſumed, and the pearls eaſily taken out. The whole conduct of the firſt day's fiſhery belonged to the naik; and after that deduction, what was caught every day was ſeparated, and particularly diſtinguiſhed, but went to the common profit. The whole number of the people employed at ſea and at ſhore amounted frequently to 50,000 or 60,000 ſouls; and the pavilions and tents ſet up for their accommodation made a fine appearance at a diſtance. When the pearls were extracted, cleanſed, and dried, they paſſed them through a kind of ſieves, by which their ſizes were diſtinguiſhed. When all was over, the naik appointed a time and place for the public market; in conſequence of which there was a kind of fair, that laſted commonly from the cloſe of June till the beginning of September. The ſmalleſt, which are what we call *ſeed-pearl,* they ſold by weight, and all the reſt according to their reſpective ſizes and beauty, from a few ſhillings up to ten or twenty pounds, and ſometimes more a-piece; but there were few buyers, except the Portugueſe merchants, who, bringing ready money, had got bargains, and thus all parties were pleaſed. The Portugueſe aſſumed the protection of this fiſhery very ſoon after they ſettled in the Indies, and held it till the year 1658, when, in conſequence of their loſſes in Ceylon and elſewhere, it fell into the hands of the Dutch, who have remained in poſſeſſion of it ever ſince.

The Dutch have changed this method, as we are informed by a perſon very well acquainted with their affairs. The courſe into which they have put it is, in few words, this: the camp is ſometimes held on the coaſt of Madura, upon the continent; ſometimes on the iſland of Manar, which is in the hands of the Dutch, who, notwithſtanding, follow the example of the Portugueſe, and lay claim to no higher title than that of protectors of the fiſhery, in which quality their commiſſary is ever in the camp, as well as the naik or ſovereign of the country, who is alſo the rajah of Tanjour. The oyſters caught every day are put up in tuns or barrels, of which, when a certain number are full, they put them up to ſale by way of auction; and the merchants bid according as they have an opinion of the oyſters for the ſeaſon: but the middle price is between 30 and 40 ſhillings ſterling per caſk. When a merchant has bought ſuch a lot as this, he carries it to his quarters; and after a certain number of days he proceeds to opening the oyſters, but always in the air, for the ſtench is ſo great as to be almoſt inſupportable. They open them over tubs, into which they pour what comes out of the oyſter, as alſo that muddy water that remains in the caſk; next they draw it out into cullenders of ſeveral ſizes, and at length perhaps they find four or five ſhillings worth of pearls, ſometimes to the value of ten or twelve pounds; ſo that it is a perfect lottery, by which ſome few becoming rich, it betrays numbers into beggary. This pearl-fiſhery, we are told, brings the Dutch company an annual tribute of 20,000 l.

There are a variety of rivers great and ſmall in Eaſtern Tartary conſiderable for pear-fiſhery; but theſe pearls, though much eſteemed by the Tartars, would be little valued by Europeans, on account of their defects in ſhape and in colour. The Emperor Kang-hi had ſeveral chaplets or ſtrings of theſe pearls, each containing 100, which were very large, and exactly matched. There are many rivulets in Livonia which produce pearls almoſt equal in ſize and clearneſs to the Oriental ones. There are ſeveral fiſheries both on the eaſtern and weſtern coaſts of Africa; the moſt conſiderable of which lie round ſome ſmall iſlands, over againſt the kingdom of Sofala; but the people thus employed, inſtead of expoſing the oyſters to the warmth of the ſun, which would induce them to open, lay them upon the embers; by which abſurd method, thoſe pearls which they catch contract a dull kind of redneſs, which robs them of their natural luſtre as well as of their value. Pearl fiſhing is performed by the women as well as the men; both being equally expert. In the ſea of California alſo there are very rich pearl-fiſheries. In Japan likewiſe there are found pearls of great price. Pearls are met with in all parts of the Red Sea in the Indian Ocean, on the low part of the coaſt of Arabia Felix named *Baharen*, adjoining to the Perſian Gulf. They are likewiſe found on the low coaſt about Gunibroom to the eaſtward of the Perſian Gulf; and many of the fineſt kind are met with on the coaſts of Ceylon. They are moſt plentiful in the Baharen, between the coaſt of Arabia Felix and Ormus, whence they are tranſported to Aleppo, then ſent to Leghorn, and then circulated through Europe.

It has been very commonly ſuppoſed, that pearls are found in a kind of oyſters; and ſuch the pearl fiſhes are called in part of the above account extracted from the Univerſal Hiſtory; but Mr Bruce abſolutely denies this, and informs us that there is no ſuch fiſh as an oyſter to be met with in the Red Sea in particular. They are indeed found in bivalve ſhells, of which there are three kinds commonly ſought after by the pearl fiſhers. One of theſe is a kind of muſcle now very rare; but whether more plentiful formerly than at preſent is not known; they are principally found in the north end of the Red Sea and on the Egyptian ſide; and Mr Bruce informs us, that the only place in which he ever met with them was about Coſſair, and to the northward of it, where there was an ancient port called *Myos Hermos*, "which (ſays Mr Bruce) commentators have called the port of the *Mouſe*, when they ſhould have tranſlated it the harbour of the *Muſcle*."

The ſecond ſort of ſhell is called *Pinna*. It is broad and ſemicircular at the top, decreaſing gradually until it turns ſharp at the lower end, where the hinge is. The outſide is rough and figured, of a beautiful red colour, and ſometimes three feet long, and extremely brittle; the inſide lined with that beautiful ſubſtance called *nacre*, or mother-of-pearl.

The third kind of Pearl-ſhell is the only one which can be ſaid to bear any reſemblance to the oyſter; though even this is evidently of a different genus.

In a general view of the writings of Linnæus by Richard Pulteney, M. D. p. 42. it is ſaid that Linnæus made a remarkable diſcovery relating to the generation of pearls; in the river pearl-muſcle *(mya margaritifera)* a ſhell fiſh found in ſeveral rivers of Great Britain and Ireland; that this fiſh will bear removal remarkably well; and that in ſome places they form reſervoirs for the purpoſe of keeping it, and taking out the pearl, which in a certain period will be renewed again. The diſcovery was a method which Linnæus found of putting theſe muſcles into a ſtate of producing pearls at his pleaſure, though the final effect did not take place for ſeveral years; but that in five or ſix years after the operation, the pearl would have acquired the ſize of a vetch. Dr Pulteney regrets that we are unacquainted with the means by which Linnæus accompliſhed this extraordinary operation, which was conſidered as important, ſince it is certain the author was rewarded with a munificent premium from the ſtates of the kingdom on that account.

The colours of pearls are different according to the ſhells in which they are found. The firſt kind often produces thoſe of a fine ſhape and excellent luſtre, but ſeldom of that very fine colour which enhances their price. The ſecond kind produces pearls having the reddiſh caſt of the inner ſhell of the pinna, called *mother of pearl;* which ſeems to confirm the opinion of Reaumur, that the pearls are formed from the glutinous fluid which makes the firſt rudiments of the ſhell; and this kind of pearl is found to be more red as it is formed nearer the broad part of the ſhell, which is redder than the other end. Mr Bruce is of opinion, that the pearl found in this ſhell is the *penim* or *peninim* of Scripture; and that this name is derived from its redneſs. "On the contrary (ſays he), the word *pinna* has been idly imagined to be derived from *penna*, a feather; as being broad and round at the top, and ending at a point, or like a quill below. The Engliſh tranſlation of the Scripture, erroneous and inaccurate in many things more material, tranſlates this *peninim* by rubies, without any foundation or authority but becauſe they were both red, as are bricks or tiles, and many other things of baſe materials. The Greeks have tranſlated it literally *pina* or *pinna*, and the ſhell they call *pinnicas;* and many places occur in Strabo, Theophraſtus, Elian, and Ptolemy, which are mentioned as famous for this kind of pearl. I ſhould imagine alſo, that by Solomon ſaying it is the moſt precious of all productions, he means that this ſpecies of pearl was the moſt valued or the beſt known in Judæa; for though we learn from Pliny that the excellency of pearls was their whiteneſs, yet we know that the pearls of a yellowiſh caſt are thoſe eſteemed in India to this day, as the *peninim* pearls, or reddiſh pearl was in Judea in the days of Solomon. In Job, where all the variety of precious ſtones are mentioned, the tranſlator is forced, as it were unwillingly, to render *peninim* pearls, as he ought indeed to have done in many other places where it occurs."

The third ſort of ſhell produces pearls of extreme whiteneſs which Bochart ſays are called *darra* or *dora* in Arabic; which ſeems to be a general term for all kinds of pearls in Scripture, whereas the *peninim* is one in particular. The *peninim* is the magnet; "wiſdom is better (a better guide) than the polar ſtone." But though the character of this pearl be extreme whiteneſs, we are told by Pliny that there are ſhades or differences of it. The cleareſt, he ſays, are thoſe of the Red Sea; but the pearls of India have the colour of the flakes or diviſions of the lapis ſpecularis. The moſt excellent are thoſe like a ſolution of alum, limpid, milky-like, and even with a certain almoſt imperceptible caſt of a fiery colour. Theophraſtus tells us, that theſe pearls are tranſparent, as the deſcription of Pliny would lead as to imagine; but it is not ſo; and if there were, it is apprehended they would loſe all their beauty and value, and approach too much to glaſs. The value of theſe commodities depends upon their ſize, regularity of form, whether round or not, weight, ſmoothneſs, colour, and the different ſhades of that colour. The pearl fiſhers ſay, that when the ſhell is ſmooth and perfect, they never expect to find any pearls, but always do ſo when it has begun to be deformed and diſtorted. Hence it would ſeem, that as the fiſh turned older the veſſels containing the juice for forming the ſhell, and keeping it in its vigour, grew weak and ruptured; and thence, from this juice accumulating in the fiſh, the pearl was formed, and the ſhell brought to decay, as ſuppoſed by Mr Reaumur. If this be the caſe, it ought to be known by the form of the ſhell whether the pearl is large or ſmall: and thus the ſmaller ones being thrown back into the ſea, a conſtant crop of large pearls might be obtained.

Pliny ſays that pearls are the moſt valuable and excellent of all precious ſtones; and from our Saviour's comparing the kingdom of heaven to a pearl, it would ſeem that they really were held in ſuch high eſtimation at that time. Mr Bruce, however, is of opinion, that this extraordinary value was put only upon the very large kind; of which we are told, that Servilia, the Mother of Marcus Brutus, preſented one to Cæſar of the value of 50,000 l. of our money; and Cleopatra diſſolved one worth 250,000 l. in vinegar, which ſhe drank at a ſupper with Mark Antony.

It is generally ſaid that the pearl ſhell grows on rocks, which, together with the method of catching them, we have already mentioned. Some ſay they are taken with nets; from whence Mr Bruce controverts the idea of their growing on rocks; for nobody, he ſays, would employ nets to gather fiſh from among rocks. He tells us, that all kinds of them are found in the deepeſt and ſtilleſt water, and ſofteſt bottom; the parts of moſt of them being too fine to bear the agitation of the ſea among the rocks. It is obſerved that they produce the moſt beautiful pearls in thoſe places of the ſea where a quantity of freſh water falls. "Thus (ſays Mr Bruce), in the Red Sea, they are always moſt eſteemed that were fiſhed from Suakem ſouthward, that is, in thoſe parts correſponding to the country anciently called *Berberia* and *Azamia;* on the Arabian Coaſt near the iſland Camaran, where there is abundance of freſh water; and in the iſland of Fooſht. As it is a fiſh that delights in repoſe, I imagine it avoids this part of the Gulf, as lying open to the Indian Ocean, and agitated by variable winds."

Mr Bruce mentions a muſcle found in the ſalt ſprings of the Nubian deſert; in many of which he found thoſe excreſcences which might be called pearls, but all of them ill formed, foul, and of a bad colour, though of the ſame conſiſtence, and lodged in the ſame part of the body as thoſe in the ſea. "The muſcle, too (ſays our author), is in every reſpect ſimilar, I think larger. The outer ſkin or covering of it is of a vivid green. Upon removing this, which is the epidermis, what next appears is a beautiful pink, without gloſs, and ſeemingly of a calcareous nature. Below this, the mother-of-pearl, which is undermoſt, is a white without luſtre, partaking much of the blue and very little of the red; and this is all the difference I obſerved between it and the pearl-bearing muſcle of the Red Sea."

"In Scotland, eſpecially to the northward (A), in all rivers running from lakes, there are found muſcles that have pearls of more than ordinary merit, though ſeldom of large ſize. They were formerly tolerably cheap, but lately the wearing of real pearls coming into faſhion, thoſe of Scotland have increaſed in price greatly beyond their value, and ſuperior often to the price of oriental ones when bought in the eaſt. The reaſon of this is a demand from London, where they are actually employed in work, and ſold as oriental. But the excellency of all glaſs or paſte manufactory, it is likely, will keep the price of this article, and the demand for it, within bounds, when every lady has it in her power to wear in her ears, for the price of ſixpence, a pearl as beautiful in colour, more elegant in form, lighter and eaſier to carry, and as much bigger as ſhe pleaſes, than the famous ones of Cleopatra and Servilia. In Scotland, as well as in the eaſt, the ſmooth and perfect ſhell rarely produces a pearl; the crooked and diſtorted ſhell ſeldom wants one.

The mother-of-pearl manufactory is brought to the greateſt perfection at Jeruſalem. The moſt beautiful ſhell of this kind is that of the peninim already mentioned; but it is too brittle to be employed in any large pieces of workmanſhip; whence that kind named *dora*, is moſt uſually employed; and great quantities of this are daily brought from the Red Sea to Jeruſalem. Of theſe, all the fine works, the crucifixes, the wafer-boxes, and the beads, are made which are ſent to the Spaniſh dominions in the New World, and produce a return incomparably greater than the ſtaple of the greateſt manufactory in the Old.

Very little is known of the natural hiſtory of the pearl fiſh. Mr Bruce ſays, that, as far as he has obſerved, they are all ſtuck upright in the mud by an extremity; the muſcle by one end, the pinna by the ſmall ſharp point, and the third by the hinge or ſquare part which projects from the round. "In ſhallow and clear ſtreams (ſays Mr Bruce), I have ſeen ſmall furrows or tracks upon the ſandy bottom, by which you could trace the muſcle from its laſt ſtation; and theſe not ſtraight, but deviating into traverſes and triangles, like the courſe of a ſhip in a contrary wind laid down upon a map, probably in purſuit of food. The general belief is, that the muſcle is conſtantly ſtationary in a ſtate of repoſe, and cannot transfer itſelf from place to

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(A) There has been in theſe parts (*i. e.* at Perth) a very great fiſhery of pearl got out of the freſh-water muſcles. From the year 1761 to 1764, 10,000 l. worth were ſent to London and ſold from 10 s. to 1 l. 16 s. per ounce. We were told that a pearl had been taken there that weighed 33 grains. But this fiſhery is at preſent exhauſted, from the avarice of the undertakers: it once extended as far as Loch-Tay.

Pearl.

to place. This is a vulgar prejudice, and one of thoſe facts that are miſtaken for want of ſufficient pains or opportunity to make more critical obſervations. Others, finding the firſt opinion a falſe one, and that they are endowed with power of changing place like other animals, have, upon the ſame foundation, gone into the contrary extreme, ſo far as to attribute ſwiftneſs to them, a property ſurely inconſiſtent with their being fixed to rocks. Pliny and Solinns ſay that the muſcles have leaders, and go in flocks; and that their leader is endowed with great cunning to protect himſelf and his flock from the fiſhers; and that, when he is taken, the others fall an eaſy prey. This, however, we may juſtly look upon to be a fable; ſome of the moſt accurate obſervers having diſcovered the motion of the muſcle, which indeed is wonderful, and that they lie in beds, which is not at all ſo, have added the reſt, to make their hiſtory complete." Our author informs us, that the muſcles found in the ſalt ſprings of Nubia likewiſe travel far from home, and are ſometimes ſurpriſed, by the ceaſing of the rains, at a greater diſtance from their beds than they have ſtrength and moiſture to carry them. He aſſures us, that none of the pearl-fiſh are eatable; and that they are the only fiſh he ſaw in the Red Sea that cannot be eaten.

Artificial PEARLS. Attempts have been made to take out ſtains from pearls, and to render the foul opaque-coloured ones equal in luſture to the oriental. Abundance of proceſſes are given for this purpoſe in books of ſecrets and travels; but they are very far from anſwering what is expected from them. Pearls may be cleaned indeed from any external foulneſſes by waſhing and rubbing them with a little Venice ſoap and warm water, or with ground rice and ſalt, with ſtarch and powder-blue, plaſter of Paris, coral, white vitriol and tartar, cuttle-bone, pumice-ſtone, and other ſimilar ſubſtances; but a ſtain that reaches deep into the ſubſtance of pearls is impoſſible to be taken out. Nor can a number of ſmall pearls be united into a maſs ſimilar to an entire natural one, as ſome pretend.

There are, however, methods of making artificial pearls, in ſuch manner as to be with difficulty diſtinguiſhed from the beſt oriental. The ingredient uſed for this purpoſe was long kept a ſecret; but it is now diſcovered to be a fine ſilver-like ſubſtance found upon the under ſide of the ſcales of the blay or bleak fiſh. The ſcales, taken off in the uſual manner, are waſhed and rubbed with freſh parcels of fair water, and the ſeveral liquors ſuffered to ſettle; the water being then poured off, the pearly matter remains at the bottom, of the conſiſtence of oil, called by the French *eſſence d'orient*. A little of this is dropped into a hollow bead of bluiſh-glaſs, and ſhaken about ſo as to line the internal ſurface; after which the cavity is filled up with wax, to give ſolidity and weight. Pearls made in this manner are diſtinguiſhable from the natural only by their having fewer blemiſhes.

*Mother-of-*PEARL, the ſhell, not of the pearl oyſter but of the *mytilus margaritifera*. See MYTILUS.

Pearl-Aſh, a kind of fixed alkaline ſalt, prepared chiefly in Germany, Ruſſia, and Poland, and America, by melting the ſalts out of the aſhes of burnt wood; and having reduced them again to dryneſs, evaporating the moiſture, and calcining them for a conſiderable time in a furnace moderately hot. The goodneſs of pearl-aſhes muſt be diſtinguiſhed by the uniform and white appearance of them: they are nevertheleſs ſubject to a common adulteration, not eaſy to be diſtinguiſhed by the mere appearance, which is done by the addition of common ſalt. In order to find out this fraud, take a ſmall quantity of the ſuſpected ſalt; and after it has been ſoftened by lying in the air, put it over the fire in a ſhovel: if it contains any common ſalt, a crackling and kind of ſlight exploſion will take place as the ſalt grows hot.

Pearl, Pearſon.

Pearl-aſhes are much uſed in the manufacture of glaſs, and require no preparation, except where very great tranſparency is required, as in the caſe of looking-glaſs, and the beſt kind of window-glaſs. For this purpoſe diſſolve them in four times their weight of boiling water: when they are diſſolved, let the ſolution be put into a clean tub, and ſuffered to remain there 24 hours or more. Let the clear part of the fluid be then decanted off from the ſediment, and put back into the iron pot in which the ſolution was made; in this let the water be evaporated till the ſalts be left perfectly dry. Keep thoſe that are not deſigned for immediate uſe in ſtone jars, well ſecured from moiſture and air.

Mr Kirwan, who has tried a courſe of experiments on the alkaline ſubſtances uſed in bleaching, &c. (ſee *Iriſh Tranſ.* for 1789), tells us, that in 100 parts of the Dantzick pearl aſh, the vegetable alkali amounted to ſomewhat above 63. His pearl-aſh he prepares by calcining a ley of vegetable aſhes dried into a ſalt to whiteneſs. In this operation, he ſays, "particular care ſhould be taken that it ſhould not melt, as the extractive matter would not be thoroughly conſumed, and the alkali would form ſuch an union with the earthy parts as could not be eaſily diſſolved." He has "added this caution, as Dr Lewis and Mr Doſſie have inadvertently directed the contrary." We apprehend, however, that here is a little inaccuracy; and that it was not for pearl-aſh, but for the unrefined pot-aſh, that theſe gentlemen directed fuſion. The fact is, that the American pot-aſhes, examined by them, had unqueſtionably ſuffered fuſion; which was effected in the ſame iron pot in which the evaporation was finiſhed, by rather encreaſing the fire at the end of the proceſs: by this management, one of the moſt troubleſome operations in the whole manufacture, the ſeparation of the hard ſalt from the veſſels with hammers and chiſſels, was avoided; and though the extractive matter was not conſumed, it was burnt to an indiſſoluble coal; ſo that the ſalt, though black itſelf, produced a pale or colourleſs ſolution, and was uncommonly ſtrong. Mr Kirwan has alſo given tables of the quanties of aſhes and ſalt obtained from different vegetables; and he concludes from them, 1. "That in general weeds yield much more aſhes, and their aſhes much more ſalt, than woods; and that, conſequently, as to ſalts of the vegetable alkali kind, neither America, Trieſte, nor the northern countries, poſſeſs any advantage over England. 2. That of all weeds, fumitary produces moſt ſalt, and next to it wormwood; but if we attend only to the quantity of ſalt in a given weight of aſhes, the aſhes of wormwood contain moſt. *Trifolium fibrinum* alſo produces more aſhes and ſalt than fern." See POTASH.

PEARSON (John), a very learned Engliſh biſhop in

Pearſon, Peaſant.

in the 17th century, was born at Snoring in 1613. After his education at Eton and Cambridge, he entered into holy orders in 1639, and was the ſame year collated to the prebend of Netherhaven in the church of Sarum. In 1640 he was appointed chaplain to the lord keeper Finch, and by him preſented to the living of Torrington in Suffolk. In 1650 he was made miniſter of St Clement's, Eaſt-cheap, in London. In 1657, he and Mr Gunning had a diſpute with two Roman Catholics upon the ſubject of ſchiſm; a very unfair account of which was printed at Paris in 1658. Some time after, he publiſhed at London, An Expoſition of the Creed, in folio, dedicated to his pariſhioners of St Clement's, Eaſt-cheap, to whom the ſubſtance of that excellent work had been preached ſeveral years before, and by whom he had been deſired to make it public. The ſame year he likewiſe publiſhed The Golden Remains of the ever memorable Mr John Hales of Eton; to which he prefixed a preface, containing, of that great man, with whom he had been acquainted for many years, a character drawn with great elegance and force. Soon after the Reſtoration, he was preſented by Juxon, then biſhop of London, to the rectory of St Chriſtopher's in that city; created doctor of divinity at Cambridge, in purſuance of the king's letters mandatory; inſtalled prebendary of Ely; archdeacon of Surry; and made maſter of Jeſus college in Cambridge: all before the end of the year 1660. March 25th, 1661, he was appointed Margaret profeſſor of divinity in that univerſity; and, the firſt day of the enſuing year, was nominated one of the commiſſioners for the review of the liturgy in the conference at the Savoy. April 14th, 1662, he was admitted maſter of Trinity college in Cambridge; and, in Auguſt, reſigned his rectory of St Chriſtopher's and prebend of Sarum — In 1667 he was admitted a Fellow of the Royal Society. In 1672 he publiſhed at Cambridge, in 4to, *Vindiciæ Epiſtolarum S. Ignatii*, in anſwer to Monſ. Daillé; to which is ſubjoined, *Iſaaci Voſſii epiſtolæ duæ adverſus Davidem Blondellum.* Upon the death of the celebrated Wilkins, Pearſon was appointed his ſucceſſor in the ſee of Cheſter, to which he was conſecrated February 9th 1672-3. In 1682, his *Annales Cyprianici, ſive tredecem annorum, quibis S. Cyprian, inter Chriſtianos verſatus eſt, hiſtoria chronologica*, was publiſhed at Oxford, with Fell's edition of that Father's works. Pearſon was diſabled from all public ſervice by ill health a conſiderable time before his death, which happened at Cheſter, July 16th 1686.

PEASANT, a hind, one whoſe buſineſs is in rural labour.

It is amongſt this order of men that a philoſopher would look for innocent and ingenuous manners. The ſituation of the peaſantry is ſuch as ſecludes them from the devaſtations of luxury and licentiouſneſs; for when the contagion has once reached the receſſes of rural retirement, and corrupted the minds of habitual innocence, that nation has reached the ſummit of vice, and is haſtening to that decay which has always been the effect of vicious indulgence. The peaſantry of Britain ſtill in a great meaſure retain that ſimplicity of manners and ruſtic innocence which ought to be the characteriſtic of this order of ſociety; and, in many parts, their condition is ſuch as, were all its advantages ſufficiently known, would create envy in the minds of those who have toiled through life, amidſt the buſtle of the world, in queſt of that happineſs which it could not confer.

Peaſant.

O fortunatos nimium, ſua ſi bona norint,
Agricolas,——— Virgil.

In other countries the peaſants do not enjoy the ſame liberty as they do in our own, and are conſequently not ſo happy. In all feudal governments they are abject ſlaves, entirely at the diſpoſal of ſome petty deſpot. This was the caſe in Poland, where the native peaſants were ſubject to the moſt horrid ſlavery, though thoſe deſcended of the Germans, who ſettled in Poland during the reign of Boleſlaus the Chaſte and Caſſimir the Great, enjoyed very diſtinguiſhed privileges. Among the native ſlaves, too, thoſe of the crown were in a better condition than thoſe of individuals. See Poland.

The peaſants of Ruſſia (Mr Coxe tells us) are a hardy race of men, and of great bodily ſtrength. Their cottages are conſtructed with tolerable propriety, after the manner of thoſe in Lithuania; but they are very poorly furniſhed. The peaſants are greedy of money, and, as the ſame author informs us, ſomewhat inclined to thieving. They afford horſes to travellers, and act the part of coachmen and poſtilions. "In their common intercourſe they are remarkably polite to each other; they take off their cap at meeting; bow ceremoniouſly and frequently, and uſually exchange a ſalute. They accompany their ordinary diſcourſe with much action, and innumerable geſtures; and are exceedingly ſervile in their expreſſions of deference to their ſuperiors: in accoſting a perſon of conſequence, they proſtrate themſelves, and even touch the ground with their heads. We were often ſtruck at receiving this kind of eaſtern homage, not only from beggars, but frequently from children, and occaſionally from ſome of the peaſants themſelves.

Coxe's Travels into Poland, Ruſſia, Sweden, and Denmark.

"The peaſants are well clothed, comfortably lodged, and ſeem to enjoy plenty of wholeſome food. Their rye-bread, whoſe blackneſs at firſt diſguſts the eye, and whoſe ſourneſs the taſte, of a delicate traveller, agrees very well with the appetite: as I became reconciled to it from uſe, I found it at all times no unpleaſant morſel, and when ſeaſoned with hunger, it was quite delicious: they render this bread more palatable, by ſtuffing it with onions and groats, carrots or green corn, and ſeaſoning it with ſweet oil. The rye-bread is ſometimes white, and their other articles of food are eggs, ſalt fiſh, bacon, and muſhrooms; their favourite diſh is a kind of hodge podge, made of ſalt, or ſometimes freſh meat, groats, rye-flour, highly ſeaſoned with onions and garlic, which latter ingredients are much uſed by the Ruſſians. Beſides, muſhrooms are ſo exceedingly common in theſe regions, as to form a very eſſential part of their proviſion. I ſeldom entered a cottage without ſeeing great abundance of them; and in paſſing through the markets, I was often aſtoniſhed at the prodigious quantity expoſed for ſale; their variety was no leſs remarkable than their number; they were of many colours, amongſt which I particularly noticed white, black, brown, yellow, green, and pink. The common drink of the peaſants is quaſs, a fermented liquor, ſomewhat like ſweet-wort, made by pouring warm water on rye or barley-meal; and deemed an excellent antiſcorbutic. They are extremely fond of whiſky, a ſpirituous liquor diſtilled from malt, which the pooreſt can occaſionally command, and which their inclination often leads them to uſe to great exceſs."

Theſe people are extremely backward in the mechanic arts, though, where they have much intercourſe with other nations, this does not appear, and therefore does not proceed from natural inability; indeed we have already given an inſtance of one peaſant of Ruſſia, who ſeems to poſſeſs very ſuperior talents. See Neva.

The dreſs of theſe people is well calculated for the climate in which they live: they are particularly careful of their extremities. On their legs they wear one or two pair of thick worſted ſtockings; and they envelope their legs with wrappers of coarſe flannel or cloth ſeveral feet in length, and over theſe they frequently draw a pair of boots, ſo large as to receive their bulky contents with eaſe. The lower ſort of people are groſsly ignorant: of which we ſhall give a very ſurpriſing inſtance in the words of Mr Coxe:—"In many families, the father marries his ſon while a boy of ſeven, eight, or nine years old, to a girl of a more advanced age, in order, as it is ſaid, to procure an able-bodied woman for the domeſtic ſervice: he cohabits with this perſon, now become his daughter-in-law, and frequently has ſeveral children by her. In my progreſs through Ruſſia, I obſerved in ſome cottages, as it were, two miſtreſſes of a family; one the peaſant's real wife, who was old enough to be his mother; and the other, who was nominally the ſon's wife, but in reality the father's concubine. Theſe inceſtuous marriages, ſanctified by inveterate cuſtom, and permitted by the pariſh-prieſts, were formerly more common than they are at preſent; but as the nation becomes more refined, and the prieſts ſomewhat more enlightened; and as they have lately been diſcountenanced by government, they are daily falling into diſuſe; and it is to be hoped, will be no longer tolerated (A)."

The peaſants of Ruſſia, like thoſe of Poland, are divided into thoſe of the crown and thoſe of individuals; the firſt of which are in the beſt condition; but all of them undergo great hardſhips, being ſubject to the deſpotic will of ſome cruel overſeer. They may obtain freedom, 1. By manumiſſion on the death of their maſter, or otherwiſe: 2. By purchaſe; and, laſtly, By ſerving in the army or navy. The Empreſs has redreſſed ſome of the grievances of this claſs of her ſubjects. The hardineſs of the peaſants ariſes in a great meaſure from their mode of education and way of life, and from the violent changes and great extremes of heat and cold to which they are expoſed.

"The peaſants of Finland differ widely from the Ruſſians in their look and dreſs: they had for the moſt part fair complexions, and many of them red hair: they ſhave their beards, wear their hair parted at the top, and hanging to a conſiderable length over their ſhoulders (B). We could not avoid remarking, that they were in general more civilized than the Ruſſians; and that even in the ſmalleſt villages we were able to procure much better accommodations than we uſually met with in the largeſt towns which we had hitherto viſited in this empire."

The peaſants of Sweden (Mr Coxe informs us) are more honeſt than thoſe in Ruſſia; in better condition, and poſſeſſing more of the conveniencies of life, both with reſpect to food and furniture. "They are well clad in ſtrong cloth of their own weaving. Their cottages, though built with wood, and only of one ſtory, are comfortable and commodious. The room in which the family ſleep is provided with ranges of beds in tiers (if I may ſo expreſs myſelf), one above the other: upon the wooden teſters of the beds in which the women lie, are placed others for the reception of the men, to which they aſcend by means of ladders. To a perſon who has juſt quitted Germany, and been accuſtomed to tolerable inns, the Swediſh cottages may perhaps appear miſerable hovels; to me, who had been long uſed to places of far inferior accommodation they ſeemed almoſt palaces. The traveller is able to procure many conveniencies, and particularly a ſeparate room from that inhabited by the family, which could ſeldom be obtained in the Poliſh and Ruſſian villages. During my courſe through thoſe two countries, a bed was a phenomenon which ſeldom occurred, excepting in the large towns, and even then not always completely equipped; but the pooreſt huts of Sweden were never deficient in this article of comfort: an evident proof that the Swediſh peaſants are more civilized than thoſe of Poland and Ruſſia.—After having witneſſed the ſlavery of the peaſants in thoſe two countries, it was a pleaſing ſatisfaction to find myſelf again among freemen, in a kingdom where there is a more equal diviſion of property; where there is no vaſſalage; where the loweſt order enjoy a ſecurity of their perſons and property; and where the advantages reſulting from this right are viſible to the commoneſt obſerver."

(A) "The truth of this fact, which fell under my own obſervation, and which I authenticated by repeated inquiries from all ranks of people, is ſtill further confirmed by the following paſſage in the Antidote to the Journey into Siberia, although the author gives another reaſon for thoſe early marriages. 'The peaſants and common people not only marry their ſons at 14 and 15 years of age, but even at eight or nine, and that for the ſake of having a workwoman the more in the perſon of the ſon's wife: By the ſame rule they try to keep their daughters ſingle as long as poſſible, becauſe they don't chooſe to loſe a workwoman. Theſe premature marriages are of very little uſe to the ſtate; for which reaſon methods, to get the better of this cuſtom have been ſought for, and, I hope, will ſoon take place: the biſhops are attentive to prevent theſe marriages as much as poſſible, and have of late ſucceeded greatly in their endeavours. It is only the inhabitants of ſome of the provinces in Ruſſia that ſtill retain this bad cuſtom."

(B) The Ruſſians have generally dark complexions and hair; they alſo wear their beards, and cut their hair ſhort.

The peaſants of Holland and Switzerland are all in a very tolerable condition; not ſubject to the undiſputed controul of a hireling maſter, they are freemen, and enjoy in their ſeveral ſtations the bleſſings of freedom. In Bohemia, Hungary, and a great part of Germany, they are legally ſlaves, and ſuffer all the miſeries attending ſuch a condition. In Spain, Savoy, and Italy, they are little better. In France, their ſituation was ſuch as to warrant the Revolution; but whether by carrying matters too far, they are now worſe than they were at any former period, remains to be aſcertained.

PEAT, a well known inflammable ſubſtance, uſed in many parts of the world as fuel. There are two ſpecies:

1. A yellowiſh-brown or black peat, found in mooriſh grounds in Scotland, Holland, and Germany.—When freſh, it is of a viſcid conſiſtence, but hardens by expoſure to the air. It conſiſts, according to Kirwan, of clay mixed with calcareous earth and pyrites; ſometimes alſo it contains common ſalt. While ſoft, it is formed into oblong pieces for fuel, after the pyritaceous and ſtony matters are ſeparated. By diſtillation it yields water, acid, oil, and volatile alkali; the aſhes containing a ſmall proportion of fixed alkali; and being either white or red according to the proportion of pyrites contained in the ſubſtance.

The oil which is obtained from peat has a very pungent taſte; and an empyreumatic ſmell, leſs fetid than that of animal ſubſtances, more ſo than that of mineral bitumens; it congeals in the cold into a pitchy maſs, which liquefies in a ſmall heat: it readily catches fire from a candle, but burns leſs vehemently than other oils, and immediately goes out upon removing the external flame; it diſſolves almoſt totally in rectified ſpirit of wine into a dark browniſh red liquor.

2. The ſecond ſpecies is found near Newbury in Berkſhire. In the Philiſophical Tranſactions for the year 1757, we have an account of this ſpecies; the ſubſtance of which is as follows:

Peat is a compoſition of the branches, twigs, leaves, and roots of trees, with graſs, ſtraw, plants, and weeds, which having lain long in water, is formed into a maſs ſo ſoft as to be cut through with a ſharp ſpade. The colour is a blackiſh brown, and it is uſed in many places for firing. There is a ſtratum of this peat on each ſide the Kennet, near Newbury in Berks, which is from about a quarter to half a mile wide, and many miles long. The depth below the ſurface of the ground is from one foot to eight. Great numbers of entire trees are found lying irregularly in the true peat. They are chiefly oaks, alders, willows, and firs, and apear to have been torn up by the roots: many horſes heads, and bones of ſeveral kinds of deer; the horns of the antelope, the heads and tuſks of boars, and the heads of beavers, are alſo found in it. Not many years ago an urn of a light brown colour, large enough to hold about a gallon, was found in the peat-pit in Speen-moor, near Newbury, at about 10 feet from the river, and four feet below the level of the neighbouring ground. Juſt over the ſpot where the urn was found, an artificial hill was raiſed about eight feet high; and as this hill conſiſted both of peat and earth, it is evident that the peat was older than the urn. From the ſide of the river ſeveral ſemicircular ridges are drawn round the hill, with trenches between them. The urn was broken to ſhivers by the peat-diggers who found it, ſo that it could not be critically examined; nor can it be known whether any thing was contained in it.

With peat alſo may be claſſed that ſubſtance called in England ſtone-turf; which hardens after its firſt expoſure to the air, but afterwards crumbles down.—The other common turf conſiſts only of mould interwoven with the roots of vegetables; but when theſe roots are of the bulbous kind, or in large proportion, they form the worſt kind of turf. "Although it may appear incredible (ſays M. Magellan), it is nevertheleſs a real fact, that, in England, pit-turf is advantageouſly employed in Lancaſhire to ſmelt the iron-ore of that county. Mr Wilkinſon, brother-in-law to Dr Prieſtley, makes uſe of pit-turf in his large ſmelting furnaces. I have ſeen in the poſſeſſion of Mr S. More, ſecretary to the Society of Arts, a kind of black tallow, extracted by the ſaid Mr Wilkinſon from pit-turf. It was very ſoft, and nearly of the ſame conſiſtence with butter. It burnt very rapidly, with a ſmoky flame in the fire; but the ſmell was very diſagreeable, like that of pit-turf." The great cauſe of the differences of peat moſt likely ariſes from the different mineral admixtures. Some ſorts of peat yield in burning a very diſagreeable ſmell, which extends to a great diſtance; whilſt others are inoffenſive.—Some burn into grey or white, and others into red ferruginous aſhes. The aſhes yield, on elixation, a ſmall quantity of alkaline ſalt, with ſometimes one and ſometimes another ſalt of the neutral kind.

The ſmoke of peat does not preſerve or harden fleſh like that of wood; and the ſoot, into which it condenſes, is more diſpoſed to liquefy in moiſt weather.

Peat aſhes, properly burnt for a manure, are noble improvers both of corn and graſs land: but the ſubſtance from which they ſhould be got is an under ſtratum of the peat, where the fibres and roots of the earth, &c. are well decayed. Indeed the very beſt are procured from the loweſt ſtratum of all. This will yield a large quantity of very ſtrong aſhes, in colour (when firſt burnt) like vermilion, and in taſte very ſalt and pungent. Great care and caution ſhould be uſed in burning theſe aſhes, and alſo in preſerving them afterwards. The method of burning them is much the ſame as burning charcoal. The peat muſt be collected into a large heap, and covered ſo as not to flame out, but ſuffered to conſume ſlowly, till the whole ſubſtance is burnt to an aſh. The aſhes thus burnt are held in moſt eſteem; but the peat-aſhes burnt in common firing in many places are uſed for the ſame purpoſes, and ſold at the ſame prices.

Peat aſhes are found excellent in ſweetening ſour meadow land, deſtroying ruſhes, and other bad kinds of graſs, and in their ſtead producing great quantities of natural graſs. They burn great quantities of peat-aſhes in ſome parts of Berkſhire and Lancaſhire, and eſteem them one of the beſt dreſſings for their ſpring crops.

The ſulphureous and ſaline particles with which the aſhes abound have a moſt happy effect in promoting vegetation; and if uſed with diſcretion, the increaſe procured by them is truly wonderful.

All aſhes are of a hot, fiery, cauſtic nature: they muſt therefore be uſed with caution. With reſpect to peat-aſhes, almoſt the only danger proceeds from laying them on in too great quantities at improper ſeaſons. Nothing can be better than they are for dreſſing low damp meadows, laying to the quantity of from fifteen to twenty Wincheſter buſhels on an acre: it is beſt to ſow them by hand, as they will then be more regularly ſpread. This ſhould be done in January or February at lateſt, that the aſhes may be waſhed in, towards the roots of the graſs by the firſt rains that fall in the ſpring.

If they were ſpread more forward in the year, and a ſpeedy rain ſhould not ſucceed, being hot in their nature, they would be apt to burn up the graſs, inſtead of doing it any ſervice. The damper and ſtiffer the ſoil, the more peat-aſhes ſhould be laid on it; but in graſs lands the quantity ſhould never exceed thirty Wincheſter buſhels, and on light warm lands leſs than half that quantity is fully ſufficient.

On wheat crops theſe aſhes are of the greateſt ſervice, but they muſt be laid on with the utmoſt diſcretion. Were they to be ſpread in any quantity before the winter, after the ſowing the corn, they would make the wheat too rank, and do more harm than good; was the ſpreading this manure, on the contrary, deferred till the ſpring, the corn could not poſſibly during the winter ſeaſon be benefited by it. About the beginning of November, before the hard froſts ſet in, ſeems to be the proper ſeaſon for this purpoſe: and it will found neceſſary to ſow on every acre of heavy clayey wheat land about eight Wincheſter buſhels of theſe aſhes; on lighter warmer lands in wheat, four will be ſufficient for this ſeaſon. The winter dreſſing is thought by practical farmers to be of great ſervice: trifling as the quantity may ſeem, it warms the root of the plant, brings it moderately forward, preſerves its verdure, and diſpoſes it to get into a growing ſtate the firſt fine weather after Chriſtmas.

About the latter end of February, or the beginning of March, on heavy lands in wheat, another dreſſing of aſhes, by ſowing of them on every acre, eight buſhels more, will do much good; on light lands, in this ſecond dreſſing, ſix buſhels may be allowed.

Theſe aſhes laid on in the ſpring are of the greateſt ſervice, without any probability of danger; if rain falls within a few days after the dreſſing is laid on, it is waſhed in, and has a happy effect on the ſucceeding crop, co-operating with the manure that was laid on in November; if, on the contrary, dry weather for a long continuance ſucceeds, the firſt winter-dreſſing has its full effect, and the quantity laid on in the ſpring is in fact ſo ſmall, that there is very little probability of its burning or hurting the crop. This excellent manure is alſo of great uſe in the turnip huſbandry on many accounts, particularly as it much contributes to preſerve the young crop from being devoured by the fly.

But one of the principal advantages derived from theſe aſhes, not yet mentioned, is the very great ſervice they are of to every kind of artificial paſture.

Saintfoin receives great benefit from this manure, and ſo does clover, rye graſs, and trefoil, provided it is laid on with diſcretion: the proper ſeaſon is about the month of February. The quantity muſt be regulated by the nature of the crop and ſoil; but it ought ſcarcely in any inſtance to exceed thirty Wincheſter buſhels. Clover, with the help of this manure, grows with great luxuriance, inſomuch that there have often been two large crops of hay from the ſame field in a year, and good autumn ſeed afterwards. They have an excellent effect on tares or vetches: to peaſe they ſeem to be hurtful.

The effects of this manure will be viſible at leaſt three years, nor does it, like ſome others, leave the land in an impoveriſhed ſtate, when its virtues are exhauſted and ſpent. Peat-aſhes are not, however, ſo certain a manure for barley and oats as for the winter corn: for as theſe are quick growers, and occupy the land but a few months, this warm manure is often apt to puſh them forward too faſt, and make them run too much to coarſe ſtraw, yielding only a lean immature grain. Oats, however, are not ſo apt to be damaged by it as barley.

Peat aſhes approach, in their effects on the ſeveral crops on which they are laid, to coal-ſoot; but two-thirds of the quantity that is uſed of ſoot will be ſufficient of the aſhes, as they are in a much ſtronger degree impregnated with a vegetative power; and they are beſides in moſt places eaſier procured in quantities, and at a cheaper rate.

Peat-aſhes are almoſt, as we have already obſerved, a general manure ſuited to every ſoil. On cold clay they warm the too compact particles, diſpoſe it to ferment, crumble, and of courſe fertilize, and, in fine, not only aſſiſt it in diſcloſing and diſpenſing its great vegetative powers, but alſo bring to its aid a conſiderable proportion of ready prepared aliment for plants. On light lands theſe aſhes have a different effect: here the pores are too large to be affected, or farther ſeparated by the ſalts or ſulphur contained in them; but, being cloſely attached to the ſurfaces of the large particles of which this earth is generally compoſed, this manure diſpoſes them, by means of its ſalts, to attract the moiſture contained in the air: by this operation, the plants which grow on theſe porous ſoils are prevented from being ſcorched and burnt; and if they want, which they generally do, more nouriſhment than the land is of itſelf capable of affording, this is readily and abundantly ſupplied by this uſeful manure. In large farms it is very uſual to ſee all the home-fields rich and well mended by the yard dung, &c. whereas the more diſtant lands are generally poor, impoveriſhed, and out of heart, for want of proper manure being applied in time. See CHEMISTRY, nº 1448.

PEAUCIER, in anatomy, a name given by Winſlow, in his Treatiſe on the Head, and by ſome of the French writers, to the muſcle called by Albinus *latiſſimus colli*; and by others *detrahens quadratus*, and *quadratus genæ*. Santorini has called the part of this which ariſes from the cheek *muſculus riſorius novus*; and ſome call the whole *platyſma myoides*.

PEBBLES, the name of a genus of foſſils, diſtinguiſhed from the flints and homocroa by their having a variety of colours. Theſe are defined to be ſtones compoſed of a cryſtalline matter debaſed by earths of various kinds in the ſame ſpecies, and then ſubject to veins, clouds, and other variegations, uſually formed by incruſtation round a central nucleus, but ſometimes the effect of a ſimple concretion; and veined like the agates, by the diſpoſition which the motion of the fluid they were formed in gave their differently coloured ſubſtances.

The variety of pebbles is ſo great, that an haſty deſcriber would be apt to make almoſt as many ſpecies as he ſaw ſpecimens. A careful examination will teach us, however, to diſtinguiſh them into a certain number of eſſentially different ſpecies, to which all the reſt may be referred as accidental varieties. When we find the ſame colours, or thoſe reſulting from a mixture of the ſame, ſuch as nature frequently makes in a number of ſtones, we ſhall eaſily be able to determine that theſe are all of them the ſame ſpecies, though of different appearances; and that whether the matter be diſpoſed of in one or two, or in 20 cruſts, laid regularly round a nucleus; or thrown irregularly, without a nucleus, into irregular lines; or laſtly, if blended into an uniform maſs.

Theſe are the three ſtates in which every pebble is found; for if it has been naturally and regularly formed by incruſtation round a certain nucleus, we find that always the ſame in the ſame ſpecies, and the cruſts not leſs regular and certain. If the whole has been more haſtily formed, and the reſult only of one ſimple concretion, if that has happened while its different ſubſtances were all moiſt and thin, they have blended together, and made a mixed maſs of the joint colour of them all. But if they have been ſomething harder when this has happened, and too far concreted to diffuſe wholly among one another, they are found thrown together into irregular veins. Theſe are the natural differences of all the pebbles; and having regard to theſe in the ſeveral variegations, all the known pebbles may be reduced to 34 ſpecies.

In all the ſtrata of pebbles there are conſtantly found ſome which are broken, and of which the pieces lie very near one another; but as bodies of ſuch hardneſs could not be broken without ſome conſiderable violence, their preſent ſituation ſeems to indicate that they have ſuffered that great violence in or near the places where they now lie. Beſide theſe, we often meet with others which have as plainly had pieces broken off from them, though thoſe pieces are nowhere to be found; whence it ſeems equally plain, that whatever has been the cauſe of their fracture, they have been brought broken, as we find them, from ſome other place, or elſe that the pieces broken from them muſt at ſome time or other have been carried from this place to ſome other diſtant one.

Several of theſe broken pebbles have their edges and corners ſo ſharp and even, that it ſeems evident they never can have been toſſed about or removed ſince the fracture was made; and others have their ſides and corners ſo rounded, blunted, and worn away, that they ſeem to have been roughly moved and rolled about among other hard bodies, either with great violence, or for a very long continuance; ſince ſuch hard bodies could not have been reduced to the condition in which we now ſee them without long friction. It may be ſuppoſed by ſome, that theſe ſtones never were broken, but have been naturally formed of this ſhape; but it will be eaſily ſeen, by any one who accurately ſurveys their veins or coats, which ſurround the nucleus, like the annular circles of a tree, that they muſt have been originally entire; and this will be the more plain if they are compared with a ſtone broken by art. Such pebbles as are found in ſtrata near the ſurface of the earth, are much more brittle than thoſe which lie in deeper ſtrata; and the more clear and tranſparent the ſand is which is found among pebbles, the more beautiful the pebbles are generally obſerved to be.

The uſe of theſe ſtones, and their diſpoſition in the earth, is a ſubject of great wonder; and may ſerve as one of the numerous proofs of an over-ruling Providence in the diſpoſition of all natural bodies. The ſurface of the earth is compoſed of vegetable mould, made up of different earths mixed with the putrid remains of animal and vegetable bodies, and of the proper texture and compages for conducting the moiſture to the roots of trees and plants. Under this are laid the ſands and pebbles which ſerve as a ſort of drain to carry off the redundant moiſture deeper into the earth, where it may be ready to ſupply the place of what is conſtantly riſing in exhalations; and leſt the ſtrata of ſand ſhould be too thick, it is common to find thin ones of clay between, which ſerve to put a ſtop to the deſcent of the moiſture, and keep it from paſſing off too ſoon; and leſt theſe thin ſtrata of clay ſhould yield and give way, and by their ſoftneſs when wetted give leave to the particles of ſand to blend themſelves with, and even force their way through them, there are found in many places thin coats of a poor iron ore, placed regularly above and below the clay; and by theſe means not only ſtrengthening and ſupporting the clay, but effectually keeping the ſand from making its way into it. There are many people of opinion, that the ſwallowing of pebbles is very beneficial to health, in helping the ſtomach to digeſt its food; and a pebble-poſſet is an old woman's medicine in the colic in many parts of England. They uſually order the ſmall white ſtones to be picked out of gravel walks for this purpoſe, and eat them in large quantities in ſome ſort of ſpoon meat, of which milk is an ingredient.

The thing that has given occaſion to this practice ſeems to have been, that people obſerve the birds to pick up the gravel, and that they are never well unleſs they have frequent recourſe to this to help their digeſtion: but this is no ſimilar caſe at all, for the gizzard or ſtomach of a bird is made very ſtrong, becauſe the creature hath no teeth to chew its food; and this gizzard is lined with a rough coat, by the help of which and theſe ſtones the food they ſwallow whole is ſo ground as to yield its juices to the nouriſhment of the animal. But the ſtomach of man is formed ſo very differently, that it can never require thoſe aſſiſtances to the comminution of food. Many people have, however, accuſtomed themſelves to ſwallow not only theſe ſmall white ſtones, but large pebbles, even to the ſize of a walnut each; and theſe will often paſs ſafely; and people who have long accuſtomed themſelves to ſwallow them, boaſt of receiving no injury from them: we can never know, however, that the death of ſuch perſons is not owing to them at laſt; and as they can do no good, it is beſt always to avoid them. There are, indeed, inſtances on record in which they have undoubtedly done much miſchief.

PECARY, in zoology. See TAJACU.

PECCANT, in medicine, an epithet given to the humours of the body, when they offend either in quantity or quality, *i. e.* when they are either morbid, or in too great abundance. Moſt diſeaſes ariſe from peccant humours, which are either to be corrected by alteratives and ſpecifics, or elſe to be evacuated.

PECHEM, in the materia medica, a name given by the modern Greek writers to the root called *behem* by Avicenna and Serapion. Many have been at a loſs to know what this root pechem was; but the virtues aſcribed to it are the ſame with thoſe of the behem of the Arabians; its deſcription is the ſame, and the diviſion of it into white and red is alſo the ſame as that of the behem. Nay, the word *pechem* is only formed of *behem* by changing the *b* into a *p*, which is very common, and the aſpirate into χ, or *ch*, which is as common. Myrepſus, who treats of this root, ſays the ſame thing that the Arabian Avicenna ſays of behem, namely, that it was the fragments of a woody root, much corrrugated and wrinkled on the ſurface, which was owing to its being ſo moiſt whilſt freſh, that it always ſhrunk greatly in the drying.

PECHYAGRA, a name given by authors to the gout affecting the elbow.

PECHYS, a name uſed by ſome anatomical writers for the elbow.

PECHYTYRBE, an epithet uſed by ſome medical writers for the ſcurvy.

PECK, a meaſure of capacity, four of which make a buſhel.

Peck (Francis), was born at Samford in Lincolnſhire, May 4th, 1692, and educated at Cambridge, where he took the degrees of B. and M. A. He was the author of many works, of which the firſt is a poem, intitled, "Sighs on the Death of queen Anne;" printed probably about the time of her death in 1714. Two years afterwards he printed "ΤΟ ΥΨΟΣ ῞ΑΓΙΟΝ; or an Exerciſe on the Creation, and an Hymn to the Creator of the World; written in the expreſs words of the ſacred text, as an Attempt to ſhow the Beauty and Sublimity of the Holy Scriptures, 1716, 8vo." In 1721, being then curate of King's Cliſton in Northamptonſhire, he iſſued propoſals for printing the Hiſtory and Antiquities of his native town, which was publiſhed in 1727, in folio, under the title of "*Academia tertia Anglicana*; or the Antiquarian Annals of Stamford in Lincoln, Rutland, and Northamptonſhires; containing the Hiſtory of the Univerſity, Monaſteries, Gilds, Churches, Chapels, Hoſpitals, and Schools there, &c." inſcribed to John Duke of Rutland. This work was haſtened by "An Eſſay on the ancient and preſent State of Stamford, 1726, 4to." written by Francis Hargrave, who, in his preface, mentions the difference which had ariſen between him and Mr Peck, on account of the former's publication unfairly foreſtalling that intended by the latter. Mr Peck is alſo therein very roughly treated, on account of a ſmall work he had formerly printed, intitled, "The Hiſtory of the Stamford Bull-running." Mr Peck had before this time obtained the rectory of Godeby near Melton in Leiceſterſhire, the only preferment he ever enjoyed. In 1722, he printed on a ſingle ſheet, "Queries concerning the Natural Hiſtory and Antiquities of Leiceſterſhire and Rutland," which were afterwards reprinted in 1740; but although the progreſs he had made in the work was very conſiderable, yet it never made its appearance. In 1732 he publiſhed the firſt volume of "*Deſiderata Curioſa*; or, a Collection of divers ſcarce and curious Pieces relating chiefly to Matters of Engliſh Hiſtory; conſiſting of choice tracts, memoirs, letters, wills, epitaphs, &c. tranſcribed, many of them, from the originals themſelves, and the reſt from divers ancient MS. copies, or the MS. collations of ſundry famous antiquaries and other eminent perſons, both of the laſt and preſent age: the whole, as nearly as poſſible, digeſted into order of time, and illuſtrated with ample notes, contents, additional diſcourſes, and a complete index." This volume was dedicated to Lord William Manners, and was followed, in 1735, by a ſecond volume dedicated to Dr Reynolds biſhop of Lincoln. In 1735 Mr Peck printed in a 4to pamphlet, "A complete catalogue of all the diſcourſes written both for and againſt popery in the time of King James II. containing in the whole an account of 457 books and pamphlets, a great number of them not mentioned in the three former catalogues, with references after each title, for the more ſpeedy finding a further account of the ſaid diſcourſes and their authors in ſundry writers, and an alphabetical liſt of the writers on each ſide." In 1739 he was the editor of "Nineteen Letters of the truly reverend and learned Henry Hammond, D. D. (author of the Annotations on the New Teſtament, &c.) written to Mr Peter Stainnough and Dr Nathaniel Angelo, many of them on curious ſubjects, &c." Theſe were printed from the originals communicated by Mr Robert Marſden archdeacon of Nottingham, and Mr John Worthington. The next year, 1740, produced two volumes in 4to, one of them intitled, "Memoirs of the Life and Actions of Oliver Cromwell, as delivered in three panegyrics of him written in Latin; the firſt, as ſaid, by Don Juan Roderiguez de Saa Meneſes, Conde de Penguiao, the Portugal ambaſſador; the ſecond, as affirmed by a certain jeſuit, the lord ambaſſador's chaplain; yet both, it is thought, compoſed by Mr John Milton (Latin ſecretary to Cromwell), as was the third; with an Engliſh verſion of each. The whole illuſtrated with a large hiſtorical preface; many ſimilar paſſages from the Paradiſe Loſt, and other works of Mr John Milton, and notes from the beſt hiſtorians. To all which is added, a collection of divers curious hiſtorical pieces relating to Cromwell, and a great number of other remarkable perſons (after the manner of *Deſiderata Curioſa*, v. i. and ii.)" The other, "New Memoirs of the Life and poetical Works of Mr John Milton; with, firſt, an examination of Milton's ſtyle; and ſecondly, explanatory and critical notes on divers paſſages in Milton and Shakeſpeare, by the editor. Thirdly, Baptiſtes; a ſacred dramatic poem in defence of liberty, as written in Latin by Mr George Buchanan, tranſlated into Engliſh by Mr John Milton, and firſt publiſhed in 1641, by order of the houſe of commons. Fourthly, the Parallel, or Archbiſhop Laud and Cardinal Wolſey compared, a Viſion by Milton. Fifthly, the Legend of Sir Nicholas Throckmorton, knt. chief butler of England, who died of poiſon, *anno* 1570, an hiſtorical poem by his nephew Sir Thomas Throckmorton, knt. Sixth, Herod the Great, by the editor. Seventh, the Reſurrection, a poem in imitation of Milton, by a friend. And eighth, a Diſcourſe on the Harmony of the Spheres, by Milton; with prefaces and notes." Theſe were the laſt publications which he gave the world. When theſe appeared, he had in contemplation no leſs than nine different works; but whether he had not met with encouragement for thoſe which he had already produced, or whether he was rendered incapable of executing them by reaſon of his declining health, is uncertain; but none of them ever were made public. He concluded a laborious, and, it may be affirmed, an uſeful life, wholly devoted to antiquarian purſuits, Aug. 13th, 1743, at the age of 61 years.

PECORA, in zoology, the fifth order of the claſs mammalia, in the Linnæan ſyſtem. See ZOOLOGY.

PECQUET (John), was a phyſician in Dieppe, and died at Paris in 1674. He was phyſician in ordinary to the celebrated Fouquet, whom he entertained at his ſpare hours with ſome of the moſt amuſing experiments in natural philoſophy. He acquired immortal honour to himſelf by the diſcovery of a lacteal vein, which conveys the chyle to the heart; and which from his name is called *le Reſervoir de Pecquet.* This diſcovery was a freſh proof of the truth of the circulation of the blood: though it met with oppoſition from many of the learned, particularly from the famous Riolau, who wrote a treatiſe againſt the author of it, with this title: *Adverſus Pecquetum & Pecquetianos.* The only works which we have of Pecquet, are, 1. *Experimenta nova Anatomica*, publiſhed at Paris, 1654. 2. A Diſſertation, *De Thoracis Lacteis*, publiſhed at Amſterdam, 1661. He was a man of a lively and active genius; but his ſprightlineſs ſometimes led him to adopt dangerous opinions. He recommended, as a remedy for all diſeaſes, the uſe of brandy. This remedy, however, proved fatal to himſelf, and contributed to ſhorten his days, which he might have employed to the advantage of the public.

PECTEN, the SCALLOP; a genus of ſhell-fiſh, the characters of which are theſe: The animal is a tethys; the ſhell bivalve and unequal; the hinge toothleſs, having a ſmall ovated hollow. This ſhell-fiſh is one of the ſpinners, having the power of ſpinning threads like the muſcles; but they are much ſhorter and coarſer than even thoſe of that fiſh; ſo that they can never be wrought into any kind of work like the longer and finer threads of the pinna marina. The uſe of the threads which are ſpun by the ſcallop is to fix the creature to any ſolid body near its ſhell. All theſe proceed, as in the muſcle, from one common trunk. It is an evident proof that the fiſh has a power of fixing itſelf at pleaſure to any ſolid body by means of theſe threads, that after ſtorms the ſcallops are often found toſſed upon rocks, where there were none the day before; and yet theſe are fixed by their threads, as well as thoſe which had remained ever ſo long in their place. They form their threads in the very ſame manner as the muſcle; only their organ which ſerves for ſpinning is ſhorter, and has a wider hollow, whence the threads are neceſſarily thicker and ſhorter.

Mr Barbut divides the genus oſtrea into four families; which he thus names according to their characters. 1. The winged equilateral pectens. 2. The pectens, that have one ear inwardly, ſpring by being ciliated. 3. The pectens that have their valves more gibbous on one ſide than on the other. 4. The rough ones, commonly called *oyſters*. Of the locomotive powers of the pecten, we have already treated under the article *Animal Motion*, which ſee p. 411. col. 2.

The pectens, ſuch as the ſole-pecten, the ducal mantle pecten, the knotted, and others, ſeem to be in general inhabitants of the Indian ſeas; ſome of them frequent thoſe of Africa and the South Seas. The moſt remarkable ſpecies is the *maximus* or great ſcallop, being the ſame with what Barbut calls the *ducal-mantle pecten.* It has 14 rays, very prominent and broad, and ſtriated both above and below. They are rugged and imbricated with ſcales. They grow to a large ſize; are found in beds by themſelves; are dredged up, and barrelled for ſale. The ancients ſay that they have a power of removing themſelves from place to place by vaſt ſprings or leaps. This ſhell was uſed both by the Greeks and Latins as a food. When dreſſed with pepper and cummin, it was taken medicinally. The ſcallop was commonly worn by pilgrims on their hat, or the cape of their coat, as a mark that they had croſſed the ſea in their way to the Holy Land, or ſome diſtant object of devotion.

The name *pecten* ſeems to have been given to theſe animals, from the longitudinal ſtriæ with which their ſurface is covered, which reſemble ſomewhat the teeth of a comb; and hence alſo the Greek name κτεις. By the general character of this ſhell, it evidently includes cockles as well as ſcallops, which are the pectens without ears, and having leſs flat or elated ſhells. They are called by all authors, by a name which is only a diminutive of *pecten, pectunculus.* The having ears indeed is the common mark of diſtinction between the pectens and the cockles, which laſt uſually have none; yet the genera are not diſtinct, as ſome have imagined: for there are ſhells univerſally allowed to be pectens or ſcallops, which have no ears, and others as univerſally allowed to be pectuncles or cockles which have. Hence then appears the errors of Liſter, who made them two diſtinct genera, and gave the ears and the equal convexity of both ſhells as the great characteriſtics of them: which, though they be good marks to diſtinguiſh the ſpecies by, are far from being ſo unalterable as to found different genera upon.

Barbut, we have ſeen, ranks the pectens under the genus oſtrea; but he ſays, that though the generic character of the hinge agrees in both, the animal inhabiting the pectens is very different from that of the oyſter; for which reaſon Linnæus has divided the genus into ſections. The pectines by ſome are eſteemed as delicious a food as the oyſter. They differ very materially in a variety of circumſtances. The pectens, as we have already obſerved, ſail on the ſurface of the water; and beſides, if they are attacked by a foe, they let down the membrane which nature has provided them for a ſail, and drop to the bottom. "Behold (ſays Barbut) the ſplendor of the pectines, which rival the glowing colours of the papilionaceous tribe, as numerous as they are beautiful, flirting from place to place, and may well be called the papiliones of the ocean. What ſuperior qualities do not the pectines enjoy above the oſtrea edulis, which, conſtantly confined to its native bed, ſeems wholly deſtined to afford food to other creatures, not having any means of defence, but its ſhelly caſtle, which is frequently attacked and ſtormed by its numerous enemies? This creature is not only uſeful to man as a dainty food, but the ſhell being levigated into a ſubtile powder, is employed as an abſorbent in heart-burns and other like complaints ariſing from acidities in the firſt paſſages; the hollow ſhells are generally made choice of, as containing more than the thinner flat ones, of the fine white earth, in proportion to the outer rough coat, which laſt is found to be conſiderably impregnated with ſea-ſalt."

The grand mark of diſtinction between the pectens and oyſter ſeems to be the locomotive faculty. It was long ſuppoſed that the oyſter poſſeſſed no power of motion, that it always remained in the place in which nature or accident had placed it, and that its life differed little from that of vegetables. Experience, however, has taught us to reject theſe premature concluſions. We ſhall here lay before our readers at length, though perhaps a little out of its place, what Abbé Dicquemare has obſerved with reſpect to this circumſtance, the concluſions of whoſe remarks we have given in another place. See *Animal* MOTION, p. 411. col. 2.

Journal de Phyſique.

"Paſſing one day (ſays the Abbé) along the ſea-ſhore, I obſerved an oyſter lying in a ſhallow place, and ejecting with conſiderable force a quantity of water. It immediately occurred to me, that, if this happened at a ſufficient depth, the reſiſtance of the water would have forced the oyſter from its place. To be ſatisfied of this, I took ſeveral middle-ſized oyſters with a light ſhell, and placed them on a ſmooth horizontal ſurface, in a ſufficient quantity of pure ſea-water. Some hours elapſed, and the night came on before any thing remarkable appeared; but next day I found one of the oyſters in a place and ſituation different from that in which I had left it; and as nothing could have diſcompoſed it, I could not doubt but that it had moved by its own powers. I continued, however, to attend my charge; but, as if they meant to conceal their ſecret, the oyſters always operated in my abſence. At laſt, as I was exploring the coaſt of Lower Normandy, I perceived in an oyſter-bed one of them changing place pretty quickly. On my return, therefore, to Havre, I made new diſpoſitions to diſcover the means by which the motions of oyſters are performed, and I ſucceeded. This animal ejects the water by that part of the ſhell which is diametrically oppoſite to the hinge; it can alſo throw it out at the ſides, at each extremity of the hinge, or even from the whole opening at once. For this purpoſe, it can vary the action of its internal mechaniſm; but the ſoft parts are not the only organs that perform this function; in certain caſes the ſhells aſſiſt in forcing out the water.

"When an oyſter thus ſuddenly, forcibly, and repeatedly, ſquirts forth a quantity of water, it repulſes thoſe of its enemies that endeavour to inſinuate themſelves within the ſhells while they are open: but this is effectual only againſt its weakeſt foes; for there are ſome ſo formidable by their ſtrength or their addreſs, that a great number of oyſters periſh in this way. The animal, therefore, endeavours with all its force to repel them; it does more, it retreats backwards, or ſtarts aſide in a lateral direction. All of them, however, are not placed in circumſtances favourable for theſe motions. They are often ſituated in the crevices of rocks, between ſtones, or among other oyſters, ſome in ſand, and ſome in mud; ſo that their ſtrength or powers of motion are exerted in vain. It is probable, however, that they have the faculty of operating their own relief from theſe circumſtances, and that they may be accidentally aſſiſted by other bodies. It muſt, however, be acknowledged, that the means of relief cannot be numerous or conſiderable in ſuch as are attached to other oyſters, to a body heavier than themſelves, or to a rock; but ſuch ſituations are the moſt uncommon in the oyſter-beds that I am acquainted with on the French coaſts in the Channel. Perhaps, indeed, a very angular or heavy ſhell may be ſufficient to render an oyſter immoveable. This is undoubtedly the caſe with ſuch of them as have been obliged by worms, or other more formidable enemies, ſo to increaſe their ſhells as to make them thick and unwieldy. But we do not know whether theſe animals, in unfavourable circumſtances, may not be able to ſupply thoſe manœuvres that I have mentioned, by others that I have not as yet been able to obſerve. An oyſter that has never been attached, may fix itſelf by any part of the margin of either of its valves, and that margin will become the middle, or nearly ſo, if the oyſter is young. I would not be ſurpriſed that oyſters, which have been fixed to a rock from the beginning, ſhould be able to detach themſelves. I have ſeen them operate upon their ſhells in ſo many different ways, and with ſuch admirable contrivance, when thoſe ſhells have been pierced by their enemies (among whom I muſt be ranked), that I do not think it at all impoſſible for them to quit the place to which they are attached. It will eaſily be imagined how delicate and difficult ſuch obſervations and experiments muſt be, conſidering the ſenſibility of the animal, the delicacy of its organs, the tranſparency of the matter that forms the layers of its ſhells, the opacity of the ſhells themſelves, the viciſſitudes of the ſea, and the ſeaſons, &c. But it was of uſe to ſhow, that, contrary to the opinion generally entertained by the learned as well as by fiſhermen, oyſters are endowed with a locomotive faculty, and by what means that faculty is exerted. I muſt add, that thoſe which firſt ſhewed me theſe motions, were brought from the coaſts of Bretagne, put into a bed at La Hogue, then at Courſeulle, whence they were carried to Havre; and that, as all theſe tranſportations were made in a dry carriage, the oyſters could not be in perfect vigour. It was neceſſary alſo to ſhow, that theſe animals have much more ſenſation and more induſtry than is generally attributed to them.

"It is not often that a ſagacious obſerver of nature is ſeduced from his object by the pride of appearing above it, or the deſire of generalization. To think of graſping the whole of nature, when we are unable to conſider in the whole the firſt and moſt intereſting of her kingdoms, is a vain illuſion. Yet ſome have endeavoured to confound the kingdoms, while they have taken the liberty of dividing the higheſt of them into beings differently animalized. Under the pretence of having a better idea of it, they lopped off all the extremities; that is to ſay, they rid themſelves of every thing they were not well acquainted with, or that threw difficulties into their way. This, to be ſure, was very convenient, but very unſuitable to the proceeding of an enlarged mind, and very unfit to inform us with regard to the œconomy of nature. The organization of the oyſter, though very different from that with which we are beſt acquainted, may be comprehended under our conſiderations of the animal œconomy in general. Thoſe authors are not ſo enlightened as they imagine, who repreſent the oyſter as an animal deprived of ſenſation, as an intermediate being between animals and vegetables, as a plant, and even in ſome reſpects as inferior to a plant. It is thus that the oyſter has been made a foundation for many an abſurd hypotheſis with reſpect to the nature of animals. But let us quit the conſideration of theſe faithleſs pictures and attend to the original.

"The oyſter is conſcious of its exiſtence, and conſcious alſo that ſomething exiſts exterior to itſelf. It chooſes, it rejects; it varies its operations with judgement, according to circumſtances; it defends itſelf by means adequate and complicated; it repairs its loſſes; and it can be made to change its habits. Oyſters newly taken from places which the ſea had never left, inconſiderately open their ſhells, loſe the water they contain, and die in a few days: but thoſe that have been taken from the ſame place, and thrown into beds or reſervoirs from which the ſea occaſionally retires, where they are incommoded by the rays of the ſun, or by the cold, or where they are expoſed to the injuries of man, learn to keep themſelves cloſe when they are abandoned by the water, and live a much longer time." See Ostrea.

PECTORAL, a ſacerdotal habit or veſtment, worn by the Jewiſh high-prieſt. The Jews called it *Hhoſchen*, the Greeks λογιον, the Latins *rationale* and *pectorale*, and in our verſion of the Bible it is called *breaſtplate*. It conſiſted of embroidered ſtuff, about a ſpan ſquare, and was worn upon the breaſt, ſet with twelve precious ſtones, ranged in four rows, and containing the names of the twelve tribes. It was faſtened to the ſhoulder by two chains and hooks of gold. God himſelf preſcribed the form of it. See Breastplate.

Pectorale, a breaſtplate of thin braſs, about 12 fingers ſquare, worn by the poorer ſoldiers in the Roman army, who were rated under 1000 drachmæ. See Lorica.

Pectoral, an epithet for medicines good in diſeaſes of the breaſt and lungs.

PECTORALIS, in Anatomy. See there, *Table of the Muſcles*.

PECULATE, in civil law, the crime of embezzling the public money, by a perſon entruſted with the receipt, management or cuſtody thereof. This term is alſo uſed by civilians for a theſt, whether the thing be public, fiſcal, ſacred, or religious.

PECULIAR, in the canon law, ſignifies a particular pariſh or church that has juriſdiction within itſelf for granting probates of wills and adminiſtrations, exempt from the ordinary or biſhop's courts. The king's chapel is a royal peculiar, exempt from all ſpiritual juriſdiction, and reſerved to the viſitation and immediate government of the king himſelf. There is likewiſe the archbiſhop's peculiar: for it is an ancient privilege of the ſee of Canterbury, that wherever any manors or advowſons belong to it, they forthwith become exempt from the ordinary, and are reputed peculiars: there are 57 ſuch peculiars in the ſee of Canterbury.

Beſides theſe, there are ſome peculiars belonging to deans, chapters, and prebendaries, which are only exempted from the juriſdiction of the archdeacon: theſe are derived from the biſhop, who may viſit them, and to whom there lies an appeal.

Court of Peculiars, is a branch of, and annexed to, the court of Arches. It has a juriſdiction over all thoſe pariſhes diſperſed through the province of Canterbury in the midſt of other dioceſes, which are exempt from the ordinary's juriſdiction, and ſubject to the metropolitan only. All eccleſiaſtical cauſes, ariſing within theſe peculiar or exempt juriſdictions, are originally cognizable by this court: from which an appeal lay formerly to the pope, but now by the ſtat. 25 H. VIII. c. 19. to the king in chancery.

PECULIUM, the ſtock or eſtate which a perſon, in the power of another, whether male or female, either as his or her ſlave may acquire by his induſtry. Roman ſlaves frequently amaſſed conſiderable ſums in this way. The word properly ſignifies the advanced price which a ſlave could get for his maſter's cattle, &c. above the price fixed upon them by his maſter, which was the ſlave's own property.

In the Romiſh church, peculium denotes the goods which each religious reſerves and poſſeſſes to himſelf.

PEDALS, the largeſt pipes of an organ, ſo called becauſe played and ſtopped with the foot. The pedals are made ſquare and of wood; they are uſually 13 in number. They are of modern invention, and ſerve to carry the ſounds of an octave deeper than the reſt. See Organ.

PEDAGOGUE, or Pædagogue, a tutor or maſter, to whom is committed the diſcipline and direction of a ſcholar, to be inſtructed in grammar and other arts. The word is formed from the Greek παιδων αγωγος, *puerorum ductor*, "leader of boys."

M. Fleury obſerves, that the Greeks gave the name *pædagogus* to ſlaves appointed to attend their children, lead them, and teach them to walk, &c. The Romans gave the ſame denomination to the ſlaves who were intruſted with the care and inſtruction of their children

PEDANT, a ſchoolmaſter or pedagogue, who profeſſes to inſtruct and govern youth, teach them the humanities and the arts. See Pedagogue.

Pedant is alſo uſed for a rough, unpoliſhed man of letters, who makes an impertinent uſe of the ſciences, and abounds in unſeaſonable criticiſms and obſervations.

Dacier defines a pedant, a perſon who has more reading than good ſenſe. See Pedantry.

Pedants are people ever armed with quibbles and ſyllogiſms, breathe nothing but diſputation and chicanery, and purſue a propoſition to the laſt limits of logic.

Malebranche deſcribes a pedant as a man full of falſe erudition, who makes a parade of his knowledge, and is ever quoting ſome Greek or Latin author, or hunting back to a remote etymology.

St Evermont ſays, that to paint the folly of a pedant, we muſt repreſent him as turning all converſation to ſome one ſcience or ſubject he is beſt acquainted withal.

There are pedants of all conditions, and all robes. Wicquefort ſays, an ambaſſador, always attentive to formalities and decorums, is nothing elſe but a political pedant.

PEDANTRY, or Pedantism, the quality or manner of a pedant. See Pedant.

To ſwell up little and low things, to make a vain ſhow of ſcience, to heap up Greek and Latin, without judgment, to tear thoſe to pieces who differ from us about a paſſage in Suetonius or other ancient authors, or in the etymology of a word, to ſtir up all the world againſt a man for not admiring Cicero enough, to be intereſted for the reputation of an ancient as if he were our next of kin, is what we properly call *pedantry*.

PEDARIAN, in Roman antiquity, thoſe ſenators who ſignified their votes by their feet, not with their tongues; that is, ſuch as walked over to the ſide of thoſe whoſe opinion they approved of, in diviſions of the ſenate.

Dr Middleton thus accounts for the origin of the word. He ſays, that though the magiſtrates of Rome had a right to a place and vote in the ſenate both during their office and after it, and before they were put upon the roll by the cenſors, yet they had not probably a right to ſpeak or debate there on any queſtion, at leaſt in the earlier ages of the republic. For this ſeems to have been the original diſtinction between them and the ancient ſenators, as it is plainly intimated in the formule of the conſular edict, ſent abroad to ſummon the ſenate, which was addreſſed to all ſenators, and to all thoſe who had a right to vote in the ſenate. From this diſtinction, thoſe who had only a right to vote were called in ridicule *pedarian;* becauſe they ſignified their votes by their feet, not their tongues, and upon every diviſion of the ſenate went over to the ſide of thoſe whoſe opinion they approved. It was in alluſion to this old cuſtom, which ſeems to have been wholly dropt in the latter ages of the republic, that the mute part of the ſenate continued ſtill to be called by the name of *pedarians*, as Cicero informs us, who in giving an account to Atticus of a certain debate and decree of the ſenate upon it, ſays that it was made with the eager and general concurrence of the pedarians, though againſt the authority of all the conſulars.

PEDATURA, a term uſed, in Roman antiquity, for a ſpace or proportion of a certain number of feet ſet out. This word often occurs in writers on military affairs: as in Hyginus de Caſtrametatione we meet with *meminerimus itaque ad computationem cohortis equitatæ milliariæ pedaturam ad milletrecentos ſexaginta dari debere;* which is thus explained: The pedatura, or ſpace allowed for a *cohors equitata* or provincial cohort, conſiſting of both horſe and foot, could not be the ſame as the pedatura of an uniform body of infantry, of the ſame number, but muſt exceed it by 360 feet; for the proportion of the room of one horſeman to one foot ſoldier he aſſigns as two and a half to one.

PEDERASTS, the ſame with SODOMITES.

PEDESTAL, in architecture, the loweſt part of an order of columns, being that part which ſuſtains the column, and ſerves it as a foot or ſtand. See COLUMN.

PEDIÆAN, in Grecian antiquity. The city of Athens was anciently divided into three different parts; one on the deſcent of an hill; another on the ſea-ſhore; and a third in a plain between the other two. The inhabitants of the middle region were called Πεδιαοι, *Peditæans*, formed from ϖοδιον, "plain," or "flat;" or as Ariſtotle will have it, *Pediaci:* thoſe of the hill, Diacrians; and thoſe of the ſhore, Paralians.

Theſe quarters uſually compoſed ſo many different factions. Piſiſtratus made uſe of the Pediæans againſt the Diacrians. In the time of Solon, when a form of government was to be choſen, the Diacrians choſe it democratic; the Pediæans demanded an ariſtocracy; and the Paralians a mixed government.

PEDICLE, among botaniſts, that part of a ſtalk which immediately ſuſtains the leaf of a flower or a fruit, and is commonly called a *footſtalk*.

PEDICULUS, the LOUSE, in zoology, a genus of inſects belonging to the order of aptera. It has ſix feet, two eyes, and a ſort of ſting in the mouth; the feelers are as long as the thorax; and the belly is depreſſed and ſublobated. It is an oviparous animal. They are not peculiar to man alone, but infeſt other animals, as quadrupeds and birds, and even fiſhes and vegetables; but theſe are of peculiar ſpecies on each animal, according to the particular nature of each, ſome of which are different from thoſe which infeſt the human body. Nay, even inſects are infeſted with vermin which feed on and torment them. Several kinds of beetles are ſubject to lice; but particularly that kind called by way of eminence the *louſy beetle*. The lice on this are very numerous, and will not be ſhook off. The earwig is often infeſted with lice, juſt at the ſetting on of its head: theſe are white, and ſhining like mites, but they are much ſmaller; they are round-backed, flat bellied, and have long legs, particularly the foremoſt pair. Snails of all kinds, but eſpecially the large naked ſorts, are very ſubject to lice; which are continually ſeen running about them, and devouring them. Numbers of little red lice, with a very ſmall head, and in ſhape reſembling a tortoiſe, are often ſeen about the legs of ſpiders, and they never leave the animal while he lives; but if he is killed, they almoſt inſtantly forſake him. A ſort of whitiſh lice is found on humble-bees; they are alſo found upon ants; and fiſhes are not leſs ſubject to them than other animals.

Kircher tells us, that he found lice alſo on flies, and M. de la Hire has given a curious account of the creature which he found on the common fly. Having occaſion to view a living fly with the microſcope he obſerved on its head, back, and ſhoulders, a great number of ſmall animals crawling very nimbly about, and often climbing up the hairs which grow at the origin of the fly's legs. He with a fine needle took up one of theſe, and placed it before the microſcope uſed to view the animalcules in fluids. It had eight legs; four on each ſide. Theſe were not placed very diſtant from each other; but the four towards the head were ſeparated by a ſmall ſpace from the four towards the tail. The feet were of a particular ſtructure, being compoſed of ſeveral fingers, as it were, and fitted for taking faſt hold of any thing; but the two neareſt the head were alſo more remarkable in this particular than thoſe near the tail; the extremities of the legs for a little way above the feet were dry and void of fleſh like the legs of birds, but above this part they appeared plump and fleſhy. It had two ſmall horns upon its head, formed of ſeveral hairs arranged cloſely together; and there were ſome other cluſters of hairs by the ſide of theſe horns, but they had not the ſame figure; and towards the origin of the hinder legs there were two other ſuch cluſters of hairs which took their origin at the middle of the back. The whole creature was of a bright yellowiſh red; the legs, and all the body, except a large ſpot in the centre, were perfectly tranſparent. In ſize, he computed it to be about $\frac{1}{2500}$th part of the head of the fly; and he obſerves, that ſuch kind of vermin are rarely found on flies.

The louſe which infeſts the human body makes a very curious appearance through a microſcope. It has ſuch a tranſparent ſhell or ſkin, that we are able to diſcover more of what paſſes within its body than in moſt other living creatures. It has naturally three diviſions, the head, the breaſt, and the tail part. In the head appear two fine black eyes, with a horn that has five joints, and is ſurrounded with hairs ſtanding before each eye; and from the end of the noſe or ſnout there is a pointed projecting part, which ſerves as a ſheath or caſe to a piercer or ſucker, which the creature thruſts into the ſkin to draw out the blood and humours which are its deſtined food; for it has no mouth that opens in the common way. This piercer or ſucker is judged to be 700 times ſmaller than a hair, and is contained in another caſe within the firſt, and can be drawn in or thruſt out at pleaſure. The breaſt is very beautifully marked in the middle; the ſkin is tranſparent, and full of little pits; and from the under part of it proceed ſix legs, each having five joints, and their ſkin all the way reſembling ſhagreen, except at the ends where it is ſmoother. Each leg is terminated by two claws, which are hooked, and are of an unequal length and ſize. Theſe it uſes as we would a thumb and middle finger; and there are hairs between theſe claws as well as all over the legs. On the back part of the tail there may be diſcovered ſome ring-like diviſions, and a ſort of marks which look like the ſtrokes of a rod on the human ſkin; the belly looks like ſhagreen, and towards the lower end it is very clear, and full of pits: at the extremity of the tail there are two ſemicircular parts all covered over with hairs, which ſerve to conceal the anus. When the louſe moves its legs, the motion of the muſcles, which all unite in an oblong dark ſpot in the middle of the breaſt, may be diſtinguiſhed perfectly, and ſo may the motion of the muſcles of the head when it moves its horns. We may likewiſe ſee the various ramifications of the veins and arteries, which are white, with the pulſe regularly beating in the arteries. But the moſt ſurpriſing of all the ſights is the periſtaltic motion of the guts, which is continued all the way from the ſtomach down to the anus.

If one of theſe creatures, when hungry, be placed on the back of the hand, it will thruſt its ſucker into the ſkin, and the blood which it ſucks may be ſeen paſſing in a fine ſtream to the fore-part of the head; where, falling into a roundiſh cavity, it paſſes again in a fine ſtream to another circular receptacle in the middle of the head; from thence it runs through a ſmall veſſel to the breaſt, and then to a gut which reaches to the hinder part of the body, where in a curve it turns again a little upward; in the breaſt and gut the blood is moved without intermiſſion, with a great force; eſpecially in the gut, where it occaſions ſuch a contraction of the gut as is very ſurpriſing. In the upper part of the crooked aſcending gut abovementioned, the propelled blood ſtands ſtill, and ſeems to undergo a ſeparation, ſome of it becoming clear and wateriſh, while other black particles are puſhed forward to the anus. If a louſe is placed on its back, two bloody darkiſh ſpots appear; the larger in the middle of the body, the leſſer towards the tail; the motions of which are followed by the pulſation of the dark bloody ſpot, in or over which the white bladder ſeems to lie. This motion of the ſyſtole and diaſtole is beſt ſeen when the creature begins to grow weak; and on pricking the white bladder, which ſeems to be the heart, the creature inſtantly dies. The lower dark ſpot is ſuppoſed to be the excrement in the gut.

Lice have been ſuppoſed to be hermaphrodites; but this is erroneous; for Mr Lieuwenhoeck obſerved, that the males have ſtings in their tails, which the females have not. And he ſuppoſes the ſmarting pain which thoſe creatures ſometimes give, to be owing to their ſtinging with theſe ſtings when made uneaſy by preſſure or otherwiſe. He ſays, that he felt little or no pain from their ſuckers, though ſix of them were feeding on his hand at once.

In order to know the true hiſtory and manner of breeding of theſe creatures, Mr Lieuwenhoeck put two female lice into a black ſtocking, which he wore night and day. He found, on examination, that in ſix days one of them had laid above 50 eggs; and, upon diſſecting it, he found as many yet remaining in the ovary: whence he concludes, that in 12 days it would have laid 100 eggs. Theſe eggs naturally hatch in ſix days, and would then probably have produced 50 males, and as many females; and theſe females coming to their full growth in 18 days, might each of them be ſuppoſed after 12 days more to lay a 100 eggs; which eggs, in ſix days more, might produce a young brood of 5000: ſo that in eight weeks, one louſe may ſee 5000 of its own deſcendents.

Signior Rhedi, who has more attentively obſerved theſe animals than any other author, has given ſeveral engravings of the different ſpecies of lice found on different animals. Men, he obſerves, are ſubject to two kinds; the common louſe and the crab louſe. He obſerves alſo, that the ſize of the lice is not at all proproportioned to that of the animal which they infeſt; ſince the ſtarling has them as large as the ſwan.

Some kinds of conſtitutions are more apt to breed lice than others: and in ſome places of different degrees of heat, they are certain to be deſtroyed upon people who in other climates are over run with them. It is an obſervation of Oviedo, that the Spaniſh ſailors, who are generally much afflicted with lice, always loſe them in a certain degree of latitude in their voyages to the Eaſt Indies, and have them again on their returning to the ſame degree. This is not only true of the Spaniards, but of all other people who make the ſame voyage: for though they ſet out ever ſo louſy, they have not one of thoſe creatures by the time they come to the tropic. And in the Indies there is no ſuch thing as a louſe about the body, though the people be ever ſo naſty. The ſailors continue free from theſe creatures till their return; but in going back, they uſually begin to be louſy after they arrive at the latitude of the Madeira iſlands. The extreme ſweats, which the working people naturally fall into

Pediculus.

between the latitude of Madeira and the Indies, drown and deſtroy the lice; and have the ſame effect as the rubbing over the louſy heads of children with butter and oil. The ſweat, in theſe hot climates, is not rank as in Europe, and therefore it is not apt to breed lice; but when people return into latitudes where they ſweat rank again, their naſtineſs ſubjects them to the ſame viſitations of theſe vermin as before. The people in general in the Indies are very ſubject to lice in their heads, tho' free from them on their bodies. The reaſon of this is, that their heads ſweat leſs than their bodies, and they take no care to comb and clean them. The Spaniſh negroes waſh their heads thoroughly once every week with ſoap, to prevent their being louſy. This makes them eſcape much better than the other negroes who are ſlaves there; for the lice grow ſo numerous in their heads, that they often eat large holes in them.

Cleanlineſs is doubtleſs the grand ſecret by which to keep clear from lice, eſpecially when we wear woollen clothes. It is alſo neceſſary where there is any danger, to take nouriſhing, ſucculent food, and to uſe wholeſome drink. J. Mercurial adviſes frequent purges as a cure in the pedicular diſeaſe: it is neceſſary alſo to rub with garlic and muſtard, to take treacle inwardly, alſo ſalted and acid food, to bathe, and to foment the body with a decoction of lupines, or of gall-nuts; but the moſt effectual remedies are ſulphur and tobacco, mercurial ointment, black pepper, and vinegar. Monkeys and ſome Hottentots, we are told, eat lice; and are thence denominated *phthirophages*. On the coaſt of the Red Sea it is reported, that there is a nation of ſmall ſtature and of a black colour, who uſe locuſts for the greateſt part of their food, prepared only with ſalt. On ſuch food thoſe men live till 40, and then die of a pedicular or louſy diſeaſe. A kind of winged lice devour them, their body putrefies, and they die in great torment. It is alſo a fact that the negroes on the weſt coaſt of Africa take great delight in making their women clear their bodies of lice, and thoſe latter devour them with greedineſs as faſt as they find them.

In ancient medicine lice were eſteemed an aperient febrifuge, and proper for curing a pale complexion. The natural repugnance to theſe ugly creatures (ſays Lemery) perhaps contributed more to baniſh the fever than the remedy itſelf. In the jaundice five or ſix were ſwallowed in a ſoft egg. In the ſuppreſſion of urine, which happens frequently to children at their birth, a living louſe is introduced into the urethra, which by the tickling which it occaſions in the canal, forces the ſphincter to relax, and permits the urine to flow. A bug produces the ſame effect. Farriers have alſo a cuſtom (ſays M. Bourgeois) of introducing one or two lice into the urethra of horſes when they are ſeized with a retention of urine, a diſeaſe pretty common among them. But, according to the Continuation of the Materia Medica, to uſe the pedicular medicine with the greateſt advantage, one would need to be in Africa, where thoſe inſects are carefully ſought after and ſwallowed as a delicious morſel. The great diſtinction between thoſe which infeſt mankind is into the head and body louſe. The former is hard and high coloured, and the latter leſs compact and more of an aſhen colour. If it were poſſible to give a reaſon why ſome families of the ſame ſpecies ſtick to the head and others to the clothes, &c. it would alſo in all probability be poſſible to underſtand the nature of many contagious diſeaſes.

Pediluvium.

PEDILUVIUM, or Bathing *of the* Feet. The uſes of warm bathing in general, and of the pediluvium in particular, are ſo little underſtood, that they are often prepoſterouſly uſed, and ſometimes as injudiciouſly abſtained from.

In the Edinburgh Medical Eſſays, we find an ingenious author's opinion of the warm pediluvium, notwithſtanding that of Borelli, Boerhaave, and Hoffman, to the contrary, to be, That the legs becoming warmer than before, the blood in them is warmed: this blood rarifying, diſtends the veſſels; and in circulating imparts a great degree of warmth to the reſt of the maſs; and as there is a portion of it conſtantly paſſing through the legs, and acquiring new heat there, which heat is in the courſe of circulation communicated to the reſt of the blood, the whole maſs rarifying, occupies a larger ſpace, and of conſequence circulates with greater force. The volume of the blood being thus increaſed, every veſſel is diſtended, and every part of the body feels the effects of it; the diſtant parts a little later than thoſe firſt heated. The benefit obtained by a warm pediluvium is generally attributed to its making a derivation into the parts immerſed, and a revulſion from thoſe affected becauſe they are relieved; but the cure is performed by the direct contrary method of operating, viz. by a greater force of circulation through the parts affected, removing what was ſtagnant or moving too ſluggiſhly there. Warm bathing is of no ſervice where there is an irreſoluble obſtruction, though, by its taking off from a ſpaſm in general, it may ſeem to give a moment's eaſe; nor does it draw from the diſtant parts, but often hurts by puſhing againſt matter that will not yield with a ſtronger impetus of circulation than the ſtretched and diſeaſed veſſels can bear; ſo that where there is any ſuſpicion of ſcirrhus, warm bathing of any ſort ſhould never be uſed. On the other hand, where obſtructions are not of long ſtanding, and the impacted matter is not obſtinate, warm baths may be of great uſe to reſolve them quickly. In recent colds, with ſlight humoral peripneumonies, they are frequently an immediate cure. This they effect by increaſing the force of the circulation, opening the ſkin, and driving freely through the lungs that lentor which ſtagnated or moved ſlowly in them. As thus conducing to the reſolution of obſtructions, they may be conſidered as ſhort and ſafe fevers; and in uſing them we imitate nature, which by a fever often carries of an obſtructing cauſe of a chronical ailment. Borelli, Boerhaave, and Hoffman, are all of opinion, that the warm pediluvium acts by driving a larger quantity of blood into the parts immerſed. But arguments muſt give way to facts: the experiments related in the Medical Eſſays ſeem to prove to a demonſtration, that the warm pediluvium acts by rarifying the blood.

A warm pediluvium, when rightly tempered, may be uſed as a ſafe cordial, by which circulation can be rouſed, or a gentle fever raiſed; with this advantage over the cordials and ſudorifics, that the effect of them may be taken off at pleaſure.

Pediluvia are ſometimes uſed in the ſmall-pox; but Dr Stevenſon thinks their frequent tumultuous operations render them ſuſpected, and at beſt of very doubtful effect; and he therefore prefers Monſ. Martin of Lauſanne's method of bathing the ſkin, not only of the legs, but of the whole body, with a ſoft cloth dipped in warm water, every four hours, till the eruption: by which means the puſtules may become univerſally higher, and conſequently more ſafe.

PEDIMENT. See Architecture, p. 240, &c.

PEDLAR, a travelling foot-trader. See Hawkers.

In Britain (and formerly in France) the pedlars are deſpiſed; but it is otherwiſe in certain countries. In Spaniſh America, the buſineſs is ſo profitable, that it is thought by no means diſhonourable; and there are many gentlemen in Old Spain, who, when their circumſtances are declining, ſend their ſons to the Indies to retrieve their fortunes in this way. Almoſt all the commodities of Europe are diſtributed through the ſouthern continent of America by means of theſe pedlars. They come from Panama to Paita by ſea; and in the road from the port laſt mentioned, they make Peura their firſt voyage to Lima. Some take the road through Caxamalia; others through Truxillo, along ſhore from Lima. They take their paſſage back to Panama by ſea, and perhaps take with them a little cargo of brandy. At Panama they again ſtock themſelves with European goods, returning by ſea to Paita, where they are put on ſhore; there they hire mules and load them, the Indians going with them in order to lead them back. Their travelling expences are next to nothing; for the Indians are brought under ſuch ſubjection, that they find lodging for them, and provender for their mules, frequently thinking it an honour done them for their gueſts to accept of this for nothing, unleſs the ſtranger now and then, out of generoſity or compaſſion, makes a ſmall recompence.

In Poland, where there are few or no manufactures, almoſt all the merchandiſe is carried on by pedlars, who are ſaid to be generally Scotſmen, and who, in the reign of king Charles II. are ſaid to have amounted to no fewer than 53,000.

PEDOMETER, or Podometer, formed from ϖȣς, *pes*, "foot," and *μετρον*, "meaſure," way-wiſer; a mechanical inſtrument, in form of a watch, conſiſting of various wheels with teeth, catching in one another, all diſpoſed in the ſame plane; which, by means of a chain or ſtring faſtened to a man's foot, or to the wheel of a chariot, advance a notch each ſtep, or each revolution of the wheel; ſo that the number being marked on the edge of each wheel, one may number the paces, or meaſure exactly the diſtance from one place to another. There are ſome of them which mark the time on a dial-plate, and are in every reſpect much like a watch, and are accordingly worn in the pocket like a watch.

PEDRO (Don) of Portugal, duke of Coimbra, was the fourth child and ſecond ſurviving ſon of King John of Portugal, and was born March the 4th 1394. His father gave him an excellent education, which, joined to ſtrong natural abilities and much application, rendered him one of the moſt accompliſhed princes of his time. He was not only very learned himſelf, but a great lover of learning, and a great patron of learned men. It was chiefly with a view to improve his knowledge that he ſpent four years in travelling through different countries in Europe, Aſia, and Africa, with a train ſuitable to his quality; of which travels there is a relation ſtill extant, but ſo loaded with fabulous circumſtances, that it wounds the reputation it was deſigned to raiſe. At his return he eſpouſed Iſabella, daughter to the count of Urgel, and grand-daughter to Don Pedro, the fourth king of Portugal, which was eſteemed a very great advancement of his fortune. He was elected into the moſt noble order of the Garter, April 22. 1417, in the fifth year of the reign of his couſin Henry V. grandſon of John of Gaunt, by the father's ſide, as the duke of Coimbra was by the mother. In 1440 he was declared regent during the minority of his couſin don Alonſo V. ſon of King Edward, who died by the plague. He found ſome difficulty at firſt in the diſcharge of his office, both from the queen-mother and others. But upon the whole, his adminiſtration was ſo mild and ſo juſt, that the magiſtrates and people of Liſbon concurred in demanding his leave to erect a ſtatue to him. The regent thanked them, ſaid he ſhould be unwilling to ſee a work of their's demoliſhed; and that he was ſufficiently rewarded by this public teſtimony of their affections. The queen dowager wiſhed to raiſe diſturbances in Portugal by aiming to recover the regency to herſelf; but the ſteadineſs of the regent's adminiſtration, the attachment of the beſt part of the nobility to him, and his enjoying, in ſo abſolute a degree, the confidence of the people; not only ſecured the interior tranquillity of the ſtate, but raiſed the credit likewiſe of the crown of Portugal to a very great height in the ſentiments of its neighbours: for in the courſe of his regency he had made it his continual ſtudy to purſue the public good; to eaſe the people in general, and the inhabitants of Liſbon in particular, of ſeveral impoſitions; to maintain the laws in their full vigour; to give the king an excellent education; and if that had been at all practicable, to diffuſe a perfect unanimity through the court, by aſſuaging the malice and envy of his enemies. The king when he came of age, and the *cortes* or parliament, expreſſed their entire ſatisfaction with the regent's adminiſtration; and all parties entirely approved of the king's marriage with Donna Iſabella, the regent's daughter, which was celebrated in 1446. The enmity of his enemies, however, was not in the leaſt abated by the regent's being out of office. They ſtill perſecuted him with their unjuſt calumnies, and unfortunately made the king hearken to their falſehoods. The unfortunate duke, when ordered to appear before the king, was adviſed to take with him an eſcort of horſe and foot. In his paſſage he was proclaimed a rebel, and quickly after he was ſurrounded by the king's troops. Soon after he was attacked, and in the heat of action he was killed: nor was the envy of his enemies even then ſatiated; his body was forbid burial; and was at length taken away privately by the peaſants. His virtue, however hated in courts, was adored by the uncorrupt part of his countrymen. At length, tho', by an inſpection of his papers, the king ſaw, when it was too late, the injuſtice that had been done the man who had behaved ſo well in ſo high and difficult an office; and whoſe papers only diſcovered ſigns of further benefit to the king and his dominions. In conſequence of theſe diſcoveries, the duke's adherents were declared loyal ſubjects, all proſecutions were ordered to ceaſe, and the king deſired the body of Coimbra to be tranſported with great pomp from the caſtle of Abrantes to the monaſtery of Batalha; where it was interred in the tomb which he had cauſed to be erected for himſelf. The royal name of Don Pedro occurs often in the hiſtory of Portugal, and many who bore the name were ſingularly diſtinguiſhed either for internal abilities, or external ſplendor. See PORTUGAL.

PEDUNCLE, in botany. See PEDICLE.

PEEBLES, or TWEEDALE, a county of Scotland, extending 25 miles in length and 18 in breadth. It is bounded on the eaſt by Ettrick Foreſt, on the ſouth by Annandale, on the weſt by Clydeſdale, and on the north by Mid Lothian. Tweedale is a hilly country, well watered with the Tweed, the Yarrow, and a great number of ſmaller ſtreams that fertilize the valleys, which produce good harveſts of oats and barley, with ſome proportion of wheat. All the rivers of any conſequence abound with trout and ſalmon. The lake called *Weſt-Water Loch* ſwarms with a prodigious number of eels. In the month of Auguſt, when the weſt-wind blows, they tumble into the river Yarrow in ſuch ſhoals, that the people who wade in to catch them run the riſk of being overturned. There is another lake on the borders of Annandale, called *Lochgennen*, which forms a cataract over a precipice 250 paces high: here the water falls with ſuch a momentum as to kill the fiſh underneath. About the middle of this country is the hill or mountain of Braidalb, from the top of which the ſea may be ſeen on each ſide of the iſland. Tweedale abounds with limeſtone and freeſtone. The hills are generally as green as the downs in Suſſex, and feed innumerable flocks of ſheep, that yield great quantities of excellent wool. The country is well ſhaded with woods and plantations, abounds with all the neceſſaries of life, and is adorned with many fine ſeats and populous villages. The earls of March were hereditary ſheriffs of Tweedale, which beſtows the title of *marquis* on a branch of the ancient houſe of Hay, earls of Errol, and hereditary high conſtables of Scotland. The family of Tweedale is, by the female ſide, deſcended from the famous Simon de Fraſer, proprietor of great part of this country, who had a great ſhare in obtaining the triple victory at Roſlin. The chief, and indeed the only town of conſequence in Tweedale, is PEEBLES, a ſmall inconſiderable royal borough, and ſeat of a preſbytery, pleaſantly ſituated on the banks of the Tweed, over which there is at this place a ſtately ſtone bridge of five arches. In the neighbourhood of Peebles, near the village of Romana, on the river Lene, we ſee the veſtiges of two Roman caſtella, or ſtationary forts; and a great many terraces on the neighbouring hills, which perhaps have ſerved as itinerary encampments. In the ſhire of Tweedale there are many ancient and honourable families of the gentry. Among theſe, Douglas of Cavers, who was hereditary ſheriff of the county, ſtill preſerves the ſtandard and the iron mace of the gallant lord Douglas, who fell in the battle of Otterburn, juſt as his troops had defeated and taken Henry Percy, ſurnamed *Hotſpur*. In the churchyard of Drumelzier, belonging to an ancient branch of the Hay-family, the famous Merlin is ſuppoſed to lie buried. There was an old traditional prophecy, that the two kingdoms ſhould be united when the waters of the Tweed and the Panſel ſhould meet at his grave. Accordingly, the country people obſerve that this meeting happened in conſequence of an inundation at the acceſſion of James VI. to the crown of England.

PEEK, in the ſea-language, is a word uſed in various ſenſes. Thus the anchor is ſaid to be a-peek, when the ſhip being about to weigh comes over her anchor in ſuch a manner that the cable hangs perpendicularly between the hauſe and the anchor.

To heave a-peek, is to bring the peek ſo as that the anchor may hang a-peek. A ſhip is ſaid to ride a-peek, when lying with her main and fore-yards hoiſted up, one end of her yards is brought down to the ſhrouds, and the other raiſed up on end; which is chiefly done when ſhe lies in rivers, leſt other ſhips falling foul of the yards ſhould break them. Riding a-broad peek, denotes much the ſame, excepting that the yards are only raiſed to half the height.

Peek is alſo uſed for a room in the hold, extending from the bitts forward to the ſtern: in this room men of war keep their powder, and merchant men their victuals.

PEEL, in the Iſle of Man, formerly Holm-town, has a fort in a ſmall iſland, and a garriſon well ſupplied with cannon. In it are the ancient cathedral, the lord's houſe, with ſome lodgings of the biſhops, and ſome other remains of antiquity.

PEER, in general, ſignifies an equal, or one of the ſame rank and ſtation: hence in the acts of ſome councils, we find theſe words, *with the conſent of our peers, biſhops, abbots*, &c. Afterwards the ſame term was applied to the vaſſals or tenants of the ſame lord, who were called *peers*, becauſe they were all equal in condition, and obliged to ſerve and attend him in his courts; and peers *in fiefs*, becauſe they all held fiefs of the ſame lord.

The term *peers* is now applied to thoſe who are impannelled in an inqueſt upon a perſon for convicting or acquitting him of any offence laid to his charge: and the reaſon why the jury is ſo called, is becauſe, by the common law and the cuſtom of England every perſon is to be tried by his peers or equals; a lord by the lords, and a commoner by commoners. See the article JURY.

Peer of the Realm, a noble lord who has a ſeat and vote in the Houſe of Lords, which is alſo called the *Houſe of Peers*.

Theſe lords are called *peers*, becauſe though there is a diſtinction of degrees in nobility, yet in public actions they are equal, as in their votes in parliament, and in trying any nobleman or other perſon impeached by the commons, &c. See PARLIAMENT.

Houſe of PEERS, or *Houſe of Lords*, forms one of the three eſtates of parliament. See LORDS and PARLIAMENT.

In a judicative capacity, the houſe of peers is the ſupreme court of the kingdom, having at preſent no original juriſdiction over cauſes, but only upon appeals and writs of error; to rectify any injuſtice or miſtake of the law committed by the courts below. To this authority they ſucceeded of courſe upon the diſſolution of the *Aula Regia*. For as the barons of parliament were conſtituent members of that court, and the reſt of its juriſdiction was dealt out to other tribunals, over which the great officers who accompanied thoſe barons were reſpectively delegated to preſide, it followed, that the right of receiving appeals, and ſuperintending all other juriſdictions, ſtill remained in that noble aſſembly, from which every other great court was derived. They are therefore in all caſes the laſt reſort, from whoſe judgment no farther appeal is permitted; but every ſubordinate tribunal muſt conform to their determinations: The law repoſing an entire confidence in the honour and conſcience of the noble perſons who compoſe this important aſſembly, that they will make themſelves maſters of thoſe queſtions upon which they undertake to decide; ſince upon their deciſion all property muſt finally depend. See LORDS, NOBILITY, &c.

PEERS, in the anti-revolution government of France, were twelve great lords of that kingdom; of which ſix were dukes and ſix counts; and of theſe, ſix were eccleſiaſtics and ſix laymen: thus the archbiſhop of Rheims, and the biſhop of Laon and Langres, were dukes and peers; and the biſhops of Chalon on the Marn, Noyons, and Beauvais, were counts and peers. The dukes of Burgundy, Normandy, and Aquitian, were lay peers and dukes; and the counts of Flanders, Champaign, and Toulouſe, lay peers and counts. Theſe peers aſſiſted at the coronation of kings, either in perſon or by their repreſentatives, where each performed the functions attached to his reſpective dignity: but as the ſix lay peerages were all united to the crown, except that of the count of Flanders, ſix lords of the firſt quality were choſen to repreſent them: but the eccleſiaſtical peers generally aſſiſted in perſon. The title of peer was lately beſtowed on every lord whoſe eſtate was erected into a peerage; the number of which, as it depended entirely on the king, was uncertain.

PEERESS, a woman who is noble by deſcent, creation, or marriage. For, there are noblemen of ſeveral ranks, ſo there are noblewomen; thus king Henry VIII. made Anne Bullen marchioneſs of Pembroke; king James I. created the Lady Compton, wife to Sir Thomas Compton, counteſs of Buckingham, in the lifetime of her huſband, without any addition of honour to him; and alſo the ſame king made the Lady Finch, viſcounteſs of Maidſtone, and afterwards counteſs of Winchelſea, to her and the heirs of her body: and king George I. made the Lady Schulenberg, ducheſs of Kendal.

If a pereeſs, by deſcent or creation, marries a perſon under the degree of nobility, ſhe ſtill continues noble: but if ſhe obtains that dignity only by marriage, ſhe loſes it, on her afterwards marrying a commoner: yet by the courteſy of England, ſhe generally retains the title of her nobility.

A counteſs or baroneſs may not be arreſted for debt or treſpaſs; for though in reſpect of their ſex, they cannot ſit in parliament, they are nevertheleſs peers of the realm, and ſhall be tried by their peers, &c.

PEWIT, in ornithology. See LARUS.

PEGASUS, among the poets, a horſe imagined to have wings; being that whereon Bellerophon was fabled to be mounted when he engaged the Chimera. See CHIMERA.

The opening of the fountain Hippocrene on mount Helicon is aſcribed to a blow of Pegaſus's hoof. It was feigned to have flown away to heaven, where it became a conſtellation. Hence,

PEGASUS, in aſtronomy, the name of a conſtellation of the northern hemiſphere, in form of a flying horſe. See ASTRONOMY, n° 406.

PEGMARES, a name by which certain gladiators were diſtinguiſhed, who fought upon moveable ſcaffolds called *pegmata*, which were ſometimes unexpectedly raiſed, and by this means ſurpriſed the people with gladiators in hot contention. They were ſometimes ſo ſuddenly lifted up as to throw the combatants into the air; and ſometimes they were let down into dark and deep holes, and then ſet on fire, thus becoming the funeral piles of theſe miſerable wretches; and roaſting them alive to divert the populace.

PEGU, a very conſiderable kingdom of Aſia, beyond the Ganges. The country properly ſo called is but about 350 miles in length from north to ſouth, and as much in breadth from eaſt to weſt. It is ſituated on the eaſtern ſide of the bay of Benegal, nearly oppoſite to Arixa, and on the north-eaſt of the coaſt of Coromandel. It is bounded on the north by the kingdoms of Arakan and Ava; on the eaſt by the Upper and Lower Siam; on the ſouth by part of Siam and the Sea; and on the weſt by the ſea and part of Arakan.

The kingdom of Pegu is ſaid to have been founded about 1100 years ago. Its firſt king was a ſeaman; concerning whom and his ſucceſſors we know nothing till the diſcovery of the Eaſt Indies by the Portugueſe in the beginning of the 16th century. In 1518 the throne of Pegu was poſſeſſed by one Breſſagukan, with whom Antony Correa the Portugueſe ambaſſador ſolemnly concluded a peace in 1519. This monarch was poſſeſſed of a very large and rich empire, nine kingdoms being in ſubjection to him, whoſe revenues amounted to three millions of gold. We hear no farther account of his tranſactions after the concluſion of the treaty with the Portugueſe. In 1539 he was murdered on the following occaſion: Among other princes who were his tributaries was Para Mandera, king of the Barmas. Theſe people inhabited the high lands called *Pangavirau*, to the northward of the kingdom of Pegu. Their prince, by one of the terms of his vaſſalage, was obliged to furniſh the king of Pegu with 30,000 Barmas, to labour in his mines and other public works. As the king uſed frequently to go and ſee how his works went forward, and in theſe journeys took along with him none but his women, the Barmas obſerving theſe viſits frequently repeated, formed a deſign of robbing the queen and all the concubines of their jewels; and purſuant to this deſign, the next time the king viſited the works, they murdered him, and having ſtripped the ladies, fled to their own country.

By this enormity all Pegu was thrown into confuſion: but inſtead of revenging the death of their king, the people divided everywhere into factions; ſo that Dacha Rupi, the lawful heir to the crown, found himſelf unable to maintain his authority. Of theſe commotions, the king of the Barmas taking the advantage, not only ſhook off the yoke, but formed a deſign of conquering the kingdom of Pegu itſelf.—With this view he invaded the country with an army of more than a million of foot, and 5000 elephants; beſides a great fleet which he ſent down the river Ava towards Bagou or Pegu, the capital of the empire; while he himſelf marched thither by land. Juſt at this time Ferdinand de Mirales arrived at Pegu from Goa with a large galleon richly laden on account of the king of Portugal. As ſoon as Dacha Rupi heard of his coming, he ſent to deſire his aſſiſtance againſt the enemy. This he obtained by great preſents and promiſes: and Mirales, ſetting out in a galliot, joined the king's ſhips. Had the numbers been any thing near an equality, the ſuperior ſkill of Mirales would undoubtedly have gained the victory: But the fleet of the Barmas covered the whole river, though as large as the Ganges, while that of Dacha Rupi could ſcarce be obſerved in compariſon with them. Mirales did every thing that man could do, and even held out alone after the natives had deſerted him; but at laſt, oppreſſed and overwhelmed with numbers, he was killed, with all his men.

Thus Para Mandara became maſter of all Pegu; after which he attacked the tributary kingdoms. In 1544 he beſieged Martavan, the capital of a kingdom of the ſame name, then very great and flouriſhing. The land-forces which he brought againſt it conſiſted of 700,000 men, while by ſea he attacked it with a fleet of 1700 ſail; 100 of which were large galleys, and in them 700 Portugueſe commanded by John Cayero, who had the reputation of being a valiant and experienced officer. The ſiege, however, continued ſeven months, during which time the Barmas loſt 120,000 men; but at laſt the beſieged king, finding himſelf ſtraitened for want of proviſions, and unable to withſtand ſo great a power, offered terms of capitulation. The beſiegers would admit of no terms, upon which the diſtreſſed king applied to the Portugueſe in the ſervice of his enemy; for by their aſſiſtance he doubted not to be able to drive away the Barmas. Accordingly, he ſent one Seixas to Cayero, intreating him to receive himſelf, his family, and treaſure, on board the four ſhips he had under his command; offering, on that condition, to give half his riches to the king of Portugal, to become his vaſſal, and pay ſuch tribute as ſhould be agreed upon. Cayero conſulted the principal officers, and in their preſence aſked Seixas what he thought the treaſure might amount to. Seixas anſwered, that out of what he had ſeen, for he had not ſeen all, two ſhips might be loaded with gold, and four or five with ſilver. This propoſal was too advantageous to be ſlighted; but the reſt of the officers envying the great fortune which Cayero would make, threatened to diſcover the whole to the king of Barma if he did not reject it. The unhappy king of Martavan had now no other reſource but to ſet fire to the city, make a ſally, and die honourably with the few men he had with him: but even here he was diſappointed; for by the deſertion of 4000 of his troops the enemy were appriſed of his deſign, and prevented it. Thus betrayed, he capitulated with the Barma king for his own life and the lives of his wife and children, with leave to end his days in retirement. All this was readily granted, but the conqueror intended to perform no part of his promiſe. This city was plundered and burnt, by which above 60,000 perſons periſhed, while at leaſt an equal number were carried into ſlavery. Six thouſand cannon were found in the place; 100,000 quintals of pepper, and an equal quantity of other ſpices. The day after this deſtruction, 21 gibbets were erected on an hill adjoining to the city; on which the queen, her children, and ladies, were executed, by hanging them up alive by the feet: however, the queen expired with anguiſh before ſhe ſuffered ſuch a cruel indignity. The king, with 50 of his chief lords, was caſt into the ſea, with ſtones about their necks. This monſtrous cruelty ſo provoked the tyrant's ſoldiers, that they mutinied, and he was in no ſmall danger of ſuffering for it: however, he found means to pacify them; after which he proceeded to beſiege Prom, the capital of another kingdom. Here he increaſed his army to 900,000 men. The queen by whom it was governed offered to ſubmit to be his vaſſal; but nothing would ſatisfy the Barma monarch leſs than her ſurrender at diſcretion, and putting all her treaſure into his hands. This ſhe, who knew his perfidy, refuſed to do; on which the city was fiercely aſſaulted, but greatly to the diſadvantage of the Barmas, who loſt near 100,000 men. However, the city was at laſt betrayed to him, when Mandara behaved with his uſual cruelty. Two thouſand children were ſlain, and their bodies cut in pieces and thrown to the elephants; the queen was ſtripped naked, publicly whipped, and then tortured, till ſhe died; the young king was tied to her dead body, and both together caſt into a river, as were alſo 300 other people of quality.

While the tyrant was employed in fortifying the city, he was informed, that the prince of Ava had ſailed down the river Queytor with 400 rowing veſſels having 30,000 ſoldiers on board; but that, hearing of the queen's diſaſter, he ſtopped at Meletay, a ſtrong fortreſs about 12 leagues north of Prom, where he waited to be joined by his father the king of Ava with 80,000 men. On this news the Barma king ſent his foſter-brother Chaumigrem along the river-ſide with 200,000 men, while he himſelf followed with 100,000 more. The prince in this emergency burnt his barks, forming a vanguard of the mariners, and, putting his ſmall army in the beſt poſition he could, expected the enemy. A moſt deſperate engagement enſued, in which only 800 of the prince's army were left, and 115,000 out of 200,000 Barmas who oppoſed him were killed. The 800 Avans retired into the fort: but Mandara coming up ſoon after, and being enraged at the terrible havock made in his army, attacked the fortreſs moſt violently for ſeven days; at the end of which time, the 800, finding themſelves unable to hold out any longer, ruſhed out in a dark and rainy night, in order to ſell their lives at as dear a rate as poſſible. This laſt effort was ſo extremely violent, that they broke through the enemy's troops in ſeveral places, and even preſſed ſo hard on the king himſelf that he was forced to jump into the river. However, they were at laſt all cut off, but not before they had deſtroyed 12,000 of their enemies.

Mandara having thus become maſter of the fort, commanded it to be immediately repaired; and ſailed up the river to the port of Ava, about a league from the capital, where he burnt between 2000 and 3000 veſſels, and loſt in the enterpriſe about 8000 men. The city itſelf he did not think proper to inveſt, as it had been newly fortified, was defended by a numerous garriſon, and an army of 80,000 men was advancing to its relief. The king alſo apprehenſive of Mandara's power, had implored the protection of the emperor of Siam; offering to become his tributary on condition that he would aſſiſt him with his forces in recovering the city of Prom. To this the emperor readily aſſented; which news greatly alarmed the Barma monarch, ſo that he diſpatched ambaſſadors to the Kalaminham or ſovereign of a large territory adjacent, requeſting him to divert the emperor from his purpoſe. On the ambaſſadors return from this court, it appeared that the treaty had already taken effect; but as the ſeaſon was not yet arrived for invading Ava, Chaumigrem the king's foſter-brother was ſent with 150,000 men to reduce Sebadi or Savadi the capital of a ſmall kingdom about 130 leagues north-eaſt from Pegu. The general, however, failed in his attempt; and afterwards endeavouring to revenge himſelf on a town in the neighbourhood, he was ſurpriſed by the enemy and put to flight

In the mean time, the empire of Siam fell into great diſtractions; the king, together with the heir to the crown, were murdered by the queen, who had fallen in love with an officer, whom ſhe married after her huſband's death. However, both of them were ſoon after killed at an entertainment; and the crown was given to a natural brother of the late king, but a coward and a tyrant. On this Mandara reſolved to invade the country; and, his principal courtiers concurring in the ſcheme, he collected an army of 800,000 men, with no fewer than 20,000 elephants. In this army were 1000 Portugueſe, commanded by one James Suarez, who already had a penſion of 200,000 ducats a-year from the king of Pegu, with the title of his brother, and governor of the kingdom. With this formidable army he ſet out in April 1548. His firſt atchievement was the taking of a fortreſs on the borders of the enemy's country; before which, being ſeveral times repulſed, and having loſt 3000 of his men, he revenged himſelf by putting all the women to the ſword. He next beſieged the capital itſelf; but though the ſiege was continued for five months, during which time the moſt violent attacks were made upon it, the aſſailants were conſtantly repulſed with great loſs. However, it was ſtill reſolved to continue the ſiege; and a mount of earth was raiſed, on which were placed 40 pieces of cannon, ready to batter it anew, when, in October, advice was received of a rebellion having broke out in Pegu.

The perſon who headed the rebels on the preſent occaſion was Shoripam Shay, near a-kin to the former monarch ſlain twelve years before. He was a religious perſon, of great underſtanding, and eſteemed a ſaint. As he was a famous preacher, he made a ſermon, in which he ſet forth the tyranny of the Barmas in ſuch a manner, that he was immediately taken out of the pulpit, and proclaimed king by the people, who, as a token of ſovereignty, gave him the title of *Shemindoo*. The firſt act of ſovereignty which he exerted was to cut in pieces 15,000 Barmas, and ſeize on the treaſure: and ſo agreeable was this change of government to all ranks of people, that in three weeks time all the ſtrong holds of Pegu fell into his hands.

On this news the king immediately raiſed the ſiege in which he was engaged, and in 17 days got to Martavan. Here he was informed, that Shemindoo had poſted 500,000 men in different places, in order to intercept his paſſage; at the ſame time that he had the mortification to find 50,000 of his beſt troops deſerted. To prevent a greater deſertion, after 14 days ſtay, he departed from Martavan, and ſoon met Shemindoo at the head of 600,000 men. A deſperate engagement followed: in which Shemindoo was entirely defeated, with the loſs of 300,000 men. Of the Barma troops were ſlain 60,000; among whom were 280 Portugueſe.

The morning after this victory, the tyrant marched to the city; the inhabitants of which ſurrendered, on condition of having their lives and effects ſpared. The kingdom being thus again brought under his ſubjection, his next ſtep was to puniſh the principal perſons concerned in the rebellion: their heads he cut off, and confiſcated their eſtates, which amounted to no leſs than ten millions of gold. Others ſay, that he put all without diſtinction to the ſword, excepting only 12,000, who took ſhelter in James Suarez's houſe; that alone affording an aſylum from the general ſlaughter. The plunder was incredible, Suarez alone getting three millions. All theſe cruelties, however, were inſufficient to ſecure the allegiance of the tyrant's ſubjects: for in leſs than three months news was brought that the city of Martavan had revolted; and that the governor had not only declared for Shemindoo, but murdered 2000 Barmas. Mandara then ſummoned all the lords of the kingdom to meet him with their force, within 15 days, at a place called *Mouchau*, not far from his capital, whither he himſelf went with 300 men, to wait their arrival. But in the mean-time he received intelligence that the ſhemin or governor of Zatan, a city of ſome conſequence, had ſubmitted to Shemindoo, and alſo lent him a large ſum of gold. The ſhemin was immediately ſent for in order to be put to death: but he, ſuſpecting Mandara's deſign, excuſed himſelf by pretending ſickneſs; after which, having conſulted with his friends, he drew together about 600 men; and having with theſe privately advanced to the place where the king was, he killed him, with the few attendants that were about him at the time. The guards in the court being alarmed with the noiſe, a ſkirmiſh enſued with the ſhemin's men, in which about 800 were ſlain on both ſides, moſt of them Barmas. The ſhemin then retreated to a place called *Pontel;* whither the people of the country, hearing of the death of the king, who was univerſally hated, reſorted to him. When he had aſſembled about 5000 men, he returned to ſeek the troops which the late king had with him; and finding them diſperſed in ſeveral places, eaſily killed them all. With the Barmas were ſlain 80 out of 300 Portugueſe. The remainder ſurrendered, with Suarez their leader; and were ſpared, on condition of their remaining in the ſervice of the ſhemin.

The ſhemin, now finding his forces daily increaſe, aſſumed the title of *king;* and, to render himſelf the more popular, gave out that he would exterminate the Barmas ſo effectually as not to leave one in all the kingdom. It happened, however, that one of thoſe who were with the late king at the time he was murdered, eſcaped the general ſlaughter; and, ſwimming over the river, informed Chaumigrem of the king's death. He had with him 180,000 men, all of them natives of Pegu, excepting 30,000 Barmas. He knew very well, that if the natives had known that the king was dead, he and all his Barmas would have inſtantly been put to the ſword. Pretending, therefore, that he had received orders to put garriſons into ſeveral places, Chaumigrem diſpatched all the natives into different parts; and thus got rid of thoſe whom he had ſo much cauſe to fear. As ſoon as they were marched, he turned back upon the capital, and ſeized the king's treaſure, together with all the arms and ammunition. He then ſet fire to the magazines, arſenals, palace, ſome of whoſe apartments were ceiled with gold, and 2000 rowing veſſels which were on the river. Then deſtroying all the artillery, he fled with the 30,000 Barmas to his own country, being purſued in vain by the natives of Pegu.

Thus the ſhemin of Zatan was left in quiet poſſeſſion of the kingdom; but, by his repeated acts of tyranny and cruelty, he ſo diſguſted his ſubjects, that many fled to foreign countries, while others went over to Shemindoo, who began now to gather ſtrength again. In the mean time, James Suarez, the Portugueſe whom we have often mentioned, loſt his life by attempting to raviſh a young woman of diſtinction; the ſhemin being unable to protect him, and obliged to give him up to the mob, who ſtoned him to death. The ſhemin himſelf did not long ſurvive him; for, being grown intolerable by his oppreſſions, moſt of his followers abandoned him, and he was beſieged in his capital by Shemindoo with an army of 200,000 men, and ſoon after ſlain in a ſally: ſo that Shemindoo now ſeemed to be fully eſtabliſhed on the throne. But in the mean time Chaumigrem, the foſter-brother to the deceaſed king, hearing that Pegu was very ill provided with the means of defence, invaded the kingdom with an army of 300,000 men. Shemindoo met him with three times their number; but his men, being all natives of Pegu, were inferior in ſtrength, notwithſtanding their numbers, to the enemy. The conſequence was, that Shemindoo was defeated with prodigious ſlaughter, and Chaumigrem cauſed himſelf to be proclaimed king of Pegu. Shortly after, Shemindoo himſelf was taken; and, after being treated with the utmoſt cruelty, was beheaded.

The hiſtory of Chaumigrem is very imperfect. However we know that he was a very great conqueror, and not at all inferior in cruelty to his predeceſſors. He reduced the empire of Siam and Arrakan, and died in 1583; being ſucceeded by his ſon named *Pranjinoko*, then about 50 years of age. When this prince aſcended the throne, the kingdom of Pegu was in its greateſt height of grandeur; but by his tyramny and obſtinacy he loſt all that his father had gained. He died in 1599, and after his death the kingdom of Pegu became ſubject to Arrakan. For ſome time paſt it has been tributary to the more powerful kingdom of Ava; the ſovereigns of which country have hitherto been extremely cautious of permitting Europeans to obtain any ſettlement among them.

The air of Pegu is very healthy, and preſently recovers ſick ſtrangers. The ſoil alſo is very rich and fertile in corn, rice, fruit, and roots; being enriched by the inundations of the river Pegu, which are almoſt incredible, extending above 30 leagues beyond its channel. It produces alſo good timber of ſeveral kinds. The country abounds with elephants, buffaloes, goats, hogs, and other animals, particularly game; and deer is ſo plenty in September and October, that one may be bought for three or four pence; they are very fleſhy, but have no fat. There is ſtore of good poultry; the cocks are vaſtly large, and the hens very beautiful. As for fiſh, there are many ſorts, and well taſted. In Pegu are found mines, not only of gold, iron, tin, and lead, or rather a kind of copper or mixture of copper and lead, but alſo of rubies, diamonds, and ſapphires. The rubies are the beſt in the world; but the diamonds are ſmall, and only found in the craws of poultry and pheaſants. Beſides, only one family has the privilege of ſelling them; and none dare open the ground to dig for them. The rubies are found in a mountain in the province of Kablan, or Kapelan, between the city of Pegu and the port of Sirian.

The inhabitants are of an olive, or rather a tawny complexion. The women are branded by ſome travellers as having ſhook off all modeſty, on account of their expoſing ſome parts of their bodies which ought to be concealed from ſight. Some alſo tell us, that the men wear bells, which at a certain age, *viz.* 25 or 30, or, according to others, when they are capable of making uſe of women, are inſerted on each ſide the virile member between the ſkin and the fleſh, which is opened for that purpoſe, and healed in ſeven or eight days. The Peguers may be ranked among the moſt ſuperſtitious of all mankind. They maintain and worſhip crocodiles; and will drink nothing but the waters of the ditches where thoſe monſtrous animals harbour. By thus expoſing themſelves to the manifeſt hazard of their lives, they have frequently the miſfortune to be devoured. They have five principal feſtivals in the year, called *ſapans*, which they celebrate with extraordinary magnificence. In one of them the king and queen make a pilgrimage about 12 leagues from the city, riding on a triumphal car, ſo richly adorned with jewels, that it may be ſaid without an hyperbole that they carry about with them the value of a kingdom. This prince is extremely rich; and has in the chapel of his palace idols of ineſtimable value, ſome of them being of maſſy gold and ſilver, and adorned with all ſorts of precious ſtones. The talapoins, or prieſts of this country, have no poſſeſſions; but ſuch is the reſpect paid them by the people, that they are never known to want. They preach to them every Monday not to commit murder; to take from no perſon any thing belonging to him; to do no hurt; to give no offence; to avoid impurity and ſuperſtition; but above all, not to worſhip the devil: but theſe diſcourſes have no effect in the laſt reſpect. The people, attached to manicheiſm, believe that all good comes from God; that the devil is the author of all the evil that happens to men; and that therefore they ought to worſhip him, that he may not afflict them. This is a common notion among the Indian idolaters.

The inhabitants of Pegu are accuſed by ſome authors with being ſlovenly in their houſes, and naſty in their diet, on account of their ſeaſoning their victuals with ſidol, a compoſition made of ſtinking fiſh, reduced to a conſiſtency like muſtard, ſo nauſeous and offenſive that none but themſelves can endure the ſmell of it. Balbi ſays, he could ſooner bear the ſcent of ſtinking carrion; and yet with this they ſeaſon their rice, and other ſoups, inſtead of oil or butter. As they have no wheat in this country, their bread is rice made into cakes. Their common drink is water, or a liquor diſtilled from cocoa-nut water. They are a ſpirited and warlike people; open, generous, and hoſpitable; and have neither the indolence nor the jealouſy of moſt other eaſtern nations.

The men here, as in moſt eaſtern countries, buy their wives, or pay their parents a dowry for them. They have an odd cuſtom; which is to offer their daughters to ſtangers, and hire them out for a time: ſome ſay they hire out their wives in the ſame manner. Theſe marriages for a time are well regulated, and often prove very beneficial to the occaſional huſband. Moſt of the foreigners who trade hither, marry a wife for the time of their ſtay. In caſe of a ſeparation, the father is obliged to take care of the boys, and the mother of the girls. We are told that no woman is looked upon the worſe, but rather the better, for having had ſeveral European huſbands: nay, we are told, that no perſon of faſhion in Pegu, from the gentleman to the king, will marry a maiden, till ſome acquaintance or ſtranger has had the firſt night's lodging with her.

In Pegu, the inheritance of all land is in the king: he is likewiſe the heir of all his ſubjects who die without iſſue; but in caſe they have children, two-thirds go to them and the reſt to his majeſty.

In the government of this country, deſpotiſm prevails in its full extent, and deſpotiſm too of the very worſt kind; for the inhabitants are under the abſolute power of a ſet of petty tyrants, who are themſelves nothing more than ſlaves to the king of Ava. As they have little or no emolument, except what they can raiſe by extortion, it is exerciſed in the moſt unlimited manner. They take cognizance of all diſputes between individuals that come to their ears, without the caſe being laid before them by either of the parties; and on whatever ſide the cauſe is determined, there is a never-failing charge brought in againſt both, for juſtice, as they expreſs it; and this price of juſtice is often three or four times greater than the value of the matter in agitation.

But the inconveniencies that this government labours under are not only thoſe of deſpotiſm; the unhappy ſubjects feel theſe of anarchy too. There are about twenty perſons concerned in the government of Rangoon, who, though one is ſubordinate to another, and though matters of the firſt conſequence are determined in a council of the whole, can yet act ſeparately; and any one member of this body can by his own authority give out orders, which no inhabitant of Pegu dares to diſobey. Thoſe orders may be contrary to the ſenſe of the whole body; in which caſe, they are, indeed, reverſed in council: but then there are inſtances, and "I myſelf, (ſays a late traveller*) obſerved one, of ſuch orders being notwithſtanding repeated more than once by the ſame perſon, and obeyed each time, till they were again reverſed: nor was any redreſs obtained by the party aggrieved, or any effectual meaſures taken to prevent ſuch a contempt of authority for the future."

When a perſon falls ſick, we are told that they generally make a vow to the devil, from whom they believe all evil comes. Then a ſcaffold is built, and victuals are ſpread on the top of it to ſolace Old Nick, and render him propitious. This feaſt is accompanied with lighted candles and muſic; and the whole is managed by an undertaker called the *devil's father*.

The commodities exported from this country are gold, ſilver, rubies, muſk, benjamin, long-pepper, tin, lead, copper; lakka, or gum-lac, whereof they make hard wax; rice, rice-wine; and ſome ſugar-canes, of which they would have plenty, but that the elephants eat them. It may be obſerved, that under the name of *rubies*, the Peguers compriſe topazes, ſapphires, amethyſts, and other ſtones; which they diſtinguiſh by ſaying the blue, the violet, and the yellow rubies. The true ruby is red, tranſparent, or ſparkling, inclining near the ſurface to the violet of the amethyſt. Cotton cloths from Bengal and Coromandel, with ſome ſtriped ſilks, are beſt for the Pegu market, and ſilver of any ſort will go off there: for the king, in return for his eight and a half *per cent.* duty on it, allows the merchant to melt it down, and put what copper alloy they pleaſe in it. They wear none of the European commodities in Pegu but hats and ribbons. The gentry will give extravagant prices for fine beaver hats, which they wear without any cocks. They are no leſs fond of ribbons flowered with gold and ſilver, which they wear round their hats.

As to the religion of the Peguers, it is the ſame at bottom with that which prevails over the reſt of India and Tibet; only varies in dreſs ſomewhat in different countries, according to the humour or intereſt of the prieſts. They hold the exiſtence of one ſupreme God, of whom they make no image; but they have many inferior created gods, whoſe images are ſet up in the temples for the laity to worſhip. Not content with theſe, we are told they worſhip the devil alſo. Many are ſeen to run about the ſtreets every morning, with rice in one hand and a torch in the other, crying aloud, that they are going to give the devil his breakfaſt, that he may not hurt them all the day. Beſides the Manichean doctrine of two principles, one the author of good and the other of evil, from whence their worſhipping the devil has its riſe, they believe an eternal ſucceſſion of worlds without creation. The Peguers hold the doctrine of the Metempſychoſis, or tranſmigration of the human ſoul, which, after paſſing through the bodies of various animals, ſhall attain to the perfection and felicity of their gods; which in effect is no other than a ſtate of annihilation. They have a ſtrong opinion of the ſanctity of apes and crocodiles, inſomuch that they believe the perſons to be perfectly happy who are devoured by them. Their temples are of a conic form, and ſome of them a quarter of a mile round. They obſerve a great many feſtivals, ſome of which are called *ſapan*. The images of their inferior gods are in a ſitting poſture, with their legs acroſs, and toes of equal length; their arms and hands very ſmall in proportion to their bodies, their faces longer than human; their ears long, and the lappets very thick. The congregation bow to them when they come in and

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* Hunter's conciſe account of the kingdom of Pegu.

when they go out; and that is all the worſhip which they pay to them. The prieſts of Pegu, called *talapoins*, are a ſort of a mendicant friars. They obſerve celibacy; and eat but once a-day; living in the woods, in a ſort of neſts or cages built on the tops of trees for fear of the tygers. They preach frequently, lead very innocent lives, and are very hoſpitable and humane.

The king of Pegu's revenues ariſe chiefly from the rent of lands, of which he is the ſole proprietor. Another branch of it are the duties paid for the commodities imported or exported. In a word, he is judged the richeſt monarch in the world, next to the emperor of China.

PEGUNTIUM (anc. geog.), Ptolemy; *Piguntiæ*, (Pliny); a town or citadel of Dalmatia, on the Adriatic, oppoſite to the iſland Brattia, ſcarce five miles off, and 40 miles to the eaſt of Salonæ. According to Fortis, a mountain, a large hollow, and ſubmarine ſprings are ſeen here. "This hollow (ſays he) ſeems to have been excavated by ſome ancient river. The ſprings which bubble up from under the ſea are ſo conſiderable, that they might paſs for the riſing again of a river ſunk under ground. Vrullia has the ſame derivation of the word *Vril*, which in Sclavonian ſignifies a fountain; and this etymology, rendering the name of Vrullia the *Berullia* of Porphyrogenitus analagous to that of Peguntium, ſince Πηγυ and Vril are ſynonymous, induces me to believe, that the caſtle named Peguntium by ancient geographers was ſituated in this place, and not at the mouth of the Cettina. No remarkable veſtiges of antiquity now exiſt on the ſpot; yet it is evident, by the quantity of fragments of vaſes, tiles, and ſepulchral inſcriptions now and then dug up, that this tract of coaſt was well inhabited in the Roman times. The principal cauſe why the tracts of ancient habitations cannot be diſcovered about Vrullia, is the ſteepneſs of the hill above it, and the quantity of ſtones brought down from thence by the waters. The mouth of the hollow of Vrullia is dreaded by ſeamen, on account of the ſudden impetuous guſts of wind that blow from thence, and in a moment raiſe a kind of hurricane in the channel between the Primorie and the iſland of Brazza, to the great danger of barks ſurpriſed by it."

Travels into Dalmatia.

PEIGNE FORT ET DURE, (Lat. *pœna fortis et dura*), ſignifies a ſpecial puniſhent inflicted on thoſe who, being arraigned of felony, refuſe to put themſelves on the ordinary trial, but ſtubbornly ſtand mute; it is vulgarly called *preſſing to death*. See ARRAIGNMENT.

PEIRCE (James), an eminent diſſenting miniſter, was born at Wapping, in London, in the year 1674, and was educated at Utrecht and Leyden; after which he ſpent ſome time at Oxford, in order to enjoy the benefit of frequenting the Bodleian library. He then for two years preached the Sunday-evening's lecture at the meeting-houſe in Miles-Lane, London, and then ſettled at Cambridge. In 1713 he was removed to a congregation at Exeter, where he continued till the year 1718: when the Calviniſts among the diſſenters propoſing a ſubſcription to articles of faith to be ſigned by all the diſſenting miniſters in the kingdom, ſeveral articles were propoſed to him and Mr John Hallet, another diſſenting miniſter at Exeter, in order to their ſubſcribing them; they both refuſed, imagining this proceeding of their diſſenting brethren to be an unworthy impoſition on religious liberty and private judgment; for which they were ejected from their congregation. Upon this, a new meeting was opened for them at Exeter, of which Mr Peirce continued miniſter till his death, in 1726. He was a man of the ſtricteſt virtue, exemplary piety, and great learning. He wrote, 1. *Exercitatio philoſophica de Homœmeria Anaxagorea*. 2. Thirteen pieces on the Controverſy between the Church of England and the Diſſenters. 3. Ten pieces on the Controverſy about the Ejectment at Exeter. 4. Six pieces on the Doctrine of the Trinity. 5. A paraphraſe and Notes on the Epiſtles of St Paul to the Coloſſians, Philippians, and Hebrews. 6. An Eſſay in favour of giving the Euchariſt to Children. 7. Fourteen Sermons.

PEIRESC (Nicolas Claude Fabri), born in 1580, was deſcended from an ancient and noble family, ſeated originally at Piſa in Italy. At ten years of age, he was ſent to Avignon, where he ſpent five years in the Jeſuits college, in the ſtudy of what in Scotland and on the Continent is called *humanity*. From Avignon he was, in 1595, removed to Aix, and entered upon the ſtudy of philoſophy. In the interim, he attended the proper maſters for dancing, riding, and handling arms; in all which, though he performed the leſſons regularly, it was with reluctance: for this being done only to pleaſe an uncle whoſe heir he was to be, he never practiſed by himſelf, eſteeming all the time loſt that was not ſpent in the purſuits of literature. During this period his father being preſented with a medal of the emperor Arcadius, which was found at Belgenſer, Peireſc begged the favour of it; and, charmed with deciphering the characters in the exergue, and reading the emperor's name, he carried the medal with a tranſport of joy to his uncle; who for his encouragement gave him two more, together with ſome books upon the ſubject. This is the epoch of his application to antiquities, for which he became afterwards ſo famous. In 1596, he was ſent to finiſh his courſe of philoſophy under the Jeſuits at Tournon, where he turned his attention particularly to coſmography, as being neceſſary to the underſtanding of hiſtory, abating, however, nothing of his application to antiquity, in which he was much aſſiſted by Petrus Rogerus, one of the profeſſors, and a ſkilful medaliſt: nor did he omit the ſtudy of humanity in general, wherein he was the maſter and inſtructor of a brother who was with him. But to do all this he was obliged to ſit up late at nights; and ſo much labour and attention, as he was naturally of a tender conſtitution, increaſed the weakneſs of his ſtomach formerly contracted, and for which he had uſed a kind of digeſtive powder. Being recalled by his uncle in 1597, he returned to Aix, and entered there upon the ſtudy of the law; which he proſecuted, however, ſo as to find leiſure to viſit and converſe frequently with Peter A. R. Bagarr, a moſt ſkilful antiquary, who was afterwards made maſter of the jewels to Henry IV.

The following year he went again to Avignon, to carry on his courſe of law under one Peter David; who, being well ſkilled likewiſe in antiquities, was pleaſed to ſee Peireſc join this ſtudy to that of the law. But Ghibertus of Naples, auditor to Cardinal Aquaviva, fed his curioſity the moſt, in ſhowing him ſome rarities, ſuch as he had never ſeen before. Ghibertus alſo lent him Goltrius's Treatiſe upon Coins, and ad-

Peireſc.

viſed him to go into Italy, eſpecially to Rome, where he would meet with curioſities to ſatisfy his moſt ardent wiſhes. Accordingly, his uncle having procured a proper governor, he and his brother ſet out upon that tour Sept. 1599; and paſſing through Florence, Bononia, and Ferrara, when he had ſtayed a few days at Venice, he fixed his reſidence at Padua, in order to complete his courſe of law. But once a quarter, going to Venice to get caſh for bills of exchange, he took theſe opportunities of introducing himſelf to the moſt diſtinguiſhed literati there; and was particularly careſſed by F. Contarin, procurator of St Mark, who was poſſeſſed of a curious cabinet of medals; and other antiquities, without knowing the value of them. This was fully ſhown to him by Peireſc, who likewiſe explained the Greek inſcriptions upon his medals, and the monumental ſtones. After a year's ſtay at Padua, he ſet out for Rome, and arrived there Oct. 1600, in order to be in time for ſeeing the Jubilee: to celebrate which, the Porta Sancta would be opened in the beginning of the next year. He paſſed ſix months in this city, viewing the numberleſs curioſities there, and in cultivating the friendſhip of Galileo, by whom he was much beloved. This friendſhip led him to carry his reſearches into aſtronomy and natural philoſophy; and he was preſent when Fabricius ab Aquapendente, out of a parcel of eggs upon which a hen was ſitting, took one every day, to obſerve the gradual formation of the chick from firſt to laſt. From this time it was generally acknowledged, that he had taken the helm of learning into his hand, and began to guide the commonwealth of letters.

Having now ſpent almoſt three years in Italy, he began to prepare for his departure; and in the end of 1602, having packed up all the rarities, gems, &c. which he had procured, and put them into the road to Marſeilles, he left Padua, and, croſſing the Alps to Geneva, went to Lyons; where receiving money, he made a handſome preſent to his governor, who took the route of Paris. From Lyons he went to Montpellier, to improve himſelf in the law under Julius Parius. From Montpellier he diſpatched more rarities to his uncle, who, ſending for him home, he arrived at Aix in November; but, bringing Parius along with him, he obtained leave to return to Montpellier in a few days. He waited upon Parius back again, under whom he continued purſuing his law ſtudies till the end of 1603, when he returned to Aix, at the earneſt requeſt of his uncle, who, having reſigned to him his ſenatorial dignity, had ever ſince the beginning of the year laboured to get the king's patent. The degree of doctor of law was a neceſſary qualification for that dignity. Peireſc, therefore, having kept the uſual exerciſe, took that degree Jan. 18. 1604, when the aforeſaid patent was given in to the ſenate, and ordered to be recorded: yet Peireſc procured leave not to be preſently entered into the liſt of ſenators. The bent of his inclination was not ſo much to buſineſs as to advance arts and ſciences, and to aſſiſt all the promoters of learning. For this purpoſe, he reſolved to lead a ſingle life; ſo that when his father had concluded a match for him with a reſpectable lady, he begged to be excuſed.

In 1605, he accompanied G. Varius, firſt preſident of the ſenate at Aix, who was very fond of him, to Paris; whence, having viſited every thing curious, he croſſed the water, in company with the king's ambaſſador, 1606, to England. Here he was very graciouſly received by king James I.; and having ſeen Oxford, and viſited Cambden, Sir Robert Cotton, Sir Henry Saville, and other learned men, he paſſed over to Holland; and after viſiting the ſeveral towns and univerſities, with the literati in each, he went through Antwerp to Bruſſels, and thence back to Paris, to ſee the ceremony of the Dauphin's baptiſm; which being ſolemnized Aug. 24. he returned home in September 1606, being expected for the ordering of the family affairs.

Peireſc.

Preſently after this, he purchaſed the barony of Rians; and at the ſolicitation of his uncle, having approved himſelf before that aſſembly, he was received a ſenator on the 1ſt of July 1607. Jan. 1608 he loſt his uncle; and the following year, falling himſelf into a dangerous fever, recovered by eating muſk-melons before ſupper, for which he had conceived a longing. He was ordered by his phyſician to eat them before his meals without bread, and to drink a glaſs of pure wine upon them. He continued this method all his life afterwards; and grew ſo fond of them, that, though he could abſtain from any other meat as he liſted, yet towards them he profeſſed he was unable to maſter himſelf. He frequently experienced, that in the muſkmelon ſeaſon he was never troubled with the gravel. In 1618, having procured a faithful copy of "the Acts of the Monaſtery of Maren in Switzerland," he publiſhed a ſecond edition of that work. As it was written in defence of the royal line of France againſt Theodoric Pieſpordius, who had attempted to prove the title of the Auſtrian family to the French crown by right of ſucceſſion, he was, upon this publication, nominated the ſame year, by Louis XIII. abbot of Sancta Maria Aquiſtrienſis. He ſtayed in France till 1623; when, upon a meſſage from his father, now grown old and ſickly, he left Paris, where he had ſpent ſeven years and ſome months. He arrived at Aix in October; and not long after preſented to the court a patent from the king, permitting him to continue in the function of his ancient dignity, and to exerciſe the office of a ſecular or lay perſon, notwithſtanding that, being an abbot, he had aſſumed the character of a churchman. To this the court of parliament not aſſenting, decreed unanimouſly, that, being already admitted into the firſt rank, he ſhould abide perpetually therein; not returning, as the cuſtom of the court was, to the inferior auditory, wherein trials are uſually had of criminal caſes. In 1625, he buried his father, who had been long afflicted with the gout. In 1627, he prevailed with the archbiſhop of Aix to eſtabliſh a poſt thence to Lyons, and ſo to Paris and all Europe; by which the correſpondence conſtantly held with the literati everywhere was much facilitated. In 1629, he began to be much tormented with the ſtranguary and hæmorrhoides; and in 1631, having completed the marriage of his nephew Claudius with Margaret Alreſia, a noblewoman of the county of Avignon, he beſtowed upon him the barony of Rianty, together with a grant of his ſenatorial dignity, only reſerving the function to himſelf for three years. But the parliament not waiting his ſurrendry of it, he reſented that affront ſo heinouſly, that he procured, in 1635, letters patent from the king to be reſtored, and to exerciſe the office for five years longer, which happened to be till his death: for being ſeized, June 1637, with a ſever that brought on a ſtoppage of urine, this put an end to his life on the 24th of that month, in his 57th year.

The character of Peireſc may be ſummed up in a few words. His perſon was of a middle ſize, and of a thin habit: his forehead large, and his eyes grey; a little hawk-noſed; his cheeks tempered with red; the hair of his head yellow, as alſo his beard, which he uſed to wear long; his whole countenance bearing the marks of uncommon and rare courteſy and affability. In his diet he affected cleanlineſs, and in all things about him; but nothing ſuperfluous or coſtly. His clothes were ſuitable to his dignity; yet he never wore ſilk. In like manner, the reſt of his houſe was adorned according to his condition, and very well furniſhed; but he neglected his own chamber. Inſtead of tapeſtry, there hung the pictures of his chief friends and of famous men, beſides innumerable bundles of commentaries, tranſcripts, notes, collections from books, epiſtles, and ſuch like papers. His bed was exceeding plain, and his table continually loaded and covered with papers, books, letters, and other things; as alſo all the ſeats round about, and the greateſt part of the floor. Theſe were ſo many evidences of the turn of his mind; in reſpect to which, the writer of his euloge compares him to the Roman Atticus; and Bayle, conſidering his univerſal correſpondence and general aſſiſtance to all the literati in Europe, daſhed it out luckily enough, when he called him "the attorney-general of the literary republic." The works which he publiſhed are, "Hiſtoria provinciæ Galliæ Narbonenſis;" "Nobilium ejuſdem provinciæ familiarum Origines, et ſeparatim Fabriciæ;" "Commentarii rerum omnium memoria dignarum ſua ætate geſtarum;" "Liber de ludicris naturæ operibus;" "Mathematica & aſtronomica varia;" "Obſervationes mathematicæ;" "Epiſtolæ ad S. P. Urbanum VIII. cardinales Barberinos, &c.;" "Authores antiqui Græci et Latini de ponderibus et menſuris;" "Elogia et epitaphia;" "Inſcriptiones antiquæ et novæ;" "Genealogia domus Auſtriacæ;" "Catalogus librorum biblioth. reg.;" "Poemata varia;" "Nummi Gallici, Saxonici, Britannici, &c.;" "Linguæ orientales, Hebræa, Samaritana, Arabica, Egyptiaca, et Indices librorum harum linguarum;" "Obſervationes in varios auctores." It is remarkable, that though Peireſc bought more books than any man of his time, yet his collection left was not large. The reaſon was, that, as faſt as he purchaſed, he kept continually making preſents of them to ſuch learned men as he knew they would be uſeful to.

Gaſſendi's Life of Peireſc, in Engliſh. Lond. 1657.

PEKIN, the capital city of the empire of China, in Aſia, where the emperor generally reſides. It is ſituated in a very fertile plain, 20 leagues diſtant from the great wall. This name, which ſignifies the *northern court*, is given to it, to diſtinguiſh it from another conſiderable city called *Nanking*, or the *ſouthern court*. The emperor formerly reſided in the latter; but the Tartars, a reſtleſs and warlike people, obliged this prince to remove his court to the northern provinces, that he might more effectually repel the incurſions of thoſe barbarians, by oppoſing to them a numerous militia which he generally keeps around his perſon. It is an exact ſquare, and divided into two parts; namely, that which contains the emperor's palace, which is in the new city, or, as it is called, the Tartar's city, becauſe it is inhabited by Tartars ever ſince they conquered this empire; the other, called the *Old City*, is inhabited by the Chineſe. The circuit of both theſe together is 52 Chineſe lys, each of which contains 240 geometrical paces; being, without the ſuburbs, full ſix leagues in circumference, according to the moſt accurate meaſurement made by order of the emperor.

Thoſe who have paid attention to the population of this place, reckon the number of inhabitants at 2,000,000, though there are others that double that number.

Groſier's Deſcription of China.

Groſier tells us, "that the height and enormous thickneſs of the walls of the Tartar city excite admiration; twelve horſemen might eaſily ride abreaſt upon them; they have ſpacious towers raiſed at intervals, a bow-ſhot diſtant from one another, and large enough to contain bodies of reſerve in caſe of neceſſity. The city has nine gates, which are lofty and well arched. Over them are large pavilion roofed towers divided into nine ſtories, each having ſeveral apertures or portholes: the lower ſtory forms a large hall for the uſe of the ſoldiers and officers who quit guard, and thoſe appointed to relieve them. Before each gate a ſpace is left of more than 360 feet: this is a kind of place of arms, incloſed by a ſemicircular wall equal in height and thickneſs to that ſurrounding the city. The great road, which ends here, is commanded by a pavilion roofed tower like the firſt, in ſuch manner, that, as the cannon of the former can batter the houſes of the city, thoſe of the latter can ſweep the adjacent country. The ſtreets of Pekin are ſtraight, about 120 feet wide, a full league in length, and bordered with ſhops. It is aſtoniſhing to ſee the immenſe concourſe of people that continually fills them, and the confuſion cauſed by the prodigious number of horſes, camels, mules, and carriages, which croſs or meet each other. Beſides this inconvenience, one is every now and then ſtopped by crowds, who ſtand liſtening to fortune-tellers, jugglers, ballad-ſingers, and a thouſand other mountebanks and buffoons, who read and relate ſtories calculated to promote mirth and laughter, or diſtribute medicines, the wonderful effects of which they explain with all the eloquence peculiar to them.

"People of diſtinction oblige all their dependents to follow them. A mandarin of the firſt rank is always accompanied in his walks by his whole tribunal; and, to augment his equipage, each of the inferior mandarins in his ſuit is generally attended by ſeveral domeſtics. The nobility of the court, and princes of the blood, never appear in public without being ſurrounded by a large body of cavalry; and, as their preſence is required in the palace every day, their train alone would be ſufficient to create confuſion in the city. It is very ſingular, that at all this prodigious concourſe no women are ever ſeen: hence we may judge how great the population of China muſt be, ſince the number of females in this country, as well as everywhere elſe, is ſuperior to that of the other ſex.

"As there is a continual influx of the riches and merchandize of the whole empire into this city, the number of ſtrangers that reſort hither is immenſe. They are carried in chairs, or ride on horſeback: the latter is more common: but they are always attended by a guide acquainted with the ſtreets, and who knows the houſes of the nobility and principal people of the city. They are alſo provided with a book, containing an account of the different quarters, ſquares, remarkable places, and of the reſidence of thoſe in public offices. In ſummer there are to be ſeen ſmall temporary ſhops, where people are ſerved with water cooled by means of ice; and one finds everywhere eating-houſes, with refreſhments of tea and fruits. Each kind of proviſion has a certain day and place appointed for its being expoſed to ſale.

" The governor of Pekin, who is a Mantchew Tartar, is ſtyled Governor of the Nine Gates. His juriſdiction extends not only over the ſoldiers, but alſo over the people in every thing that concerns the police. No police can be more active; and it is ſurpriſing to ſee among an infinite number of Tartars and Chineſe mixed together, the greateſt tranquillity prevail. It is rare, in a number of years, to hear of houſes being robbed, or people aſſaſſinated. All the principal ſtreets have guard-rooms, and ſoldiers patrol night and day, each having a ſabre hanging from his girdle, and a whip in his hand, to correct, without diſtinction, thoſe who excite quarrels or cauſe diſorder. The lanes are guarded in the ſame manner; and have latticed gates, which do not prevent thoſe from being ſeen who walk in them: they are always kept ſhut during the night, and ſeldom opened even to thoſe who are known; if they are, the perſon to whom this indulgence is granted muſt carry a lanthorn, and give a ſufficient reaſon for his going out. In the evening, as ſoon as the ſoldiers are warned to their quarters by beat of drum, two centinels go and come from one guard-room to another, making a continual noiſe with a kind of caſtanet, to ſhow that they are not aſleep. They permit no one to walk abroad in the night-time. They even examine thoſe whom the emperor diſpatches on buſineſs; and if their reply gives the leaſt cauſe of ſuſpicion, they have a right to convey them to the guard-room. The ſoldiers in each of the guard rooms are obliged to anſwer every time the centinels on duty call out.

" It is by theſe wiſe regulations, obſerved with the greateſt ſtrictneſs, that peace, ſilence, and ſafety reign throughout the whole city. The governor is alſo obliged to go the round; and the officers ſtationed on the walls, and in the towers over the gates (in which are kept large kettle-drums that are beat every time the guard is relieved), are continually diſpatching ſubalterns to examine the quarters belonging to the gates where they are poſted. The leaſt neglect is puniſhed next morning, and the officer who was on guard is caſhiered. This police, which prevents nocturnal aſſemblies, would appear no doubt extraordinary in Europe, and in all probability would not be much reliſhed by young men of fortune and ladies of quality. But the Chineſe think juſtly: they conſider it to be the duty of the magiſtrates of a city to prefer good order and public tranquillity to vain amuſements, which generally occaſion many attempts againſt the lives and property of the citizens. It is true, the ſupport of this police coſts the emperor a great deal; for part of the ſoldiers we have mentioned are maintained for this purpoſe only. They are all infantry, and their pay is generally very high. Their employment conſiſts not only in watching for thoſe who may occaſion diſturbance in the day-time, or walk abroad during the night; they muſt alſo take care that the ſtreets are kept clean and ſwept every day; that they are watered morning and evening in time of dry weather; and that every nuiſance is removed. They have orders alſo to aſſiſt in this labour themſelves; and to clear the kennels, that the water may have a free courſe."

The walls of the emperor's palace, including that and the gardens, are about two miles in length. " Although (ſays Groſier) the Chineſe architecture has no reſemblance to that of Europe, the imperial palace of Pekin does not fail to ſtrike beholders by its extent, grandeur, and the regular diſpoſition of its apartments, and by the ſingular ſtructure of its pavilion-roofs, ornamented at each corner with a carved platband, the lower extremity of which is turned upwards. Theſe roofs are covered with varniſhed tiles of ſo beautiful a yellow colour, that, at a diſtance, they make as ſplendid an appearance as if they were gilded. Below the upper roof there is another of equal brilliancy, which hangs ſloping from the wall, ſupported by a great number of beams, daubed over with green varniſh, and interſperſed with gilt figures. This ſecond roof, with the projection of the firſt, forms a kind of crown to the whole edifice. The palace is a ſmall diſtance from the ſouth gate of the Tartar city. The entrance to it is through a ſpacious court, to which there is a deſcent by a marble ſtaircaſe, ornamented with two large copper lions, and a baluſtrade of white marble. This baluſtrade runs in the form of a horſe-ſhoe, along the banks of a rivulet, that winds acroſs the palace with a ſerpentine courſe, the bridges over which are of marble. At the bottom of this firſt court ariſes a façade with three doors: that in the middle is for the emperor only; the mandarins and nobles paſs through thoſe on each ſide. Theſe doors conduct to a ſecond court, which is the largeſt of the palace: it is about 300 feet in length, and 50 in breadth. An immenſe gallery runs round it, in which are magazines, containing rich effects, which belong to the emperor as his private property; for the public treaſure is entruſted to a ſovereign tribunal called *Hou-pou*. The firſt of theſe magazines is filled with plate and veſſels of different metals; the ſecond contains the fineſt kinds of furs; the third, dreſſes lined with ſable, ermine, minever, and foxes' ſkins, which the emperor ſometimes gives in preſents to his officers; the fourth is the depoſitory of jewels, pieces of curious marble, and pearls fiſhed up in Tartary; the fifth, conſiſting of two ſtories, is full of wardrobes and trunks, which contain the ſilk ſtuffs uſed by the emperor and his family; the reſt are filled with bows, arrows, and other pieces of armour taken from the enemy or preſented by different princes.

" The royal hall, called *Tai-hotien*, or the Hall of the Grand Union, is in this ſecond court. It is built upon a terrace about 18 feet in height, incruſted with white marble, and ornamented with baluſtrades of excellent workmanſhip. Before this hall all the mandarins range themſelves, when they go, on certain days, to renew their homage, and perform thoſe ceremonies that are appointed by the laws of the empire. This hall is almoſt ſquare, and about 130 feet in length. The ceiling is carved, varniſhed green, and loaded with gilt dragons. The pillars which ſupport the roof within are ſix feet in circumference towards the baſe, and are coated with a kind of maſtich varniſhed red; the floor is partly covered with coarſe carpets, after the Turkiſh manner; but the walls have no kind of ornament, neither tapeſtry, luſtres, nor paintings.

“ The throne, which is in the middle of the hall, conſiſts of a pretty high alcove, exceedingly neat. It has no inſcription but the character *ching*, which the authors of this relation have interpreted by the word *holy*: but it has not always this ſignification; for it anſwers better ſometimes to the Latin word *eximius*, or the Engliſh words *excellent*, *perfect*, *moſt wiſe*. Upon the platform oppoſite to this hall ſtand large veſſels of bronze, in which incenſe is burnt when any ceremony is performing. There are alſo chandeliers ſhaped like birds and painted different colours, as well as the wax-candles that are lighted up in them. This platform is extended towards the north, and has on it two leſſer halls; one of them is a rotunda that glitters with varniſh, and is lighted by a number of windows. It is here that the emperor changes his dreſs before or after any ceremony. The other is a ſaloon, the door of which opens to the north: through this door the emperor muſt paſs, when he goes from his apartment to receive on his throne the homage of the nobility; he is then carried in a chair, by officers dreſſed in long red robes bordered with ſilk, and caps ornamented with plumes of feathers. It would be difficult to give an exact deſcription of the interior apartments which properly form the palace of the emperor, and are ſet apart for the uſe of his family. Few are permitted to enter them but women and eunuchs.”

The temples and the towers of this city are ſo numerous, that it is difficult to count them. Proviſions of all kinds are exceeding plentiful, they being, as well as the merchandiſes, brought from other parts by means of canals cut from the rivers, and always crowded with veſſels of different ſizes, as well as from the adjacent country. An earthquake which happened here in 1731 buried above 100,000 perſons in the ruins of the houſes which were thrown down. E. Long. 116. 41. N. Lat. 39. 54.

Mod. Un. Hiſt. v. vii.

We have already, under the article Observatory, mentioned the famous obſervatory in this city, of which we ſhall give this further account from the Univerſal Hiſtory. “ The Chineſe had thought nothing in the univerſe could equal in magnificence this famous place; and one of the moſt celebrated mathematicians of the royal academy of Paris hath made no ſcruple to repreſent it as one of the greateſt prodigies of art and ingenuity, of beauty and magnificence; and yet, when this celebrated ſtructure came to be viewed by more proper and unbiaſſed judges, it appears to have been of little worth as to its ancient machines, and leſs as to its ſituation; and that all that is now valuable in it is owing to the improvements made by Father Verbieſt a Flemiſh Jeſuit, who cauſed a new ſet of inſtruments to be made, with extraordinary care, neatneſs, and preciſion.

“ This fabric ſtands in a court of a moderate extent, and is built in the form of a ſquare tower, contiguous to the city wall on the inſide, and raiſed but ten or twelve feet above its bulwark. The aſcent up to the top is by a very narrow ſtaircaſe; and on the platform above were placed all the old inſtruments, which, though but few, took up the whole room, till Father Verbieſt introduced his new apparatus, which he diſpoſed in a more convenient order. Theſe are large, well caſt, and embelliſhed; and were the neatneſs of the diviſions anſwerable to the work, and the teleſcopes faſtened to them according to the new method, they would be equal to thoſe of Europe; but the Chineſe artificers were, it ſeems, either too negligent, or incapable of following his directions. As to the old inſtruments, they were, by order of the emperor Kang-hi, ſet aſide as uſeleſs, and laid in the hall near the tower, where they may be ſeen through a croſs-barred window, all covered with ruſt, and buried in oblivion.

“ In this famed obſervatory there are five mathematicians employed night and day, each in a proper apartment on the top of the tower, to obſerve all that paſſes over their heads: one of them is gazing towards the zenith, and the other towards the four points of the compaſs, that nothing may eſcape their notice. Their obſervations extend not only to the motions of the heavenly bodies, but to fires, meteors, winds, rain, thunder, hail, ſtorms, and other phenomena of the atmoſphere; and theſe are carefully entered in their journals, and an account of them is brought every morning to the ſurveyor of the mathematics, and regiſtered in his office.”

PELAGIANS, a Chriſtian ſect who appeared about the fifth or end of the fourth century. They maintained the following doctrines. 1. That Adam was by nature mortal, and, whether he had ſinned or not, would certainly have died. 2. That the conſequences of Adam's ſin were confined to his own perſon. 3. That new-born infants are in the ſame ſituation with Adam before the fall. 4. That the law qualified men for the kingdom of heaven, and was founded upon equal promiſes with the goſpel. 5. That the general reſurrection of the dead does not follow in virtue of our Saviour's reſurrection. 6. That the grace of God is given according to our merits. 7. That this grace is not granted for the performance of every moral act; the liberty of the will, and information in points of duty, being ſufficient, &c. The founder of this ſect was,

PELAGIUS, a native of Great Britain; but whether of England, Scotland, or Wales, is as uncertain as it is immaterial (A). He was born towards the cloſe of the fourth century, and educated in the monaſtery of

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(A) Dr Henry thinks he was born in North Wales; that his real name was Morgan, of which Pelagius is a tranſlation: and that he was born on the 13th of November A. D. 354, the ſame day with his great antagoniſt St Auguſtin. The ſame learned hiſtorian gives us the following account of Pelagius and his great coadjutor Celeſtius. “ He received a learned education in his own country, moſt probably in the great monaſtery of Banchor near Cheſter, to the government of which he was advanced A. D. 404. He was long eſteemed and loved by St Jerome and St Auguſtin, who kept up a friendly correſpondence with him by letters before of Banchor, in Wales, of which he became a monk, and afterwards abbot. In the early part of his life he went over to France, and thence to Rome, where he had the inſolence to promulgate certain opinions ſomewhat different from thoſe of the infallible church. His morals being irreproachable, he gained many diſciples; and the dreadful hereſy made ſo rapid a progreſs, that, for the ſalvation of ſouls, it became neceſſary for the pope to exert his power. Pelagius, to avoid the danger, in the year 409 paſſed over to Sicily, attended by his friend and pupil Celeſtius. In 411 they landed in Africa, continued ſome time at Hippo, and were preſent at the famous conference between the Catholics and Donatiſts which was held at Carthage in 412. From thence they travelled to Egypt; and from Egypt, in 415, to Paleſtine, where they were graciouſly received by John biſhop of Jeruſalem. In the ſame year Pelagius was cited to appear before a council of ſeventeen biſhops, held at Dioſpolis. They were ſatisfied with his creed, and abſolved him of hereſy. The African biſhops, however, being diſpleaſed with their proceedings, appealed to the Roman pontiff: he firſt approved, and afterwards condemned, the opinions of Pelagius, who with his pupil Celeſtius, was publicly excommunicated; and all the biſhops who refuſed to ſubſcribe the condemnation of the Pelagian hereſy were immediately deprived. What became of him after this period is entirely unknown; but it ſeems very probable that he retired to Banchor, and died abbot of that monaſtery. He wrote, 1. *Expoſitionem in epiſt. Paulinas,* lib. xiv. 2. *Epiſtola ad Demetriadem de virginitate.* 3. *Explanationis ſymboli ad Damaſum.* 4. *Epiſtolæ ad viduam duæ* 5. *De libero arbitrio.* These and many other fragments are ſcattered among the works of St Jerome. They are alſo collected by Garnerius, and publiſhed in Append. op. Mercatoris, p. 373. *Cave.*

PELAGOSA, an iſland in the Adriatic, which, together with ſeveral rocks that appear above water near it, are the remains of an ancient volcano. "I will not aſſure you (ſays Fortis) that it was thrown up out of the ſea like ſeveral other iſlands in the Archipelago, though there is ſome ground to ſuſpect this to have been the caſe; becauſe we find no preciſe mention of it in the moſt ancient geographers. It ſhould ſeem that it ought not to be confuſed with the Diomedee, from which it is 30 miles diſtant; yet it is not impoſſible that they have reckoned it among them. The lava which forms the ſubſtance of this iſland, is perfectly like the ordinary lava of Veſuvius, as far as I could diſcover in paſſing near it. If a naturaliſt ſhould land there, and viſit on purpoſe the higheſt parts of the iſland, perhaps we might then know whether it has been thrown up by a ſubmarine volcano, as the iſland near Santerini was in our age; or if we ought to believe it the top of ſome ancient volcanic mountain, of which the roots and ſides have been covered by the waters, which divided Africa from Spain, forming the ſtraits of Gibraltar; an invaſion that no one can doubt of who has examined the bottoms and ſhores of our ſea. The Liſſan fiſhermen ſay, that Pelagoſa is ſubject to frequent and violent earthquakes; and the aſpect of the iſland proves, at

Travels into Dalmatia.

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before they diſcovered the heretical pravity of his opinions; for Pelagius, being a cautious and artful man, for ſome time vented his peculiar notions as the ſentiments of others, without diſcovering that they were his own. At length, however, he threw off the maſk, and openly publiſhed and defended his doctrines at Rome about the beginning of the fifth century. This involved him in many troubles, and drew upon him the indignation of his former friends St Jerome and St Auguſtin, who wrote againſt him with great acrimony. He is acknowledged, even by his adverſaries, to have been a man of good ſenſe and great learning, and an acute diſputant, though they load him with the moſt bitter reproaches for his abuſe of theſe talents. His perſonal blemiſhes are painted in very ſtrong colours; and he is repreſented by theſe good fathers, in the heat of their zeal, as a very ugly fellow, 'broad-ſhouldered, thick-necked, fat-headed, lame of a leg, and blind of an eye.' Even the moſt northern parts of this iſland (Britain) produced ſome men of learning in this period. Celeſtius, the diſciple and friend of Pelagius, was a Scotſman, who made a prodigious noiſe in the world by his writings and diſputations about the beginning of the fifth century. He defended and propagated the peculiar opinions of his maſter Pelagius with ſo much learning, zeal, and ſucceſs, that thoſe who embraced theſe opinions were frequently called Celeſtians. Before he became acquainted with theſe doctrines he wrote ſeveral books, which were univerſally admired for their orthodoxy, learning, and virtuous tendency. After he had ſpent his youth in his own country in a ſtudious privacy, he travelled for his further improvement to Rome, where he became acquainted with Rufinus and Pelagius, and was by them infected with their hereſies. From that time he became the moſt indefatigable and undaunted champion of theſe hereſies, and thereby brought upon himſelf the indignation of the orthodox fathers of theſe days, who gave him many very bad names in their writings. St Jerome, whoſe commentaries on the Epheſians he had preſumed to criticiſe, calls him 'an ignorant, ſtupid fool, having his belly ſwelled and diſtended with Scots pottage; a great, corpulent, barking dog, who was fitter to kick with heels than to bite with his teeth; a Cerberus, who, with his maſter Pluto (Pelagius), deſerved to be knocked on the head, that they might be put to eternal ſilence.' Such were the flowers of rhetoric which theſe good fathers employed againſt the enemies of the orthodox faith! But candour obliges us to obſerve, that this was perhaps more the vice of the age in which they lived than of the men. Both Pelagius and Celeſtius were very great travellers; having viſited many different countries of Aſia and Africa, as well as Europe, with a view to elude the perſecutions of their enemies, and to propagate their opinions. It is no inconſiderable evidence of their ſuperior learning and abilities, that their opinions gained great ground in all the provinces both of the eaſtern and weſtern empire, in ſpite of the writings of many learned fathers, and the dercees of many councils againſt them. 'The Pelagian and Celeſtian hereſy (ſays Photius) not only flouriſhed in great vigour in the Weſt, but was alſo propagated into the Eaſt.'

at firſt ſight, that it has ſuffered many revolutions; for it is rugged, ruinous, and ſubverted."

PELAIAH, a Levite (Nehem. viii. 7. x. 10.) He was one of the principal Levites that returned from captivity, and was one of thoſe that ſigned the covenant that Nehemiah renewed with the Lord.

PELALIAH, ſon of Amazi and father of Jeroham, of the family of Paſhur ſon of Machiah, of all whom mention has been made: he was of the race of the prieſts (Nehem. xi. 12.)

PELASGI. See PELASGIOTIS.

PELASGIA (Pliny); the ancient name of *Leſbos*; ſo called from the Pelaſgi, its firſt inhabitants (Diodorus Siculus.) Alſo the ancient name of *Peloponneſus*, from Pelaſgius, a native of the country (Nicolaus Damaſcenus, Ephorus).

PELASGICUM (Pauſanias, Pliny); the north wall of Athens; ſo called from the builders, the Pelaſgi. There was an execration pronounced on any that ſhould build houſes under this wall; becauſe the Pelaſgi, while dwelling there, entered into a conſpiracy againſt the Athenians (Thucydides).

PELASGIOTIS, a third part of Theſſaly, (Strabo); ſo called from a very ancient people, the Pelaſgi, called *Pelaſgiotæ* (Ptolemy; who formerly, together with the Æolians, occupied Theſſaly, and thence that part was called *Pelaſgicum Argos*; beſides many other parts of Greece. The poets extend the appellation to Greeks in general. *Pelaſgus*, the epithet. Some of the inhabitants of Crete were called *Pelaſgi* (Homer); who thus alſo calls the neighbouring people to the Cilicians in Troas. The Pelaſgi were the deſcendants of Peleg, and inhabited Greece before the Ionians, the poſterity of Javan, poſſeſſed it, hence the Lacedemonians and Jews were related (1 Maccab. xii. 21.) The Pelaſgiotis was ſituated between Pieria and Macedonia to the north and weſt, Theſſaliotis to the ſouth, and Magneſia to the eaſt, (Strabo, Pliny.)

PELATÆ, were free born citizens, among the Athenians, who by poverty were reduced to the neceſſity of ſerving for wages. During their ſervitude they had no vote in the management of public affairs, as having no eſtate to qualify them; but this reſtriction was removed whenever they had releaſed themſelves from their ſervile ſituation, which they were allowed to do when able to ſupport themſelves. While they continued ſervants, they had alſo a right to change their maſters. We find them ſometimes diſtinguiſhed by the name of *Thetæ*.

PELATIAH, ſon of Hananiah, and father of Iſhi, of the tribe of Simeon. He ſubdued the Amalekites upon the mountain of Seir (1 Chron. iv. 42.) The time of this action is unknown.

PELATIAH, ſon of Benaiah, a prince of the people, who lived in the time of Zedekiah king of Judah, and oppoſed the wholeſome advice given by Jeremiah, to ſubmit to king Nebuchadnezzar. Ezekiel (xi. 1, 2, 3, 4.) being a captive in Meſopotamia, had a viſion, in which he ſaw five and twenty men at the door of the temple of Jeruſalem, among which were Jaazaniah the ſon of Azur, and Pelatiah the ſon of Benaiah, who were the moſt remarkable. Then the Lord ſaid to him, "Son of man, theſe are the men that have thoughts of iniquity, and who are forming pernicious deſigns againſt this city, ſaying; Have not the houſes been built a long time? Jeruſalem is the pot, and we are the fleſh. Thus ſaith the Lord, Ye have made great havock in this city, and have filled its ſtreets with dead bodies. Theſe men are the fleſh, and the city is the pot. But as for you, I will make you come forth from the middle of this city, and I will make you periſh by the hand of your enemies." As he was prophecying in this manner, Pelatiah the ſon of Benaiah died.

PELE (Stephanus). There were two towns of this name in Theſſaly; the one ſubject to Eurypylus, the other to Achilles; both extinct. *Peleus* the gentilitious name (*id.*)

PELEG, ſon of Eber, was born in the year of the world 1757. The ſcripture ſays his father gave him the name of Peleg, ſignifying diviſion, becauſe in his time the earth began to be divided (Gen. xi. 16. x. 25.); whether it was that Noah had begun to diſtribute the earth among his deſcendants, ſome years before the building of Babel; or that Peleg came into the world the ſame year that Babel was begun, and at the diviſion of languages; or that Eber by a ſpirit of prophecy gave his ſon the name of *Peleg* ſome years before the tower of Babel was begun, is not abſolutely certain. That which here perplexes the interpreters is, firſt, that Peleg came into the world not above 100 years after the deluge. But it ſhould ſeem, that the number of men was not then ſufficient for ſuch an undertaking as that of Babel. Secondly, Joktan the brother of Peleg had already thirteen ſons at the time of this diſperſion, which happened after the confuſion of Babel (Gen. x. 26, 27, 28, &c.) Peleg being born in the thirty-fourth year of Eber (Gen. xi. 16.), it is impoſſible his brother Joktan ſhould have ſuch a number of children at the birth of Peleg. It ſeems therefore that he was not born at the time of the diſperſion. To this may be anſwered, that Moſes has there enumerated the names of the thirteen ſons of Joktan (in Gen. x. 26.) by way of anticipation, though they were not born till a good while after the confuſion of Babel; but as they poſſeſſed a very large country, it was convenient to take notice of them, and to name them among the other deſcendants of Noah, who divided the provinces of the eaſt among themſelves. However this may have been, at the age of thirty years Peleg begat Reu; and he died at the age of 239.

PELETHITES. The Pelethites and Cherethites were famous under the reign of King David. They were the moſt valiant men in the army of that prince, and had the guard of his perſon. See Ezekiel xxv. 16. Zephaniah ii. 5. 1 Samuel xxx. 14. 2 Samuel xv. 18. xx. 7. *Patrick's Comm. Pool's Annot.* and *Delany's Hiſt. of the Life of David.*

PELETHRONII, a name or epithet given to the Lapithæ, either becauſe they inhabited the town of Pelethronium at the foot of mount Pelion in Theſſaly, or becauſe one of their number bore the name of *Pelethronius*. It is to them, we are told, that mankind are indebted for the invention of the bit with which they tamed their horſes with ſo much dexterity.

PELETHRONIUM (Nicander and Scholiaſt); a town of Theſſaly, ſituated in a flowery part of mount Pelios; and hence the appellation *throna*, ſignifying "flowers."

“ flowers.” Lucan ſays the Centaurs were natives of that place; to whom Virgil aſſigns mount Othrys. Moſt authors, however, aſcribe the breaking of horſes to the Centaurs. Some make the Lapithæ and Centaurs the ſame; others a different people; allowed however to be both of Theſſaly. Their ſtory is greatly involved in fable. See Lapithus.

PELEUS, in fabulous hiſtory, a king of Theſſaly, ſon of Æacus and Endeis, the daughter of Chiron. He married Thetis one of the Nereids, and was the only mortal man who ever married an immortal. He was concerned in the murder of his brother Phocus, and was therefore obliged to leave his father's dominions. He fled to the court of Eurytus the ſon of Actor, who reigned at Phthia, or according to the opinion of Ovid, the truth of which is queſtioned, to Ceyx king of Trachinia. He was purified of his murder by Eurytus, with the uſual ceremonies, and the king gave him his daughter Antigone in marriage. After this, as Peleus and Eurytus went to the chace of the Calydonian boar, the father-in-law was accidentally killed by an arrow which his ſon-in-law had aimed at the beaſt. This unfortunate accident obliged him to baniſh himſelf from the court of Phthia, and he went to Iolchos, where he was alſo purified of the murder of Eurytus by Acaſtus the king of the country. His reſidence at Iolchos was ſhort: Aſtydamia the wife of Acaſtus fell in love with him; but when ſhe found him inſenſible to her paſſionate declarations, ſhe accuſed him of attempts upon her virtue. The king her huſband partly believed the accuſations of his wife; but not willing to violate the laws of hoſpitality, by putting him inſtantly to death, he ordered his officers to conduct him to mount Pelion, on pretence of hunting, and there to tie him to a tree and to leave him a prey to the wild beaſts of the place. The orders of Acaſtus were faithfully obeyed; but Jupiter knowing the innocence of his grandſon Peleus, ordered Vulcan to ſet him at liberty. As ſoon as he had been delivered from danger, Peleus aſſembled his friends in order to puniſh the ill treatment which he had received from Acaſtus. He took Iolchos by force, drove the king from his poſſeſſions, and put to death the wicked Aſtydamia. On the death of Antigone, Peleus made love to Thetis, of whoſe ſuperior charms Jupiter himſelf had been enamoured. His pretenſions were rejected; for as he was but a mortal, the goddeſs fled from him with the utmoſt abhorrence, and the more effectually to evade his inquiries, ſhe generally aſſumed the ſhape of a bird, or a tree, or of a tygreſs. Peleus's paſſion was fanned by refuſal; he offered a ſacrifice to the gods; and Proteus informed him, that to obtain Thetis he muſt ſurpriſe her while ſhe was aſleep in her grotto, near the ſhores of Theſſaly. This advice was immediately attended to; and Thetis, unable to eſcape from the graſp of Peleus, at laſt conſented to marry him. Their nuptials were celebrated with the greateſt ſolemnity, all the gods attending and making them each the moſt valuable preſents. The goddeſs of Diſcord was the only one of the deities who was abſent; and ſhe puniſhed this ſeeming neglect by throwing an apple into the midſt of the aſſembly of the gods, with the inſcription of *Detur pulchriori*. The celebrated Achilles was the fruit of this marriage, whoſe education was early entruſted to the Centaur Chiron, and afterwards to Phœnix, the ſon of Amyntor. Achilles, it is well known, went to the Trojan war, at the head of his father's troops; and Peleus gloried in having a ſon who was ſuperior to all the Greeks in valour and intrepidity. His death, however, was the ſource of great grief to Peleus; but Thetis, to comfort her huſband, promiſed him immortality, and ordered him to retire into the grottoes of the iſland of Leuce, where he ſhould ſee and converſe with the manes of his ſon. Peleus had a daughter called *Polydora*, by Antigone.

PELEW Islands, a cluſter of ſmall iſlands ſituated between the latitudes of 5° and 7° north, and the longitudes 134° and 136° eaſt. Various conjectures have been formed reſpecting the time of their firſt diſcovery by Europeans. Mr Keate, the editor of the only voyage in which we have any account of their climate, ſoil, and produce, together with the manners of their inhabitants, thinks they were firſt noticed by the Spaniards from the Philippines, and by them named *Palos* from the number of trees growing in them reſembling the maſts of ſhips. This conjecture has been vehemently oppoſed by a critic, who affirms that the whole of M Keate's introduction is erroneous, and that the iſlands in queſtion were firſt diſcovered by a French Jeſuit named *Pere Papin*. The Jeſuit, he imagines, was directed to them by one of the inhabitants, who had found his way to the Moluccas, where he was baptized. They are ſaid to have been again noticed by *P. Centova* in 1724, who ſaw at Agdane, the capital of the Merian iſlands, ſome of the inhabitants; and from their account gives a deſcription not very favourable of theſe harmleſs iſlanders. Centova's deſcription is to be found in the 15th volume, and the relation of the diſcovery by P. Pepin in the 11th volume, of *Lettres Edifiantes et Curieuſes*, publiſhed at Paris 1781.

The lateſt and moſt authentic account of them, however, is given from the Journals of Captain Wilſon of the Antelope, a packet belonging to the Eaſt India company, which was wrecked upon one of them in Auguſt 1783. This ſhip was fitted out in England by the court of directors in the ſummer 1782, as was then generally underſtood, for a ſecret expedition. Whatever may have been her deſtination, as ſhe was proceeding from Macao in ſqually weather, the man who, on the night of the 10th of Auguſt, had the look out, ſuddenly called out *Breakers!* But the ſound of the word had ſcarce reached the ears of the officer on deck, before the ſhip ſtruck and ſtuck faſt; and in leſs than an hour bulged and filled with water. Having ſecured the gunpowder, ſmall arms, bread and ſuch other proviſions as were liable to be ſpoiled by water, Captain Wilſon, after many difficulties, effected a landing. The crew of the Antelope conſiſted of 33 Europeans beſide the captain, and 16 Chineſe; and the only poſſible means by which they could be delivered from an iſland, which at firſt appeared to them uninhabited, was by building a ſhip capable of tranſporting them to the neareſt European ſettlement in that quarter of the globe. Whilſt they were meditating upon this undertaking, the natives appeared on the ſecond day after their arrival; and their intercourſe with them was facilitated by means which appear

Pelew Iſlands.

pear as ſingular as they were providential. Captain Wilſon had a ſervant recommended to him at Macao, who ſpoke both the Malay and Engliſh languages perfectly well; and they had not been long at Pelew before they had the good fortune to meet with a Malay, who had been thrown by a tempeſt upon this very ſpot about a year before, and had made himſelf acquainted with the language of the country; ſo that by this extraordinary event each party had an interpreter who could readily explain their wants and deſires, and by that means prevent a number of miſconceptions which might have ariſen from making uſe of ſigns and geſtures only.

The natives are all of a deep copper colour, going perfectly naked. They are of a middling ſtature, very ſtraight, muſcular, and well formed; but their legs, from a little above their ancles to the middle of their thighs, are tatooed ſo very thick, as to appear dyed of a far deeper colour than the reſt of their ſkin. Their hair is of a fine black, long, and rolled up behind, in a ſimple manner, cloſe to the back of their heads, which appeared both neat and becoming; but few of them had beards, it being the general cuſtom to pluck them out by the roots.

They began by ſtroking the bodies and arms of the Engliſh, or rather their waiſtcoats and coat ſleeves, as if they doubted whether the garment and the man were not of the ſame ſubſtance; and as the Malay explained the circumſtances to them, our people were greatly ſurpriſed at the quickneſs with which they ſeemed to comprehend every information he gave them. The next thing they noticed was our people's white hands, and the blue veins of their wriſts; the former of which they ſeemed to conſider as artificial, and the other as the Engliſh manner of tatooing. After being ſatisfied in this particular, they expreſſed a further wiſh to ſee their bodies; and, among other things, were greatly ſurpriſed at finding hair on their breaſts, it being conſidered by them as a great mark of indelicacy, as it is their cuſtom to eradicate it from every part of the body in both ſexes.

They afterwards walked about, teſtifying great curioſity at every thing they ſaw, but at the ſame time expreſſing a fear that they might be thought too intruding. As our people were conducting them to the tents, one of the natives picked up a bullet, which had been caſually dropped on the ground, and immediately expreſſed his ſurprize, that a ſubſtance ſo ſmall to the eye ſhould be ſo very ponderous to the touch; and on their entering the tent, a large Newfoundland dog, and a ſpaniel which had been tied up there to prevent their being loſt, ſet up a moſt violent barking, and the natives a noiſe but little leſs loud, which at firſt it was not eaſy to account for. They ran in and out of the tent, and ſeemed to wiſh that they might be made to bark again. This the Malay ſoon explained to be the effect of their joy and ſurpriſe, as theſe were the firſt large animals they had ever ſeen, there being no quadrupeds of any ſpecies on theſe iſlands, except a very few grey rats in the woods.

After ſome time it was agreed on by Captain Wilſon and his people, that ſome of the crew ſhould be ſent to the king of the place in order to ſolicit his friendſhip, and intreat his permiſſion to build a veſſel that might carry them back to their own country. This buſineſs was allotted to the captain's brother; and during his abſence, Raa Kook, the king's brother, and ſeveral of the natives, remained with our people. This amiable chief ſeemed to place an entire confidence in thoſe he was among; he endeavoured to accommodate himſelf to their manners; would ſit at table as they did, inſtead of ſquatting on his hams; and inquired particularly into the principles and cauſes of every thing he obſerved about him, lending his perſonal aſſiſtance in all that was going forward, and even deſiring the cook to let him aid him in blowing the fire.

Pelew Iſlands.

In order to conciliate their affections, Captain Wilſon had preſented Arra Kooker, another of the king's brothers, with a pair of trowſers; but having conceived a great paſſion for a white ſhirt, one was immediately given to him; which he had no ſooner put on, than he began to dance and jump about with ſo much joy, that every body was diverted by his ſingular geſtures, and the contraſt which the linen formed with his ſkin. This prince was about 40, of a ſhort ſtature, but ſo plump and fat that he was nearly as broad as he was long. He poſſeſſed an abundant ſhare of good humour, and a wonderful turn for mimickry; and had beſides a countenance ſo lively and expreſſive, that though our people at this time were ſtrangers to almoſt all he ſaid, yet his face and geſtures made them accurately comprehend whatever he was deſcribing.

After three or four days, Abba Thulle the king arrived with a great retinue. He was received with every mark of reſpect by the ſhip's company, who were exerciſed before him, and fired three volleys in different poſitions. The ſurprize of the natives, their hooting, hallooing, jumping, and chattering, produced a noiſe almoſt equal to the diſcharge of the muſkets; and when one of the men ſhot a bird, which was done to diſplay the effect of their arms, the ſurprize it occaſioned was wonderful. Some of the natives ran for it, and carried it to the king, who examined it with great attention, but was unable to comprehend how it could be wounded, not having ſeen any thing paſs out of the gun.

Raa Kook expreſſed great impatience to ſhow the king whatever had impreſſed his own mind; and taking his brother by the hand, led him to a grindſtone which was fixed behind one of the tents. He immediately put it in motion, as he had frequently done before; at the rapidity of which the king was greatly aſtoniſhed, particularly when he was informed that it would ſharpen iron. Captain Wilſon ordered a hatchet to be brought and ground, that they might more readily percieve its operation, when Raa Kook eagerly ſeized the handle, and began turning it, appearing highly delighted to let his brother ſee how well he underſtood it. The whole appeared like ſomething ſupernatural; but the circumſtances which moſt bewildered their ideas was, how the ſparks of fire could come, and how a ſtone ſo well wetted could become ſo ſoon dry.

The king then viſited the different tents, and inquired about every thing he ſaw; all was novelty, and of courſe intereſted his attention. When he got to the tent where the Chineſe men were, who had been brought with them from Macao, Raa Kook, whoſe retentive mind never loſt a ſingle trace of any thing he had been informed of, acquainting the king that theſe were a people quite different from the Engliſh, and that he had learnt there were many other nations beſides theſe interſpread through the world, ſome of which fought with guns and others with boarding-ſpikes, an inſtrument which he held very cheap in compariſon with the former.

When the king heard his brother diſcourſing about a variety of nations, who all ſpoke differently, and had before him the example of the Chineſe, whoſe language was not the ſame with the Engliſh, he appeared inſtantly thoughtful and ſerious, as if ſtruck by conceptions which had never before croſſed his mind. He remained a while penſive and bewildered; and this circumſtance impreſſed on every one at the time an idea that there was every reaſon to imagine that there had never been a communication between thoſe people and any other nation: and indeed it is evident, that if Pere Papin did really viſit them in 1710, they had before 1783 loſt the remembrance of every trace of European manners. This indeed is not ſurpriſing, as they had no other record than knots ſimilar to the quipes of Peru at the landing of the Spaniards.

Raa Kook would now ſhow his brother the kitchen, which was in the hollow of a rock, a little above the cove. It was at the time when the cook was preparing dinner; and though the implements were exceedingly ſcanty, an iron pot, a tea kettle, a tin ſauce-pan, with a poker, a pair of tongs, and a frying-pan, were here of ſufficient conſequence to excite admiration; nor were the bellows now forgotten by Raa Kook, who taking them up, as he explained their uſe to the king, ſeemed ambitious to let his brother ſee what an adept he was at blowing. The little bald cook, who was always cloſe ſhaven, and never wore any thing on his head, was likewiſe pointed out to the king as an object of merriment and curioſity.

Sometime after this the king requeſted five of Captain Wilſon's men to attend him in a war he was going to make againſt the inhabitants of a neighbouring iſland called *Oroolong*, who, as he ſaid, had done him an injury. But before this requeſt was made known, he had long ſtruggled with a delicacy of ſentiment which no one would have expected to find in regions ſo disjoined from the reſt of mankind. This was no other than that it might prove a temporary inconvenience to the unfortunate ſtrangers who had ſought his protection, and might be conſidered by them as an ungenerous proceeding. It was, however, no ſooner made known, than Captain Wilſon inſtantly complied: and every face, which had before been clouded with doubt and apprehenſion, became immediately brightened and gay.

In this enterpriſe little more was done than braving their enemies, ſtripping ſome cocoa-nut trees of their fruit, and carrying off a number of yams and other proviſions; but in another, which was undertaken againſt the iſland of Artingall, they were more ſucceſsful, and ſhewed ſigns of the ſame ſanguinary diſpoſition which ſome demon has infuſed into the whole human race. Nine priſoners of war who had been taken upon this occaſion were cruelly put to death; and notwithſtanding the Engliſh ſtrongly remonſtrated againſt this proceeding, all the arguments they could uſe were of no avail. In juſtification of their conduct, they alleged the neceſſity of doing it for their own ſecurity, declaring that they had formerly only detained them as menial ſervants, but that they always found means to get back to their own country, and return with ſuch a force as frequently made great depredations.

Having given this general account of the character and conduct of theſe hitherto unknown people we now proceed to lay before our readers what we have learned of their government, cuſtoms, manners, and arts, together with a deſcription of the face of their country. In this the editor of Captain Wilſon's voyage muſt be our guide; and if our narrative do not ſatisfy the man of ſcience, it is to be obſerved, that the Antelope was not a ſhip ſent out purpoſely to explore undiſcovered regions, nor were there people on board properly qualified to eſtimate the manners of a new race of men; they had amongſt them no philoſophers, botaniſts, or draughtſmen, experienced in ſuch ſcientific purſuits as might enable them to examine with judgment every object which preſented itſelf. Diſtreſs threw them upon theſe iſlands; and while they were there, all their thoughts were occupied on the means of liberating themſelves from a ſituation of all others the moſt afflicting to the mind, that of being cut off for ever from the ſociety of the reſt of the world.

It, however, clearly appears, form their uniform teſtimony, that at Pelew the king was conſidered as the firſt perſon in the government.

“ He was looked up to as the father of his people; and though diveſted of all external decorations of royalty, had every mark of diſtinction paid to his perſon. His *rupacks* or chiefs approached him with the greateſt reſpect; and his common ſubjects, whenever they paſſed near him, or had occaſion to addreſs him, put their hands behind them, and crouched towards the ground. Upon all occurrences of moment, he convened the rupacks and officers of ſtate; their councils were always held in the open air, where the king firſt ſtated the buſineſs upon which he had aſſembled them, and ſubmitted it to their conſideration. Each rupack delivered his opinion, but without riſing from his ſeat; and when the matter before them was ſettled, the king ſtanding up put an end to the council.

“ When any meſſage was brought him, whether in council or elſewhere, if it came by one of the common people, it was delivered at ſome diſtance in a low voice to one of the inferior rupacks, who, bending in an humble manner at the king's ſide, delivered it in the ſame manner with his face turned aſide. His commands appeared to be abſolute, though he acted in no important buſineſs without the advice of his chiefs: and every day in the afternoon, whether he was at Pelew or with the Engliſh, he went to ſit in public for the purpoſe of hearing any requeſts, or of adjuſting any difference or diſpute which might have ariſen among his ſubjects.”

But theſe, according to our editor, ſeldom happened; for as their real wants were but few, and they ſaw nothing to create artificial ones, every one was chiefly occupied with his own humble purſuits; and as far as the ſhip's crew, who remained among them about three months, could decide, they appeared to conduct themſelves towards each other with the greateſt civility and benevolence; never wrangling or entering into quarrelſome

ſome contentions, as is cuſtomary among thoſe who call themſelves a poliſhed and enlightened people. Even when children ſhowed a diſpoſition of this kind, they ſtrongly marked their diſpleaſure, by ſtifling with rebuke their little animoſities,

The character of the king is thus drawn by the editor: "The excellent man who reigned over theſe ſons of nature, ſhowed himſelf in every part of his conduct firm, noble, generous, and benevolent; there was a dignity in all his deportment, a gentleneſs in all his manners, and a warmth and ſenſibility about his heart, that won the love of all who approached him. Nature had beſtowed on him a contemplative mind, which he had improved by thoſe reflections that good ſenſe dictated and obſervation confirmed. The happineſs of his people ſeemed to be always in his thoughts. In order more effectually to ſtimulate them to uſeful labour, he had himſelf learnt all the few arts they poſſeſſed, and was looked on in ſome of them to be the beſt workman in his dominions. Placed as he was by Providence in its obſcurer ſcenes, he lived beloved by his chiefs, and revered by his people; over whom, whilſt he preſerved a dignity which diſtinguiſhed his ſuperior ſtation, he reigned more as the father than the ſovereign. The eyes of his ſubjects beheld their naked prince with as much awe and reſpect as thoſe are viewed with who govern poliſhed nations, and are decorated with all the dazzling parade and ornaments of royalty; nor was the purple robe or the ſplendid diadem neceſſary to point out a character which the maſterly hand of nature had rendered ſo perfect."

Next in power to the king was his brother Raa Kook, who was official general of all his forces. It was his duty to ſummon the rupacks to attend the king for whatever purpoſe they were wanted. He was alſo his preſumptive heir; the ſucceſſion of Pelew not going to the king's children till it had paſſed through his brothers; ſo that after the demiſe of Abba Thulle, the ſovereignty would have deſcended to Raa Kook; on his demiſe to Arra Kooker; and on the death of this laſt it would have reverted to Qui Bill, the king's eldeſt ſon, when Lee Boo, his ſecond ſon, of whom we have much to ſay, would have become the hereditary general.

The office of firſt miniſter is deſcribed as follows: "The king was always attended by a particular chief or rupack, who did not appear to poſſeſs any hereditary office, but only a delegated authority. He was always near the king's perſon, and the chief who was always firſt conſulted; but whether his office was religious or civil, or both, our people could not learn with any certainty. He was not conſidered as a warrior, or ever bore arms, and had only one wife, whereas the other rupacks had two. The Engliſh were never invited to his houſe, or introduced into it, although they were conducted to thoſe of almoſt every other chief.

Of the rupacks it is obſerved, "That they could only be regarded as chiefs or nobles; they were not all of the ſame degree, as was plain by a difference in the *bone* (A) they wore: they generally attended the king, and were always ready at his command to accompany him on any expedition with a number of canoes properly manned, and armed with darts and ſpears, who were to remain with him till they had his permiſſion to return home with their dependents. In this part of their government we may trace an outline of the feudal ſyſtem; but from the few opportunities our people had of inveſtigating points of internal government, it appeared that the titles of *rupacks* were perſonal badges of rank and diſtinction; nor did they apprehend they were hereditary honours, unleſs in the reigning family, who muſt of neceſſity be of this claſs."

As to property, it was underſtood, "That the people poſſeſſed only ſuch as aroſe from their work and labour, but no abſolute one in the ſoil, of which the king appeared to be general proprietor. A man's houſe, furniture, or canoe, was conſidered as his private property, as was alſo the land allotted him, as long as he occupied and cultivated it; but whenever he removed with his family to another place, the ground he held reverted to the king, who gave it to whom he pleaſed, or to thoſe who ſolicited to cultivate it."

All that part of the iſland which they had an opportunity of ſeeing is ſaid to have been well cultivated. It was covered with trees of various kinds and ſizes, many of which muſt have been very large, as they made canoes of their trunks, ſome of which were capable of carrying 28 or 30 men. Among the timber trees was noticed the ebony, and a tree which when pierced or wounded yielded a thick white liquor of the conſiſtence of cream. "They had alſo a ſpecies of the manchineel tree, in cutting down of which our people frequently got bliſtered and ſwelled; the inhabitants pointed out the cauſe, ſaying it was owing to their being ſprinkled by the ſap. This they reckoned among the unlucky trees, and adviſed our people againſt the uſe of it."

But the moſt ſingular tree noticed at Pelew, was one in its ſize and manner of branching not unlike our cherry-tree, but in its leaves reſembling the myrtle. Its peculiarity was, that it had no bark, but only an outward coat of about the thickneſs of a card, which was darker than the inſide, though equally cloſe in texture. Its colour was nearly that of mahogany, and the wood was ſo extremely hard, that few of the tools which the Engliſh had could work it. They alſo found cabbage-trees, the wild bread fruit, and another tree whoſe fruit ſomething reſembled an almond. But yams and cocoa nuts, being their principal articles of ſuſtenance, claimed their chief attention.

The iſland Coorooraa, of which Pelew is the capital, likewiſe produced plantains, bananas, Seville oranges and lemons, but neither of them in any conſiderable quantity. None of the iſlands which the Engliſh viſited had any kind of grain. As to birds, they had plenty of common cocks and hens, which, though not domeſticated, kept running about near their houſes and plantations; and what appears extremely ſingular is, that the natives had never made any uſe of them, till

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(A) This was a mark of rank worn upon the wriſt, with which Captain Wilſon was inveſted by the king; but what animal it came from our people could not learn.

till our people told them they were excellent eating. Pigeons they accounted a great dainty; but none but thoſe of a certain dignity were permitted to eat of them. The Engliſh left them two geeſe, which were the only remains of their live ſtock.

From the deſcription of the country it appears to be very mountainous; but ſome of the valleys are repreſented as extenſive and beautiful, affording many delightful proſpects. The ſoil being very rich, produces a great abundance of graſs, which, as there are no cattle to eat it, grows very high, and was ſcorched and burnt up by the ſun. Our people ſaw no river at Pelew; their ſupplies of freſh water being obtained from ſmall ſtreams and ponds, of which there are a great many.

From this account of the ſcanty produce of theſe iſlands, it is evident that no luxury reigned among their inhabitants, whoſe principal article of food appears to be fiſh; they had no ſalt, nor did they make uſe of ſauce or any ſeaſoning in any thing they eat. Their drink was alſo as ſimple as their diet; it principally conſiſted of the milk of the cocoa nut; but upon particular occaſions they uſed a kind of ſweet drink and ſherbet, which latter had the addition of ſome juice of orange.

The iſlands appeared to be populous, though to what extent could not be aſcertained. Their houſes were raiſed about three feet from the ground, upon ſtones which appeared as if hewn from the quarry. The interior part of them was without any diviſion, the whole forming one great room, which roſe in a ridge like our barns, the outſide being thatched thick and cloſe with bamboos or palm leaves. All their implements, utenſils, weapons of war, and canoes, are much of the ſame kind with thoſe which were found in the South Sea iſlands.

In their marriages they allow a plurality of wives, though in general not more than two. When a woman is pregnant, the utmoſt attention is paid to her; but upon other occaſions no more reſpect is ſhown to one ſex than the other. "One of our people endeavouring to make himſelf agreeable to a lady belonging to one of the rupacks, by what we ſhould call a marked aſſiduity, Arra Kooker, with the greateſt civility, gave him to underſtand that it was not right to do ſo."

They have places particularly appropriated to ſepulture; their graves being made nearly the ſame as they are in our country churchyards. The corpſe is attended only by women, who at the place of interment make a great lamentation. The men, however, aſſemble round the body before it is carried to the grave, on which occaſion they preſerve a ſolemn ſilence; "their minds, from principles of fortitude or philoſophy, being armed to meet the events of mortality with manly ſubmiſſion, diveſted of the external teſtimony of human weakneſs."

On the article of religion our editor obſerves, "That, among all the race of men whom navigation has brought to our knowledge, few appear to be without a ſenſe of ſomething like religion, however it may be mixed with idolatry or ſuperſtition. And yet our people, during their continuance with the natives of Pelew, never ſaw any particular ceremonies, or obſerved any thing that had the appearance of public worſhip. But though there was not found on any of the iſlands they viſited any place appropriated to religious rites, it would perhaps be going too far to declare that the people of Pelew had abſolutely no idea of religion. Independent of external teſtimony, there may be ſuch a thing as the religion of the heart, by which the mind may in awful ſilence be turned to contemplate the God of Nature; and though unbleſſed by thoſe lights which have pointed to the Chriſtian world an unerring path to happineſs and peace, yet they might, by the light of reaſon only, have diſcovered the efficacy of virtue, and the temporal advantages ariſing from moral rectitude.

"Superſtition is a word of great latitude, and vaguely defined: though it hath in enlightened ages been called the offspring of ignorance, yet in no time hath it exiſted without having ſome connection with religion. Now the people of Pelew had beyond all doubt ſome portion of it, as appeared by the wiſh expreſſed by the king when he ſaw the ſhip building, that the Engliſh would take out of it ſome particular wood, which he perceived they had made uſe of, and which he obſerved was deemed an ill omen, or unpropitious.

"They had alſo an idea of an evil ſpirit, that often counteracted human affairs. A very particular inſtance of this was ſeen when Mr Barker, a moſt valuable member in the Engliſh ſociety, fell backwards from the ſide of the veſſel, whilſt he was on the ſtocks: Raa Kook, who happened to be preſent, obſerved that it was owing to the unlucky wood our people had ſuffered to remain in the veſſel, that the evil ſpirit had occaſioned this miſchief to Mr Barker."

They likewiſe appeared to entertain a ſtrong idea of divination, as was evident from the ceremonies they practiſed before they undertook any enterpriſe of moment. A few occurrences which are mentioned in the courſe of the narrative, would alſo lead us to believe that they could not be altogether unacquainted with the nature of religious worſhip; for when they were preſent at the public prayers of the Engliſh, they expreſſed no ſurpriſe at what was doing, but ſeemed deſirous to join in them, and conſtantly preſerved the moſt profound ſilence. The general even refuſed to receive a meſſage from the king which arrived during divine ſervice. And upon another occaſion, when Captain Wilſon told Lee Boo, that good men would live again above, he replied, with great earneſtneſs, "All ſame Pelew, bad men ſtay in earth; good men go into ſky; become very beautiful;" holding his hand up, and giving a fluttering motion to his fingers. Some later voyagers, however, have affirmed, that theſe people, notwithſtanding their ſuperſtition, have no notion whatever of a Deity; a circumſtance to which it is extremely difficult to give full credit.

The moſt wonderful circumſtance in the hiſtory of this people, except that laſt mentioned, are the acuteneſs of their underſtanding, their hoſpitality, and the implicit confidence which they placed in utter ſtrangers. That their manners were pleaſing, and their ſociety not diſagreeable, is evident from the conduct of Madan Blanchard, one of the ſeamen, who, when the veſſel was built and ready to take her departure with his Captain and companions, was left behind at his own particular requeſt. That they had the fulleſt confidence in Captain Wilſon and his crew, is put beyond a doubt by the behaviour of the king and Raa Kook when their gueſts were to leave them. Raa Kook ſolicited his brother's permiſſion to accompany the Engliſh, but from prudential motives was refuſed. The ſovereign, however, reſolved to entruſt his ſecond ſon Lee Boo to Captain Wilſon's care, that he might improve his mind, and learn ſuch things as at his return would benefit his country.

The inſtructions which he gave the young man, and the fortitude which he ſhowed upon this occaſion, would have done honour to the moſt enlightened mind. Upon delivering him to Captain Wilſon, he uſed theſe expreſſions: "I would wiſh you to inform Lee Boo of all things which he ought to know, and make him an Engliſhman. The ſubject of parting with my ſon I have frequently revolved; I am well aware that the diſtant countries he muſt go through, differing much from his own, may expoſe him to dangers, as well as diſeaſes, that are unknown to us here, in conſequence of which he may die; I have prepared my thoughts to this: I know that death is to all men inevitable; and whether my ſon meets this event at Pelew or elſewhere is immaterial. I am ſatisfied, from what I have obſerved of the humanity of your character, that if he is ſick you will be kind to him; and ſhould that happen, which your utmoſt care cannot prevent, let it not hinder you, or your brother, or your ſon, or any of your countrymen, returning here; I ſhall receive you, or any of your people, in friendſhip, and rejoice to ſee you again." How noble? this is the language of a king, a father, and a philoſopher, who would have been delighted to ſee his ſon with European accompliſhments. But, alas! the ſubſequent hiſtory of this amiable youth muſt force a tear from the eye of every reader whoſe heart is not callous to the genuine feelings of nature and humanity. As ſoon as they arrived at Macao, the houſe into which he firſt entered, and the different articles of furniture, fixed him in ſilent admiration; but what ſtruck his imagination moſt was the upright walls and flat ceilings of the rooms, being utterly unable to comprehend how they could be ſo formed. When he was introduced to the ladies of the family, his deportment was ſo eaſy and polite, that it could be exceeded by nothing but his abundant good nature; and at his departure, his behaviour left on the mind of every one preſent the impreſſion, that, however great the ſurpriſe might be which the ſcenes of a new world had awakened in him, it could hardly be exceeded by that which his own amiable manners and native poliſh would excite in others.

They were now conducted to the houſe of an Engliſh gentleman, who introduced them into a large hall, which was lighted up, with a table in the middle, covered for ſupper, and a ſideboard handſomely decorated. Here a new ſcene burſt at once upon Lee Boo's mind; he was all eye, all admiration. The veſſels of glaſs particularly rivetted his attention; but when he ſurveyed himſelf in a large pier glaſs at the upper end of the hall, he was in raptures with the deception. It was in truth, to him, a ſcene of magic, a fairy tale.

Soon after the people of the veſſel came on ſhore, ſome of them went to purchaſe things they were in want of; in doing which they did not forget Lee Boo, who was a favourite with them all. Among the trinkets they brought him was a ſtring of large glaſs beads, the firſt ſight of which almoſt threw them into an ecſtacy: he hugged them with a tranſport which could not have been exceeded by the intereſted poſſeſſor of a ſtring of oriental pearls. His imagination ſuggeſted to him that he held in his hand all the wealth the world could afford him. He ran with eagerneſs to Captain Wilſon to ſhow him his riches, and begged he would get him a Chineſe veſſel to carry them to the king his father, that he might ſee what the Engliſh had done for him; adding, that if the people faithfully executed their charge, he would at their return preſent them with one or two beads as a reward for their ſervices.

Having no quadrupeds at Pelew, the ſheep, goats, and other cattle, which he met with at Macao, were viewed with wonder; but ſoon after, ſeeing a man paſs the houſe on horſeback, he was ſo much aſtoniſhed, that he wanted every one to go and look at the ſtrange ſight. After the matter, however, was explained to him, he was eaſily perſuaded to get upon horſeback himſelf; and when he was informed what a noble, docile, and uſeful animal it was, he beſought the captain to ſend one to his uncle Raa Kook, as he was ſure it would be of great ſervice to him.

Omitting a number of other particulars of this kind, which excited his curioſity and ſhowed the excellent diſpoſition of his heart, we ſhall follow him to England, the country from which he was never to return. Here he had not been long before he was ſent to an academy to be inſtructed in reading and writing, which he was extremely eager to attain, and moſt aſſiduous in learning. His temper was mild and compaſſionate in the higheſt degree; but it was at all times governed by diſcretion and judgment. If he ſaw the young aſking relief, he would rebuke them with what little Engliſh he had, telling them it was a ſhame to beg when they were able to work; but the intreaties of old age he could never withſtand, ſaying, "Muſt give poor old man, old man no able to work."

He always addreſſed Mr Wilſon by the name of Captain, but never would call Mrs Wilſon by any other name than mother, looking on that as a mark of the greateſt reſpect; and ſuch was the gratitude of his heart for the kindneſs they ſhowed him, that if any of the family were ill, he always appeared unhappy, would creep ſoftly up to the chamber, and ſit ſilent by the bedſide for a long time together without moving, peeping gently from time to time between the curtains, to ſee if they ſlept or lay ſtill.

He was now proceeding with haſty ſtrides in gaining the Engliſh language, writing, and accounts, when he was overtaken by that fatal diſeaſe, the ſmall-pox, which the greateſt pains had been taken to guard him againſt; and notwithſtanding the utmoſt care and attention of his phyſician he fell a victim to this ſcourge of the human race.

Upon this trying occaſion, his ſpirit was above complaining, his throughts being all engroſſed by the kindneſs of his benefactors and friends. He told his attendant, that his father and mother would grieve very much, for they knew he was ſick. This he repeated ſeveral times, "and begged him to go to Pelew, and tell Abba Thulle that Lee Boo take much drink to make ſmall-pox go away, but he die; that the captain and mother very kind; all Engliſh very good men; much ſorry he could not ſpeak to the king the number of fine things the Engliſh had got." Then he reckoned up the preſents which had been given him, deſiring that they might be properly diſtributed among the chiefs, and requeſting that particular care might be taken of two glaſs pedeſtals, which he begged might be preſented to his father.

We have given this ſhort hiſtory of Lee Boo, becauſe it exhibits in a ſtrong light the manners of the natives of the Pelew iſlands, to which we know nothing ſimilar in the hiſtory of man from the ſavage ſtate to that of civilization. They appear to have had no communication with any other people, and were yet neither treacherous, cruel, nor cowardly. They are a ſtriking inſtance of the weakneſs of all the philoſophic theories by which mankind are uſually traced from their origin through the ſeveral ſtages of ſavagiſm, barbariſm, and civilization, down to the period of refinement, ending in effeminacy.

Since the publication of Captain Wilſon's voyage we have ſome further accounts of theſe iſlands, all confirming what we were firſt told of the gentleneſs of the people. Two armed ſhips were, by order of the court of directors, fitted out at Bombay in 1790, for the purpoſe of ſurveying the iſlands of Pelew, and furniſhing the natives with domeſtic animals, and ſuch other things as might add to the comforts of life. Among the preſents to the king were ſwords and other European implements of war; of which it is at leaſt poſſible that he and his people might have been equally happy had they remained for ever in total ignorance. The foundation of a fort was likewiſe laid on one of the iſlands, and poſſeſſion of it taken in the name of the Engliſh; we truſt with no remote view of enſlaving the people, or of driving them from their native country. It has been likewiſe announced in a late publication, that Captain M'Clue, who commanded the armed ſhips, was ſo delighted with the manners of the king and his ſubjects, that he has reſolved to paſs the remainder of his days on thoſe iſlands at the early age of 34; and we hope he will prove a father to the people.

PELIAS (fab. hiſt.) twin-brother of Neleus, was ſon of Neptune by Tyro, daughter of Salmoneus. His birth was concealed by his mother, who wiſhed her father to be ignorant of her incontinence. He was expoſed in the woods, but his life was preſerved by ſhepherds; and he received the name of *Pelias*, from a ſpot of the colour of *lead* in his face. Some time after Tyro married Cretheus, ſon of Æolus, king of Iolchos, and became mother of three children, of whom Æſon was the eldeſt. Pelias viſited his mother, and was received in her family; and after the death of Cretheus, he unjuſtly ſeized the kingdom, which belonged not to him, but to the children of Tyro by the deceaſed king. To ſtrengthen himſelf in his uſurpation, Pelias conſulted the oracle; and when he was told to beware of one of the deſcendants of Æolus, who ſhould come to his court with one foot ſhod and the other bare, he privately removed the ſon of Æſon, after he had openly declared that he was dead. Theſe precautions proved vain. Jaſon, the ſon of Æſon, who had been educated by Chiron, returned to Iolchos, when come to years of maturity; and having loſt one of his ſhoes in croſſing the river Anaurus or the Evenus, Pelias immediately perceived that this was the perſon whom he had ſo much dreaded. His unpopularity prevented him from acting with violence to a ſtranger, whoſe uncommon dreſs and commanding aſpect had raiſed admiration in the people. But his aſtoniſhment was greatly excited, when he ſaw Jaſon arrive at his palace, with his friends and his relations, and boldly demand the kingdom which he had uſurped. Pelias, conſcious that his complaints were well founded, endeavoured to divert his attention, and told him that he would voluntarily reſign the crown to him, if he went to Colchis to avenge the death of Phryxus, the ſon of Athamas, whom Æetes had cruelly murdered. He further declared, that the expedition would be attended with the greateſt glory, and that nothing but the infirmities of old age had prevented himſelf from vindicating the honour of his country, and the injuries of his family, by puniſhing the aſſaſſin. This ſo warmly recommended, was with equal warmth accepted by the young hero, and his intended expedition was made known all over Greece. While Jaſon was abſent in the Argonautic expedition, Pelias murdered Æſon and all his family; but, according to the more received opinion of Ovid, Æſon was ſtill living when the Argonauts returned, and he was reſtored to the flower of youth by the magic of Medea. This change in the vigour and the conſtitution of Æſon aſtoniſhed all the inhabitants of Iolchos; and the daughters of Pelias, who have received the patronymic of Peliades, expreſſed their deſire to ſee their father's infirmities vaniſh by the ſame powerful magic. Medea, who wiſhed to avenge the injuries which her huſband Jaſon had received from Pelias, raiſed the deſires of the Peliades, by cutting an old ram to pieces, and boiling the fleſh in a cauldron, and then turning it into a fine young lamb. After they had ſeen this ſucceſsful experiment, the Peliades cut their father's body to pieces, after they had drawn all the blood from his veins, on the aſſurance that Medea would repleniſh them by her wonderful power. The limbs were immediately put into a cauldron of boiling water; but Medea ſuffered the fleſh to be totally conſumed, and refuſed to give the promiſed aſſiſtance, and the bones of Pelias did not even receive a burial. The Peliades were four in number, Alceſte, Piſidice, Pelopea, and Hippothoe, to whom Hyginus adds Meduſa. Their mother's name was Anaxibia, the daughter of Bias or Philomache, the daughter of Amphion. After this parricide, the Peliades fled to the court of Admetus, where Acaſtus, the ſon-in-law of Pelias, purſued them, and took their protector priſoner. The Peliades died, and were buried in Arcadia.

PELICAN, in ornithology. See PELICANUS.

PELICAN, in chemiſtry, is a glaſs alembic conſiſting of one piece. It has a tubulated capital, from which two oppoſite and crooked beaks paſs out and enter again at the belly of the cucurbit. This veſſel has been contrived for a continued diſtillation and cohobation, which chemiſts call *circulation*. The volatile parts of ſubſtances put into this veſſel riſe into the capital, and are obliged to return through the crooked beaks into the cucurbit; and this without interruption, or luting and unluting the veſſels.

Although the pelican ſeems to be a very convenient inſtrument, it is nevertheleſs little uſed, and even much neglected at preſent; either becauſe the modern chemiſts have not ſo much patience as the ancient chemiſts had for making long experiments; or becauſe they find that two matreſſes, the mouth of one of which is inſerted into the mouth of the other, produce the ſame effect.

PELICANUS, in ornithology, a genus belonging to the order of anſeres. The bill is ſtraight, without teeth, and crooked at the point; the face is naked, and the feet are palmated. Mr Latham enumerates no leſs than 30 different ſpecies of this genus, beſides varieties. The moſt remarkable ſeem to be theſe that follow:

1. The carbo, or corvorant, ſometimes exceeds ſeven pounds in weight; the length three feet four; the extent four feet two; the bill duſky, five inches long, deſtitute of noſtrils; the baſe of the lower mandible is covered with a naked yellow ſkin, that extends under the chin, and forms a ſort of pouch; a looſe ſkin of the ſame colour reaches from the upper mandible round the eyes and angles of the mouth; the head and neck are of a ſooty blackneſs, but under the chin of the male the feathers are white; and the head in that ſex is adorned with a ſhort, looſe, pendant creſt; in ſome the creſt and hind-part of the head are ſtreaked with white. The coverts of the wings, the ſcapulars, and the back, are of a deep green, edged with black, and gloſſed with blue; the quill-feathers and tail duſky; the legs are ſhort, ſtrong, and black; the middle claw ſerrated on the inſide; the irides are of a light aſh-colour.

Theſe birds occupy the higheſt parts of the cliffs that impend over the ſea: they make their neſts of ſticks, ſea-tang, graſs, &c. and lay ſix or ſeven white eggs of an oblong form. In winter they diſperſe along the ſhores, and viſit the freſh waters, where they make great havoc among the fiſh. They are remarkably voracious, having a moſt ſudden digeſtion, promoted by the infinite quantity of ſmall worms that fill their inteſtines. The corvorant has the rankeſt and moſt diſagreeable ſmell of any bird, even when alive. Its form is diſagreeable; its voice hoarſe and croaking, and its qualities baſe. Theſe birds, however, have been trained to fiſh, like falcons to fowl. Whitelock tells us, that he had a caſt of them manned like hawks, and which would come to hand. He took much pleaſure in them; and relates, that the beſt he had was one preſented him by Mr Wood, maſter of the corvorants to Charles I. It is well known that the Chineſe make great uſe of theſe birds, or a congenerous ſort, in fiſhing; and that not for amuſement, but profit.

2. The graculus, or ſhag, called in the north of England the *crane*, is much inferior in ſize to the corvorant: the length is 27 inches; the breadth three feet ſix; the weight three pounds three quarters. The bill is four inches long, and more ſlender than that of the preceding: the head is adorned with a creſt two inches long, pointing backward; the whole plumage of the upper part of this bird is of a fine and very ſhining green; the edge of the feathers a purpliſh black; but the lower part of the back, the head, and neck, wholly green; the belly is duſky; the tail of a duſky hue, tinged with green; the legs are black, and like thoſe of the corvorant.

Both theſe kinds agree in their manners, and breed in the ſame places; and, what is very ſtrange in web-footed birds, will perch and build in trees: both ſwim with their head quite erect, and are very difficult to be ſhot; for, like the grebes and divers, as ſoon as they ſee the flaſh of the gun, they pop under water, and never riſe but at a conſiderable diſtance.

3. The baſſanus, gannet, or ſolan gooſe, weighs ſeven pounds; the length is three feet one inch; the breadth ſix feet two inches. The bill is ſix inches long, ſtraight almoſt to the point, where it inclines down; and the ſides are irregularly jagged, that it may hold its prey with more ſecurity: about an inch from the baſe of the upper mandible is a ſharp proceſs pointing forward; it has no noſtrils; but in their place a long furrow, that reaches almoſt to the end of the bill: the whole is of a dirty white, tinged with aſh-colour. The tongue is very ſmall, and placed low in the mouth; a naked ſkin of a fine blue ſurrounds the eyes, which are of a pale yellow, and are full of vivacity; this bird is remarkable for the quickneſs of its ſight. Martin tells us, that *ſolan* is derived from an Iriſh word expreſſive of that quality.

From the corner of the mouth is a narrow ſlip of black bare ſkin, that extends to the hind-part of the head; beneath the chin is another, that, like the pouch of the pelican, is dilatable, and of ſize ſufficient to contain five or ſix entire herrings; which in the breeding ſeaſon it carries at once to its mate or young.

The young birds, during the firſt year, differ greatly in colour from the old ones; being of a duſky hue, ſpeckled with numerous triangular white ſpots; and at that time reſemble in colours the ſpeckled diver. Each bird, if left undiſturbed, would only lay one egg in the year; but if that be taken away, they will lay another; if that is alſo taken then a third; but never more that ſeaſon. Their egg is white, and rather leſs than that of the common gooſe; the neſt is large, and formed of any thing the bird finds floating on the water, ſuch as graſs, ſea-plants, ſhavings, &c. Theſe birds frequent the Iſle of Ailſa, in the Frith of Clyde; the rocks adjacent to St Kilda; the Stalks of Souliſkerry, near the Orkneys; the Skelig Iſles, off the coaſts of Kerry, Ireland; and the Baſs Iſle, in the Frith of Edinburgh: the multitudes that inhabit theſe places are prodigious. Dr Harvey's elegant account of the latter, will ſerve to give ſome idea of the numbers of theſe, and of the other birds that annually migrate to that little ſpot.

“ There is a ſmall iſland, called by the Scotch *Baſs Iſland*, not more than a mile in circumference; the ſurface is almoſt wholly covered during the months of May and June with neſts, eggs, and young birds; ſo that it is ſcarcely poſſible to walk without treading on them: and the flocks of birds in flight are ſo prodigious as to darken the air like clouds; and their noiſe is ſuch, that you cannot without difficulty hear your next neighbour's voice. If you look down upon the ſea from the top of the precipice, you will ſee it on every ſide covered with infinite numbers of birds of different kinds, ſwimming and hunting for their prey:

if in ſailing round the iſland you ſurvey the hanging cliffs, you may ſee in every cragg or fiſſure of the broken rocks innumerable birds of various ſorts and ſizes, more than the ſtars of heaven when viewed in a ſerene night: if from afar you ſee the diſtant flocks, either flying to or from the iſland, you would imagine them to be a vaſt ſwarm of bees."

Nor do the rocks of St Kilda ſeem to be leſs frequented by theſe birds; for Martin aſſures us, that the inhabitants of that ſmall iſland conſume annually no leſs than 22,600 young birds of this ſpecies, beſides an amazing quantity of their eggs, theſe being their principal ſupport throughout the year: they preſerve both eggs and fowls in pyramidal ſtone-buildings, covering them with turf-aſhes to preſerve them from moiſture. This is a dear-bought food, earned at the hazard of their lives, either by climbing the moſt difficult and narrow paths, where (to appearance) they can barely cling, and that too at an amazing height over the raging ſea; or elſe, being lowered down from above, they collect their annual proviſion, thus hanging in midway air; placing their whole dependence on the uncertain footing of one perſon, who holds the rope by which they are ſuſpended at the top of the precipice. The young birds are a favourite diſh with the North Britons in general; during the ſeaſon, they are conſtantly brought from the Baſs Iſle to Edinburgh, ſold at 20 d. a piece, are roaſted, and ſerved up a little before dinner as a whet.

Mr Macaulay, miſſionary from the general aſſembly to St Kilda, gives the following account of them in that iſland: "Theſe rocks are in ſummer totally covered with ſolan geeſe and other fowls, and appear at a diſtance like ſo many mountains covered with ſnow. The neſts of the ſolan geeſe, not to mention thoſe of other fowls, are ſo cloſe, that when one walks between them, the hatching fowls on either ſide can always take hold of one's cloths; and they will often ſit until they are attacked, rather than expoſe their eggs to the danger of being deſtroyed by the ſea-gulls; at the ſame time, an equal number fly about, and furniſh food for their mates that are employed in hatching; and there are, beſides, large flocks of barren fowls of the different tribes that frequent the rocks of St Kilda.

"The ſolan geeſe equal almoſt the tame ones in ſize. The common amuſement of the herring-fiſhers ſhow the great ſtrength of this fowl. The fiſhers fix a herring upon a board which has a ſmall weight under it, to ſink it a little below the ſurface of the ſea: the ſolan gooſe, obſerving the fiſh, darts down upon it perpendicularly, and with ſo much force, that he runs his bill irrecoverably through the board, and is taken up directly by the fiſhers.

"The ſolan geeſe repair to St Kilda in the month of March, and continue there till after the beginning of November. Before the middle of that month they, and all the other ſea-fowls that are fond of this coaſt, retire much about the ſame time into ſome other favourite regions; ſo that not a ſingle fowl belonging to their element is to be ſeen about St Kilda from the beginning of winter down to the middle of February. Before the young ſolan geeſe fly off, they are larger than their mothers, and the fat on their breaſts is ſometimes three inches deep, Into what quarter of the world theſe tribes of wild fowl repair, after winter ſets in, whether into the northern ocean, the native country and winter quarters of herrings in general, or into ſome other region near the ſun, or whether they be of the ſleeping kind, they who pry into the myſteries of natural hiſtory, or have converſed much with writers of voyages, can beſt explain (A). I ſhall only pretend to ſay, that theſe different nations of the feathered kind

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(A) The continuance of theſe birds, is longer or ſhorter in the iſlands according as the inhabitants take or leave their firſt egg; but, in general, the time of breeding, and that of their departure, ſeems to coincide with the arrival of the herring, and the migration of that fiſh (which is their principal food) out of thoſe ſeas. It is probable therefore that theſe birds attend the herring and pilchard during their whole circuit round the Britiſh iſlands; the appearance of the former being always eſteemed by the fiſhermen as a ſure preſage of the approach of the latter. It migrates, we are told, in queſt of food as far ſouth as the mouth of the Tagus, being frequently ſeen off Liſbon during the month of September, or, as ſome ſay, December. Of the extenſive migrations of this ſpecies we have the following more particular account in Pennant's Arctic Zoology: "It inhabits the coaſt of Newfoundland, where it breeds, and migrates ſouthward as far as South Carolina. In Europe, it is common on the coaſt of Norway and Iceland; but as it never voluntarily flies over land, is not ſeen in the Baltic. It wanders for food as far as the coaſt of Liſbon and Gibraltar, where it has been ſeen in December, plunging for ſardinæ. Straggles as high as Greenland. In northern Aſia, it has been once ſeen by Steller off Bering's iſle; but has been frequently met with in the ſouthern hemiſphere, in the Pacific Ocean; particularly in numbers about New Zealand and New Holland. Captain Cook alſo ſaw them in his paſſage from England to the Cape of Good hope, and remoter from land than they had been ſeen elſewhere. Among thoſe obſerved in the South Sea, is the variety called *ſula*, with a few black feathers in the tail and among the ſecondaries. They are found not only on the Feroe iſlands, but on our coaſts, one having been brought to me a few years ago which had fallen down wearied with its flight." In the month of Auguſt, the ſame accurate naturaliſt has obſerved in Caithneſs their northern migrations; he has ſeen them paſſing the whole day in flocks, from five to fifteen in each: in calm weather they fly high; in ſtorms they fly low, and near the ſhore; but never croſs over the land, even when a bay with promontories intervenes, but follow, at an equal diſtance, the courſe of the bay, and regularly double every cape. Many of the parties made a ſort of halt for the ſake of fiſhing: they ſoared to a vaſt height, then darting headlong into the ſea, made the water foam and ſpring up with the violence of their deſcent, after which they purſued their route. Our author inquired whether they ever were obſerved to return ſouthward in the ſpring, but was anſwered in the negative; ſo it appears that they annually encircle the whole iſland.

kind are taught to chooſe the propereſt habitations and feeding places, and to ſhift their quarters ſeaſonably, by the unerring hand of God.

"From the account given above of the multitudes of ſea-fowls that ſeek their food on this coaſt, we may juſtly conclude that there muſt be inexhauſtible ſtores of fiſh there. Let us for a moment confine our attention to the conſumption made by a ſingle ſpecies of fowls. The ſolan gooſe is almoſt inſatiably voracious; he flies with great force and velocity, toils all the day with very little intermiſſion, and digeſts his food in a very ſhort time; he diſdains to eat any thing worſe than herring or mackarel, unleſs it be in a very hungry place, which he takes care to avoid or abandon. We ſhall take it for granted that there are 100,000 of that kind around the rocks of St Kilda; and this calculation is by far too moderate, as no leſs than 20,000 of this kind are deſtroyed every year, including the young ones. We ſhall ſuppoſe, at the ſame time, that the ſolan geeſe ſojourn in theſe ſeas for about ſeven months of the year; that each of them deſtroys five herrings in a day; a ſubſiſtence infinitely poor for ſo greedy a creature, unleſs it were more than half ſupported at the expence of other fiſhes. Here we have 100,000,000 of the fineſt fiſh in the world devoured annually by a ſingle ſpecies of the St Kilda ſea-fowls.

"If, in the next place, it be conſidered, that much the greateſt part of the other tribes have much the ſame appetite for herring, and purſue it from place to place, in the ſeveral migrations it makes from one ſea to another, the conſumption muſt be prodigiouſly great. Taking theſe into the account, and allowing them the ſame quantity of food, and of the ſame kind, by reaſon of their vaſt ſuperiority in point of numbers, tho' their ſtomachs are conſiderably weaker; we ſee there are no leſs than 200,000,000 of herrings ſwallowed up every year by the birds of a very ſmall diſtrict of rocks, which occupy ſo inconſiderable a ſpace in the Deucaledonian ocean.

"Should all the articles of this account be ſuſtained, articles which ſeem no leſs juſt than plain, and ſhould our curioſity lead us into a new calculation, allowing between 600 and 700 to every barrel, it is evident that more than 330,000 barrels are annually carried away by ſuch creatures."

Theſe birds are well known on moſt of the coaſts of England, but not by the name of the *Solan gooſe*. In Cornwall and in Ireland they are called *gannets*; by the Welſh, *gan*. Mr Ray ſuppoſed the Corniſh gannet to be a ſpecies of large gull: a very excuſable miſtake; for during his ſix months reſidence in Cornwall, he never had an opportunity of ſeeing that bird, except flying; and in the air it has the appearance of a gull. On that ſuppoſition he gave our ſkua the title of *cataracta*, a name borrowed from Ariſtotle, and which admirably expreſſes the rapid deſcent of this bird on its prey. Mr Moyle firſt detected this miſtake; and the Rev. Dr William Borlaſe, by preſenting us with a fine ſpecimen of this bird, confirms the opinion of Mr Moyle; at the ſame time giving the following natural hiſtory of the bird.

"The gannet comes on the coaſts of Cornwall in the latter end of ſummer, or beginning of autumn; hovering over the ſhoals of pilchards that come down to us through St George's Channel from the northern ſea. The gannet ſeldom comes near the land, but is conſtant to its prey, a ſure ſign to the fiſhermen that the pilchards are on the coaſts; and when the pilchards retire, generally about the end of November, the gannets are ſeen no more. The bird now ſent was killed at Chandour, near Mountſbay, Sept. 30. 1762, after a long ſtruggle with a water-ſpaniel, aſſiſted by the boatmen; for it was ſtrong and pugnacious. The perſon who took it obſerved that it had a tranſparent membrane under the eye-lid, with which it covered at pleaſure the whole eye, without obſcuring the ſight or ſhutting the eye lid; a gracious proviſion for the ſecurity of the eyes of ſo weighty a creature, whoſe method of taking its prey is by darting headlong on it from a height of 150 feet or more into the water. About four years ago, one of theſe birds flying over Penzance, (a thing that rarely happens), and ſeeing ſome pilchards lie on a fir-plank, in a cellar uſed for curing fiſh, darting itſelf down with ſuch violence, that it ſtruck its bill quite through the board (about an inch and a quarter thick), and broke its neck."

Theſe birds are ſometimes taken at ſea by a deception of the like kind; the fiſhermen faſtening a pilchard to a board, as in St Kilda they faſten herrings, and which in the ſame manner decoys the unwary gannet to its own deſtruction.

In the *Cataracta* of Juba may be found many characters of this bird: he ſays, that the bill is toothed; that its eyes are fiery; and that its colour is white: and in the very name is expreſſed its furious deſcent on its prey. The reſt of his accounts ſavour of fable. —We are uncertain whether the gannet breeds in any other parts of Europe beſides our own iſlands; except, as Mr Ray ſuſpects, the ſula (deſcribed in Cluſius's Exotics, which breeds in Feroe Iſles) be the ſame bird.

4. The ſula, or booby, is ſomewhat leſs than a gooſe; the baſis of the bill yellow, and bare of feathers; the eyes of a light-grey colour; the lower part of the bill of a light brown. The colours of the body are brown and white; but varied ſo in different individuals, that they cannot be deſcribed by them. Their wings are very long; their legs and feet pale yellow, ſhaped like thoſe of corvorants. They frequent the Bahama iſlands, where they breed all months in the year, laying one, two, or three eggs, on the bare rock. While young, they are covered with a white down, and continue ſo till they are almoſt ready to fly. They feed on fiſh like the reſt of this genus; but have a very troubleſome enemy of the man-of-war bird which lives on the ſpoils obtained from other ſea-birds, particularly the booby. As ſoon as this rapacious enemy perceives that the booby has taken a fiſh, he flies furiouſly at him, upon which the former dives to avoid the blow; but as he cannot ſwallow his prey below water, he is ſoon obliged to come up again with the fiſh in his bill as before, when he ſuffers a new aſſault; nor does his enemy ceaſe to perſecute him till he lets go the fiſh, which the other immediately carries off.

5. The great booby, called by Linnæus *pelicani Balſani puſſus*, frequents the rivers and ſea-coaſts of Florida, purſuing and devouring fiſhes like others of the genus. Mr Catſbey informs us, that he has ſeveral

Pelicanus.

veral times found them diſabled, and ſometimes dead, on the ſhore: whence he thinks that they meet with ſharks or other voracious fiſhes, which deſtroy them. The bird is about the ſize of a gooſe, the head and neck remarkably prominent; the back of a brown colour; the belly duſky white; the feet black, and ſhaped like thoſe of a corvorant; the head elegantly ſpotted with white; the wings extend ſix feet when ſpread. Both this ſpecies and the laſt have a joint in the upper mandible of the bill, by which they can raiſe it conſiderably from the lower one without opening the mouth.

Latham's Synopſis of Birds.

6. The aquilus, or man-of-war bird, is in the body about the ſize of a large fowl; in length three feet, and in breadth 14. The bill is ſlender, five inches long, and much curved at the point; the colour is duſky; from the baſe a reddiſh dark coloured ſkin ſpreads on each ſide of the head, taking in the eyes: from the under mandible hangs a large membranaceous bag attached ſome way down the throat, as in the pelican, and applied to the ſame uſes; the colour of this is a fine deep red, ſprinkled on the ſides with a few ſcattered feathers; the whole plumage is browniſh-black, except the wing coverts, which have a rufous tinge: the tail is long, and much forked; the outer feathers are 18 inches or more in length; the middle ones from ſeven to eight: the legs are ſmall, all the toes are webbed together, and the webs are deeply indented; the colour of them is duſky red.

The female differs in wanting the membranaceous pouch under the chin; and in having the belly white: in other things is greatly like the male.

The frigate pelican, or man-of-war bird (B), as it is by ſome called, is chiefly, if not wholly, met with between the tropics, and ever out at ſea, being only ſeen on the wing. It is uſual with other birds, when fatigued with flying, to reſt themſelves on the ſurface of the water; but nature, from the exceeding length of wing ordained to this, has made the riſing therefrom utterly impoſſible, at leaſt writers not only ſo inform us, but every one whom we have talked with avers the ſame: though perhaps this is no defect of nature, as it ſcarcely ſeems to require much reſt: at leaſt, from the length of wing, and its apparent eaſy gliding motion (much like that of the kite), it appears capable of ſuſtaining very long flights; for it is often ſeen above 100, and not unfrequently above 200, leagues from land. It has indeed been known to ſettle on the maſts of ſhips; but this is not a frequent circumſtance, though it will often approach near, and hover about the top-maſt flag. Sometimes it ſoars ſo high in the air as to be ſcarcely viſible, yet at other times approaches the ſurface of the ſea, where, hovering at ſome diſtance, the moment it ſpies a fiſh, it darts down on it with the utmoſt rapidity, and ſeldom without ſucceſs, flying upwards again as quick as it deſcended. It is alſo ſeen to attack* gulls and other birds which have caught a fiſh, when it obliges them to diſgorge it, and then takes care to ſeize it before it falls into the water. It is an enemy to the flying-fiſh; for, on their being attacked beneath by the dolphin and other voracious fiſh, to eſcape their jaws, theſe ſemi-volatiles leap out of the water in cluſters, making uſe of their long fins as wings to buoy them up in the air, which they are enabled to do as long as they remain wet; but the moment they become dry are uſeleſs, and drop into their proper element again: during their flight, the frigate darts in among the ſhoal, and ſeizes one or two at leaſt. Theſe birds know the exact place where the fiſh are to riſe from the bubbling of the water, which directs them to the ſpot; in this they are accompanied by gulls and other birds, who act in concert with them.

* See the account of the ſula or booby ſpecies above.

Theſe birds, which, though not uncommon everywhere within the tropics, yet are leſs frequent in ſome places than others, were ſeen by Cook in 30½ deg. In the old route of navigators, they are mentioned frequently as being met with at Aſcenſion Iſland, Ceylon, Eaſt Indies, and China (c). Dampier ſaw them in great plenty in the iſland of Aves in the Weſt Indies. Our later navigators talk of them as frequenting various places of the South Sea, about the Marqueſas, Eaſter Iſles, and New Caledonia, alſo at Otaheitee, though at this laſt place not in ſuch plenty as in many others. They are ſaid to make neſts on trees, if there be any within a proper diſtance; otherwiſe on the rocks. They lay one or two eggs of a fleſh colour, marked with crimſon ſpots. The young birds are covered with greyiſh white down: the legs are of the ſame colour, and the bill is white. There is a variety of this ſpecies, which is leſs, meaſuring only two feet nine inches in length; the extent from wing to wing is five feet and a half. The bill is five inches long, and red; the baſe of it, and bare ſpace round the eye, are of the ſame colour; the noſtrils are ſufficiently apparent, and appear near the baſe; the ſhape of the bill is as in the larger one: the head, hind part of the neck, and upper parts of the body and wings, are ferruginous brown; the throat, fore part of the neck, and breaſt, are white; the tail is greatly forked as in the other; the legs are of a dirty yellow.

Pelicanus.

"In my collection (ſays Latham) is a bird very ſimilar to this, if not the ſame: general colour of the plumage full black; breaſt and belly mottled with aſh-colour; the inner ridge of the wing the ſame; the bill has the long furrow, as is ſeen in the greater one; but the noſtrils are ſufficiently apparent, being about half an inch in length, rather broader at that part near the baſe. This has a large red pouch at the chin and throat, as in the former ſpecies. It is moſt likely that mine is the male bird, as others, ſuſpected to be of the oppoſite ſex, have little or no traces of the jugular pouch. This ſuppoſition ſeems juſtified from a pair in the Hunterian muſeum, in both of which the plumage is wholly black; the one has a large pouch, the other

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(B) It is alſo called *tailleur*, or tailor, by the French, from the motion of its tail repreſenting a pair of ſhears when opened; and when on the wing, it opens and ſhuts them frequently, in the manner of uſing that inſtrument.—*Ulloa, Voy.* ii. p. 304.

(c) Thought by Oſbeck to be one of the ſorts of birds uſed in fiſhing by the Chineſe.

other deſtitute of it. Some have ſuppoſed that the greater and leſſer frigates are the ſame bird, in different periods of age."

7. The onocratalus, or pelican of Aſia, Africa, and America; though Linnæus thinks that the pelican of America may poſſibly be a diſtinct variety. This creature, in Africa, is much larger in the body than a ſwan, and ſomewhat of the ſame ſhape and colour. Its four toes are all webbed together; and its neck in ſome meaſure reſembles that of a ſwan: but that ſingularity in which it differs from all other birds is in the bill and the great pouch underneath. This enormous bill is 15 inches from the point to the opening of the mouth, which is a good way back behind the eyes. At the baſe the bill is ſomewhat greeniſh, but varies towards the end, being of a reddiſh blue. It is very thick in the beginning, but tapers off to the end, where it hooks downwards. The under chap is ſtill more extraordinary; for to the lower edges of it hang a bag, reaching the whole length of the bill to the neck, which is ſaid to be capable of containing 15 quarts of water. This bag the bird has a power of wrinkling up into the hollow of the under-chap; but by opening the bill, and putting one's hand down into the bag, it may be diſtended at pleaſure. The ſkin of which it is formed will then be ſeen of a bluiſh aſh colour, with many fibres and veins running over its ſurface. It is not covered with feathers, but with a ſhort downy ſubſtance as ſmooth and as ſoft as ſattin, and is attached all along to the under edges of the chap, is fixed backward to the neck of the bird by proper ligaments, and reaches near half way down. When this bag is empty, it is not ſeen; but when the bird has fiſhed with ſucceſs, it is then incredible to what an extent it is often ſeen dilated. For the firſt thing the pelican does in fiſhing is to fill up the bag; and then it returns to digeſt its burden at leiſure. When the bill is opened to its wideſt extent, a perſon may run his head into the bird's mouth, and conceal it in this monſtrous pouch, thus adapted for very ſingular purpoſes. Yet this is nothing to what Ruyſch aſſures us, who avers that a man has been ſeen to hide his whole leg, boot and all, in the monſtrous jaws of one of theſe animals. At firſt appearance this would ſeem impoſſible, as the ſides of the under chap, from which the bag depends, are not above an inch aſunder when the bird's bill is firſt opened, but then they are capable of great ſeparation; and it muſt neceſſarily be ſo, as the bird preys upon large fiſhes, and hides them by dozens in its pouch. Tertre affirms, that it will hide as many fiſh as will ſerve 60 hungry men for a meal.

Plate CCCLXXXI.

This pelican was once alſo known in Europe, particularly in Ruſſia; but it ſeems to have deſerted thoſe coaſts. This is the bird of which ſo many fabulous accounts have been propagated; ſuch as its feeding its young with its own blood, and its carrying a proviſion of water for them in its great reſervoir in the deſert. But the abſurdity of the firſt account anſwers itſelf; and as for the latter, the pelican uſes its bag for very different purpoſes than that of filling it with water.

Clavigero, in his Hiſtory of Mexico, ſays that "there are two ſpecies, or rather varieties, of this bird in Mexico; the one having a ſmooth bill, the other a notched one. Although the Europeans are acquainted with this bird, I do not know whether they are equally well acquainted with the ſingular circumſtance of its aſſiſting the ſick or hurt of its own ſpecies; a circumſtance which the Americans ſometimes take advantage of to procure fiſh without trouble. They take a live pelican, break its wing, and after tying it to a tree, conceal themſelves in the neighbourhood; there they watch the coming of the other pelicans with their proviſions, and as ſoon as they ſee theſe throw up the fiſh from their pouch, run in, and after leaving a little for the captive bird, they carry off the reſt."

This amazing pouch may be conſidered as analogous to the crop in other birds; with this difference, that as theirs lie at the bottom of the gullet, ſo this is placed at the top. Thus, as pigeons and other birds macerate their food for their young in their crops, and then ſupply them; ſo the pelican ſupplies its young by a more ready contrivance, and macerates their food in its bill, or ſtores it for its own particular ſuſtenance.

The ancients were particularly fond of giving this bird admirable qualities and parental affections: ſtruck, perhaps, with its extraordinary figure, they were willing to ſupply it with as extraordinary appetites; and having found it with a large reſervoir, they were pleaſed with turning it to the moſt tender and parental uſes. But the truth is, the pelican is a very heavy, ſluggiſh, voracious bird, and very ill fitted to take thoſe flights, or to make thoſe cautious proviſions for a diſtant time, which we have been told they do.

The pelican, ſays Labat, has ſtrong wings, furniſhed with thick plumage of an aſh-colour, as are the reſt of the feathers over the whole body. Its eyes are very ſmall, when compared with the ſize of its head; there is a ſadneſs in its countenance, and its whole air is melancholy. It is as dull and reluctant in its motions as the flamingo is ſprightly and active. It is ſlow of flight; and when it riſes to fly, performs it with difficulty and labour. Nothing, as it would ſeem, but the ſpur of neceſſity, could make theſe birds change their ſituation, or induce them to aſcend into the air: but they muſt either ſtarve or fly.

They are torpid and inactive to the laſt degree, ſo that nothing can exceed their indolence but their gluttony; it is only from the ſtimulations of hunger that they are excited to labour; for otherwiſe they would continue always in fixed repoſe. When they have raiſed themſelves about 30 or 40 feet above the ſurface of the ſea, they turn their head with one eye downwards, and continue to fly in that poſture. As ſoon as they perceive a fiſh ſufficiently near the ſurface, they dart down upon it with the ſwiftneſs of an arrow, ſeize it with unerring certainty, and ſtore it up in their pouch. They then riſe again, though not without great labour, and continue hovering and fiſhing, with their head on one ſide as before.

This work they continue with great effort and induſtry till their bag is full, and then they fly to land to devour and digeſt at leiſure the fruits of their induſtry. This, however, it would appear, they are not long in performing; for towards night they have another hungry call, and they again reluctantly go to labour. At night, when their fiſhing is over, and the toil of the day crowned with ſucceſs, theſe lazy birds retire a little way from the ſhore; and, though with the webbed feet and clumſy figure of a gooſe, they will be contented to perch no where but upon trees among the light and airy tenants of the foreſt. There they take their repoſe for the night; and often ſpend a great part of the day, except ſuch times as they are fiſhing, ſitting in diſmal ſolemnity, and as it would ſeem, half aſleep. Their attitude is with the head reſting upon their great bag, and that reſting upon their breaſt. There they remain without motion, or once changing their ſituation, till the calls of hunger break their repoſe, and till they find it indiſpenſably neceſſary to fill their magazine for a freſh meal. Thus their life is ſpent between ſleeping and eating; and our author adds, that they are as foul as they are voracious, as they are every moment voiding excrements in heaps as large as one's fiſt.

The ſame indolent habits ſeem to attend them even in preparing for incubation, and defending their young when excluded. The female makes no preparation for her neſt, nor ſeems to chooſe any place in preference to lay in; but drops her eggs on the bare ground, to the number of five or ſix, and there continues to hatch them. Attached to the place, without any deſire of defending her eggs or her young, ſhe tamely ſits and ſuffers them to be taken from under her. Now and then ſhe juſt ventures to peck, or to cry out when a perſon offers to beat her off.

She feeds her young with fiſh macerated for ſome time in her bag; and when they cry, flies off for a new ſupply. Labat, tells us, that he took two of theſe when very young, and tied them by the leg to a poſt ſtuck into the ground, where he had the pleaſure of ſeeing the old one for ſeveral days come to feed them, remaining with them the greateſt part of the day, and ſpending the night on the branch of a tree that hung over them. By theſe means they were all three become ſo familiar, that they ſuffered themſelves to be handled; and the young ones very kindly accepted whatever fiſh he offered them. Theſe they always put firſt into their bag, and then ſwallowed at their leiſure.

It ſeems, however, that they are but diſagreeable and uſeleſs domeſtics; their gluttony can ſcarcely be ſatisfied; their fleſh ſmells very rancid, and taſtes a thouſand times worſe than it ſmells. The native Americans kill vaſt numbers; not to eat, for they are not fit even for the banquet of a ſavage, but to convert their large bags into purſes and tobacco-pouches. They beſtow no ſmall pains in dreſſing the ſkin with ſalt and aſhes, rubbing it well with oil, and then forming it to their purpoſe. It thus becomes ſo ſoft and pliant, that the Spaniſh women ſometimes adorn it with gold and embroidery to make work-bags of.

Yet, with all the ſeeming hebetude of this bird, it is not entirely incapable of inſtruction in a domeſtic ſtate. Father Raymond aſſures us, that he has ſeen one ſo tame and well educated among the native Americans, that it would go off in the morning at the word of command, and return before night to its maſter, with its great pouch diſtended with plunder; a part of which the ſavages would make it diſgorge, and a part they would permit it to reſerve for itſelf.

"The pelican," as Faber relates, "is not deſtitute of other qualifications. One of thoſe which was brought alive to the duke of Bavaria's court, where it lived 40 years, ſeemed to be poſſeſſed of very uncommon ſenſations. It was much delighted in the company and converſation of men, and in muſic both vocal and inſtrumental; for it would willingly ſtand," ſays he, "by thoſe that ſung or ſounded the trumpet; and ſtretching out its head, and turning its ear to the muſic, liſtened very attentively to its harmony, though its own voice was little pleaſanter than the braying of an aſs." Geſner tells us, that the emperor Maximilian had a tame pelican which lived for above 80 years, and that always attended his army on their march. It was one of the largeſt of the kind, and had a daily allowance by the emperor's orders. As another proof of the great age to which the pelican lives, Aldrovandus makes mention of one of theſe birds that was kept ſeveral years at Mechlin, and was verily believed to be 50 years old.—We often ſee theſe birds at our ſhows about town.

Mr Edwards, in his Hiſtory of Birds, deſcribes the pelican of America from one, the body of which was ſent him ſtuffed and dried. From the point of the bill to the angles of the mouth meaſured 13 inches, and the wing when cloſed meaſured 18 inches. The pouch when dry appeared of the conſiſtance and colour of a brown dry ox's bladder, having fibres running its whole length, and blood veſſels croſſing them; and proceeding from the ſides of the lower part of the bill, which opened into this pouch, its whole length. The greater bone of the wing being broken, was found to be light, hollow, void of marrow, and the ſides of it thin as parchment. Sir Hans Sloane writes thus of it (ſee *Nat. Hiſt. of Jamaica*, vol. ii. p. 322.); "This ſeems to be the ſame with the white pelican, only of a darker colour. They are frequent in all the ſeas of the hot Weſt Indies. They fiſh after the ſame manner as man-of-war birds, and come into the ſheltered bays in ſtormy weather, where they very often perch on trees: they fly over the ſea as gulls, and take the fiſh when they ſpy them, by falling down upon them, and they then riſe again and do the like. They are not reckoned good food. When they are ſeen at ſea, it is a ſign of being near land." Wafer, in his voyage and deſcription of the iſthmus of America, ſays, "The pelican is not found on the South Sea ſide of the iſthmus, but they abound on the nothern ſide; They are of a dark grey colour, and under the throat hangs a bag: the old ones are not eaten, but the young are good meat." Mr Edwards, in another place, gives the deſcription of a pelican, which he ſays is double the bigneſs of the largeſt ſwan. His drawing was made from the pelican ſhown at London in 1745, which was brought by Capt. Pelly from the Cape of Good Hope, where they are larger than anywhere elſe. The body, legs, and feet, very much reſemble the pelican of America; and it differs little but in the head and neck, which laſt is very long, like a ſwan's; the bill is ſtraighter, and the upper part only hooked at the end: the pouch is ſhaped ſomething different, hanging more down in the middle. Mr Edwards thus deſcribes it. "From the point of the bill to the angle of the mouth is 20 inches of our Engliſh meaſure, which is ſix inches more than any natural hiſtorian has found it; the academy of Paris having meaſured one which was about 14 inches, Paris meaſured I ſuppoſe; and our countryman, Willoughby, meaſured one brought from Ruſſia, which he makes 14 inches Engliſh. I thought it ſomething incredible in Willoughby's deſcription, that a man ſhould put his head into the pouch under the bill, but I ſaw it performed in this bird by its keeper, and am ſure a ſecond man's head might have been put in with it at the ſame time."

The Academy of Paris think the bird they have deſcribed is the pelican of Ariſtotle, and the Onocrotalus of Pliny. They are alſo confirmed in the opinion that this is a long-lived bird; for, out of a great number kept at Verſailles, none had died for more than 12 years, being the only animals kept in the menagery of which ſome have not died in that time. Some authors ſay they live 60 or 70 years.

Capt. Keeling, in his voyage to Siera Leona, ſays the pelicans there are as large as ſwans, of a white colour with exceeding long bills: and M. Thevenot, in his travels to the Levant, obſerves, that the pelicans about ſome part of the Nile near the Red Sea ſwim by the bank ſide like geeſe, in ſuch great numbers that they cannot be counted. Father Morolla, in his voyage to Congo, ſays pelicans are often met with in the road to Singa, and are all over black, except on their breaſt, which is of a fleſh colour like the neck of a turkey. He adds further, that father Francis de Pavia informed him, that on his journey to Singa he obſerved certain large white birds, with long beaks, necks, and feet, which, whenever they heard the leaſt ſound of an inſtrument, began immediately to dance, and leap about the rivers, where they always reſide, and whereof they were great lovers; this, he ſaid, he took a great pleaſure to contemplate, and continued often upon the banks of the rivers to obſerve.

It would extend our article beyond all proportion, were we to touch on each individual ſpecies of this extenſive genus, together, with their accidental varieties. But as the genus is unqueſtionably very curious, we ſhall here ſubjoin a liſt of books, which ſuch of our readers as deſire it may have recourſe to for further information: *Edward's Hiſtory of Birds; Natural Hiſtory of Jamaica; Mem. de l'Academie Royale des Sciences, depuis* 1666 *juſqu'à* 1699. tom 3. troiſieme partie, p. 186.; *Willoughby; Pennant's Britiſh* and *Arctic Zoology;* and *Latham's Synopſis of Birds;* the laſt of which is the fulleſt and moſt ſcientifical of any we have yet ſeen.

PELION (Diodorus Siculus, &c.), *Pelios mons*, underſtood, (Mela, Virgil, Horace, Seneca), a mountain of Theſſaly near Oſſa, and hanging over the Sinus Pelaſgicus, or Pegaſicus; its top covered with pines, the ſides with oaks, (Ovid). Said alſo to abound in wild aſh, (Val. Flaccus). From this mountain was cut the ſpear of Achilles, called *pelias*, which none but himſelf could wield, (Homer). Dicearchus, Ariſtotle's ſcholar, found this mountain 1250 paces higher than any other of Theſſaly, (Pliny). *Pelius*, Cicero; *Peliacus*, (Catullus), the epithet.

PELLA (anc. geog.), a town ſituated on the confines of Emathia, a diſtrict of Macedonia, (Ptolemy); and therefore Herodotus allots it to Bottiæa, a maritime diſtrict on the Sinus Thermaicus. It was the royal reſidence, ſituated on an eminence, verging to the ſouth-weſt, encompaſſed with unpaſſable marſhes ſummer and winter: in which, next the town, a citadel like an iſland riſes, placed on a bank or dam, a prodigious work, both ſupporting the wall and ſecuring it from any hurt by means of the circumfluent water. At a diſtance, it ſeems cloſe to the town, but is ſeparated from it by the Ludias, running by the walls, and joined to it by a bridge, (Livy): diſtant from the ſea 120 ſtadia, the Ludias being ſo far navigable, (Strabo). Mela calls the town *Pelle*, though moſt Greek authors write *Pella*. The birth place of Philip, who enlarged it; and afterwards of Alexander, (Strabo, Mela). Continued to be the royal reſidence down to Perſes, (Livy). Called *Pella Colonia*, (Pliny); *Colonia Julia Auguſta*, (Coin). It afterwards came to decline, with but few and mean inhabitants, (Lucian). It is now called Τα Παλατισια, the *Little Palace*, (Holſtenius). *Pellæus*, both the gentilitious name and the epithet, (Lucian, Juvenal, Martial.)—Another Pella; (Polybius, Pliny); a town of the Decapolis, on the other ſide the Jordan; abounding in water, like its cognominal town in Macedonia; built by the Macedonians, (Strabo); by Seleucus, (Euſebius): anciently called *Butis*, (Stephanus); *Apamea*, (Strabo); ſituated 35 miles to the north-eaſt of Geraſa, (Ptolemy). Thither the Chriſtians, juſt before the ſiege of Jeruſalem by Titus, were divinely admoniſhed to fly, (Euſebius). It was the utmoſt boundary of the Peræa, or Transjordan country, to the north, (Joſephus).

PELLETIER (James), a doctor of phyſic, and an eminent mathematician, was born at Mans in 1517, and died at Paris in 1582. He was an excellent Latin and French poet, a good orator, phyſician, and grammarian. He wrote *Oeuvres Poetiques, Commentaires Latins ſur Euclide, &c.*

PELLETS, in heraldry, thoſe roundles that are black; called alſo *ogreſſes* and *gunſtones*, and by the French *torteaux de ſable*.

PELLICLE, among phyſicians, denotes a thin film or fragment of a membrane. Among chemiſts it ſignifies a thin ſurface of chryſtals uniformly ſpread over a ſaline liquor evaporated to a certain degree.

PELLISON, or Pellison Fontanier, (Paul), one of the fineſt geniuſes of the 17th century, was the ſon of James Pelliſon counſellor at Caſtres. He was born at Beziers in 1624, and educated in the Proteſtant religion. He ſtudied with ſucceſs the Latin, Greek, French, Spaniſh, and Italian tougues, and applied himſelf to the reading the beſt authors in theſe languages; after which he ſtudied the law at Caſtres with reputation. In 1652 he purchaſed the poſt of ſecretary to the king, and five years after became firſt deputy to M. Fouquet. He ſuffered by the diſgrace of that miniſter; and in 1661 was confined in the Baſtile, from whence he was not diſcharged till four years after. During his confinement he applied himſelf to the ſtudy of controverſy; and in 1670 abjured the Proteſtant religion. Louis XIV. beſtowed upon him an annual penſion of 2000 crowns: and he likewiſe enjoyed ſeveral poſts. In 1676 he had the abbey of Giment, and ſome years after the priory of St Orens at Auch. He died in 1693. His principal works are, 1. The Hiſtory of the French Academy. 2. Reflections on religious Diſputes, &c. in 4 vols 12mo. 3. The Hiſtory of Louis XIV. 5. Hiſtorical Letters and Miſcellanies, in 3 vols 12mo.

PELOPIA, a feſtival obſerved by the Eleans in honour of Pelops. A ram was ſacrificed on the occaſion, which both prieſts and people were prohibited from partaking of, on pain of excommunication from Jupiter's temple; the neck only was allotted to the officer who provided wood for the ſacrifice. This officer was called Ξυλευς; and white poplar was the only wood made uſe of at this ſolemnity.

PELOPONNESUS, (Dionyſius,) a large peninſula to the ſouth of the reſt of Greece; called, as it were, *Pelopus neſus* or *inſula*, though properly not an iſland, but a peninſula; yet wanting but little to be one, viz. the iſthmus of Corinth, ending in a point like the leaf of the plantane or plane-tree. Anciently called *Apia* and *Pelaſgia;* a peninſula ſecond to no other country for nobleneſs; ſituated between two ſeas, the Egean and Ionian, and reſembling a plantane-leaf, on account of its angular receſſes or bays, (Pliny, Strabo, Mela). Strabo adds from Homer, that one of its ancient names was *Argos*, with the epithet *Achaicum*, to diſtinguiſh it from Theſſaly, called *Pelaſgicum*. Divided into ſix parts; namely, Argolis, Laconica, Meſſenia, Elis, Achaia, and Arcadia, (Mela). Now called the *Morea*.

PELOPS, in fabulous hiſtory, the ſon of Tantalus king of Phrygia, went into Elis, where he married Hippodamia the daughter of Œnomaus king of that country; and became ſo powerful, that all the territory which lies beyond the Iſthmus, and compoſes a conſiderable part of Greece, was called *Peloponneſus*, that is, the *iſland of Pelops*, from his name and the word Νεσος.

PELTA, a ſmall, light, manageable buckler, uſed by the ancients. It was worn by the Amazons. The pelta is ſaid by ſome to have reſembled an ivy leaf in form; by others it is compared to the leaf of an Indian fig tree; and by Servius to the moon in her firſt quarter.

PELTARIA, in botany: A genus of the ſiliculoſa order, belonging to the tetradynamia claſs of plants; and in the natural method ranking under the 39th order, *Siliquoſa*. The ſilicula is entire, and nearly orbiculated, compreſſed plane, and not opening.

PELUSIUM (anc. geog.), a noble and ſtrong city of Egypt, without the Delta, diſtant 20 ſtadia from the ſea; ſituated amidſt marſhes; and hence its name and its ſtrength. Called the *key* or *inlet of Egypt* (Diodorus, Hirtius); which being taken, the reſt of Egypt lay quite open and expoſed to an enemy. Called *Sin* (Ezekiel). *Peluſiacus* the epithet (Virgil, Diodorus). From its ruins aroſe Damietta. E. Long. 32°. N Lat. 31°.

Letters on Egypt.

Mr Savary gives us the following account of this place: "The period of its foundation, as well as that of the other ancient cities of Egypt, is loſt in the obſcurity of time. It flouriſhed long before Herodotus. As it commanded the entrance of the country on the ſide of Aſia, the Pharaohs rendered it a conſiderable fortreſs, one of them raiſed a rampart of 30 leagues in length from the walls of this town to Heliopolis. But we find from the hiſtory of nations that the long wall of China, thoſe which the weakneſs of the Greek emperors led them to build round conſtantinople, and many others, built at an immenſe expence, were but feeble barriers againſt a warlike people: theſe examples have taught us, that a ſtate, to be in ſecurity againſt a foreign yoke, muſt form warriors within itſelf, and that men muſt be oppoſed to men. This rampart, which covered Peluſium, did not ſtop Cambyſes, who attacked it with a formidable army. The feeble character of the Son of Amaſis, unable to prevent the deſertion of 200,000 Egyptians, who went to found a colony beyond the cataracts, had not force ſufficient to oppoſe that torrent which broke in upon his country. Cambyſes, after a bloody battle, wherein he cut his enemies to pieces, entered Peluſium in triumph. That memorable day, which ſaw the deſertion of one part of the Egyptian militia and the ruin of the other, is the true epoch of the ſubjugation of that rich country. Since that period, it has paſſed under the yoke of the Perſians, the Macedonians, the Romans, the Greeks, the Arabs, and the Turks. A continued ſlavery of more than 2000 years ſeems to ſecure them an eternal bondage.

"Herodotus, who viſited Peluſium ſome years after the conqueſt of Cambyſes, relates an anecdote which I cannot omit: 'I ſurveyed (ſays he) the plain where the two armies had fought. It was covered with human bones collected in heaps. Thoſe of the Perſians were on one ſide, thoſe of the Egyptians on the other, the inhabitants of the country having taken care to ſeparate them after the battle. They made me take notice of a fact which would have appeared very aſtoniſhing to me without their explanation of it. The ſkulls of the Perſians, which were ſlight and fragile, broke on being lightly ſtruck with a ſtone; thoſe of the Egyptians, thicker and more compact, reſiſted the blows of flint. This difference of ſolidity they attributed to the cuſtom the Perſians have of covering their heads from their infancy with the tiara, and to the Egyptian cuſtom of leaving the heads of their children bare and ſhaved, expoſed to the heat of the ſun. This explanation appeared ſatisfactory to me.' Mr Savary aſſures us that the ſame cuſtoms ſtill ſubſiſt in Egypt, of which he frequently had ocular demonſtration.

"Peluſium (continues he), after paſſing under the dominion of Perſia, was taken by Alexander. The brave Antony, general of cavalry under Gabinius, took it from his ſucceſſors, and Rome reſtored it to Ptolemy Auletes. Pompey, whoſe credit had eſtabliſhed this young prince on the throne of Egypt, after the fatal battle of Pharſalia took refuge at Peluſium. He landed at the entrance of the harbour; and on quitting his wife Cornelia and his ſon, he repeated the two following verſes of Sophocles, 'The free man who ſeeks an aſylum at the court of a king will meet with ſlavery and chains,' He there found death. Scarcely had he landed on the ſhore, when Theodore the rhetorician, of the iſle of Chio, Septimius the courtier, and Achilles the eunuch, who commanded his troops, wiſhing for a victim to preſent to his conqueror, ſtabbed him with their ſwords. At the ſight of the aſſaſſins Pompey covered his face with his mantle, and died like a Roman. They cut off his head, and embalmed it, to offer it to Cæſar, and left his body naked on the ſhore. It was thus that this great man, whoſe warlike talents had procured the liberty of the ſeal, for the Romans, and added whole kingdoms to their extended empire, was baſely ſlain in ſetting foot on the territory of a king who owed to him his crown. Philip his freedman, collecting together, under favour of the night, the wreck of a boat, and ſtripping of his own cloak to cover the ſad remains of his maſter, burnt them according to the cuſtom. An old ſoldier, who had ſerved under Pompey's colours, came to mingle his tears with thoſe of Philip, and to aſſiſt him in performing the laſt offices to the manes of his general.—Peluſium was often taken and pillaged during the wars of the Romans, the Greeks, and the Arabs. But in ſpite of ſo many diſaſters, ſhe preſerved to the time of the Cruſades her riches and her commerce. The Chriſtian princes having taken it by ſtorm, ſacked it. It never again roſe from its ruins; and the inhabitants went to Damietta." See **Damietta**.

PELVIS, in anatomy. See there, n° 3—43.

PEMBROKE (Mary Counteſs of). See **Herbert**.

Pembroke, in Pembrokeſhire, in England, is the principal town in the county. It is ſituated upon a creek of Milford-Haven, and in the moſt pleaſant part of Wales, being about 256 miles diſtant from London. It is the county-town, and has two handſome bridges over two ſmall rivers which run into a creek, forming the weſt ſide of a promontory. It is well inhabited, has ſeveral good houſes, and but one church. There is alſo a cuſtom-houſe in it. There are ſeveral merchants in it, who, favoured by its ſituation, employ near 200 ſail on their own account; ſo that, next to Caermarthen it is the largeſt and richeſt town in South Wales. It has one long ſtraight ſtreet, upon a narrow part of a rock; and the two rivers ſeem to be two arms of Milford Haven, which ebbs and flows cloſe up to the town. It is governed by a mayor, bailiffs, and burgeſſes; and was in former times fortified with walls, and a magnificent caſtle ſeated on a rock at the weſt end of the town. In this rock, under the chapel, is a natural cavern called *Wogan*, remarked for having a very fine echo: this is ſuppoſed to have been a ſtore-room for the garriſon, as there is a ſtaircaſe leading into it from the caſtle: it has alſo a wide mouth towards the river. This ſtructure being burnt a few years after it was erected, it was rebuilt. It is remarkable for being the birthplace of Henry VII. and for the brave defence made by the garriſon for Charles I.

PEMBROKESHIRE, a county of Wales, bounded on all ſides by the Iriſh ſea, except on the eaſt, where it joins to Caermarthenſhire, and on the north-eaſt to Cardiganſhire. It lies the neareſt to Ireland of any county in Wales; and extends in length from north to ſouth 35 miles, and from eaſt to weſt 29, and is about 140 in circumference. It is divided into ſeven hundreds, contains about 420,000 acres, one city, eight market towns, two foreſts, 145 pariſhes, about 2300 houſes, and 25,900 inhabitants. It lies in the province of Canterbury, and dioceſe of St David's. It ſends three members to parliament, viz. one for the ſhire, one for Haverfordweſt, and one for the town of Pembroke.

The air of Pembrokeſhire, conſidering its ſituation, is good; but it is in general better the farther from the ſea. As there are but few mountains, the ſoil is generally fruitful, eſpecially on the ſea-coaſts; nor are its mountains altogether unprofitable, but produce paſture ſufficient to maintain great numbers of ſheep and goats. Its other commodities are corn, cattle, pit coal, marl, fiſh, and fowl. Among theſe laſt are falcons, called here *peregrins*. Amongſt the birds common here are migratory ſea-birds, that breed in the Iſle of Ramſey, and the adjoining rocks called *The Biſhop and his Clerks*. About the beginning of April ſuch flocks of birds, of ſeveral ſorts, reſort to theſe rocks, as appear incredible to thoſe who have not ſeen them. They come to them in the night time, and alſo leave them then; for, in the evening, the rocks may be ſeen covered with them, and the next morning not one be ſeen at all. In like manner, not a ſingle bird ſhall appear in the evening, and the next morning the rocks ſhall be covered with them. They alſo generally make a viſit about Chriſtmas, ſtaying a week or longer; and then take their leave till breeding-time. Among theſe birds are the eligug, razor bill, puffin, and harry-bird. The eligug lays only one egg, which, as well as thoſe of the puffin and razor-bill, is as big as a duck's, but longer and ſmaller at one end. She never leaves it till it is hatched, nor then till the young one is able to follow her; and ſhe is all this time fed by the male. This and the razor-bill breed upon the bare rocks, without any kind of neſt. The puffin and harry-bird breed in holes, and commonly in the holes of rabbits; but ſometimes they dig holes for themſelves with their beaks. The harry-birds are never ſeen on land but when taken. All the four kinds cannot raiſe themſelves to fly away when they are on land, and therefore they creep or waddle to the cliffs, and throwing themſelves off, take wing. The eligug is the ſame bird which they call in Cornwall (England) a *kiddaw*, and in Yorkſhire a *ſcout*. The razor-bill is the *merre* of Cornwall. The puffin is the *arctic duck* of Cluſius, and the harry-bird the *ſhire-water* of Sir Thomas Brown. The inhabitants of this county make a very pleaſant durable fire of culm, which is the duſt of coal made up into balls with a third part of mud. The country is well watered by the rivers Clethy, Dougledye, Cledhew, and Teive; which laſt parts it from Cardiganſhire. There is a diviſion of the county ſtyled *Rhos* in the Welch, by which is meant a large green plain. This is inhabited by the deſcendants of the Flemings, placed there by Henry I. to curb the Welch, who were never able to expel them, though they often attempted it. On the coaſts of this county, as well as on thoſe of Glamorganſhire and the Severn Sea, is found a kind of alga or laver, the *lactuca marina* of Camden, being a marine plant or weed. It is gathered in ſpring; of which the inhabitants make a ſort of food, called in Welch *lhavan*, and in Engliſh *black-butter*. Having waſhed it clean, they lay it to ſweat between two flat ſtones, then ſhred it ſmall, and kned it well, like dough for bread, and then make it up into great balls or rolls, which is by ſome eat raw, and by others fryed with oatmeal and butter. It is accounted excellent againſt all diſtempers of the liver and ſpleen; and ſome affirm that they have been relieved by it in the ſharpeſt fits of the ſtone.

PEN, a town of Somerſetſhire in England, on the north-eaſt ſide of Wincaunton, where Kenwald a Weſt Saxon king ſo totally defeated the Britons, that they were never after able to make head againſt the Saxons; and where, many ages after this, Edmund Ironſide gained a memorable victory over the Danes, who had before, *i. e.* in 1001, defeated the Saxons in that ſame place.

Pen, a little inſtrument uſually formed of a quill, ſerving to write withal.

Pens are alſo ſometimes made of ſilver, braſs, or iron.

Dutch Pens are made of quills that have paſſed through hot aſhes, to take off the groſſer fat and moiſture, and render them more tranſparent.

Fountain Pen, is a pen made of ſilver, braſs, &c. contrived to contain a conſiderable quantity of ink, and let it flow out by gentle degrees, ſo as to ſupply the writer a long time without being under the neceſſity of taking freſh ink.

The fountain pen is compoſed of ſeveral pieces, as in Plate CCCLXXXII. where the middle piece F carries the pen, which is ſcrewed into the inſide of a little pipe which again is ſoldered to another pipe of the ſame bigneſs as the lid G; in which lid is ſoldered a male ſcrew, for ſcrewing on the cover, as alſo for ſtopping a little hole at the place and hindering the ink from paſſing through it. At the other end of the piece F is a little pipe, on the outſide of which the top-cover H may be ſcrewed. In the cover there goes a port-crayon, which is to be ſcrewed into the laſt-mentioned pipe, in order to ſtop the end of the pipe, into which the ink is to be poured by a funnel. To uſe the pen, the cover G muſt be taken off, and the pen a little ſhaken, to make the ink run more freely.

There are, it is well known, ſome inſtruments uſed by practical mathematicians, which are called *pens*, and which are diſtinguiſhed according to the uſe to which they are principally applied; as for example the drawing pen, &c. an inſtrument too common to require a particular deſcription in this place. But it may be proper to take ſome notice of the geometric pen, as it is not ſo well known, nor the principles on which it depends ſo obvious.

The *geometric* Pen is an inſtrument in which, by a circular motion, a right line, a circle, an ellipſe, and other mathematical figures, may be deſcribed. It was firſt invented and explained by John Baptiſt Suardi, in a work intitled *Nouvo Iſtromenti per la Deſcrizzione di diverſe Curve Antiche Moderne*, &c. Several writers had obſerved the curves ariſing from the compound motion of two circles, one moving round the other; but Suardi firſt realized the principle, and firſt reduced it to practice. It has been lately introduced with ſucceſs into the ſteam-engine by Watt and Boulton. The number of curves this inſtrument can deſcribe is truly amazing; the author enumerates not leſs than 1273, which (he ſays) can be deſcribed by it in the ſimple form. We ſhall give a ſhort deſcription of it from Adams's Geometrical and Graphical Eſſays.

“ Plate CCCLXXXII. fig. 10. repreſents the geometric pen; A, B, C, the ſtand by which it is ſupported; the legs A, B, C, are contrived to fold one within the other for the convenience of packing. A ſtrong axis D is fitted to the top of the frame; to the lower part of this axis any of the wheels (as *i*) may be adapted; when ſcrewed to it they are immoveable. EG is an arm contrived to turn round upon the main axis D; two ſliding boxes are fitted to this arm; to theſe boxes any of the wheels belonging to the geometric pen may be fixed, and then ſlid ſo that the wheels may take into each other and the immoveable wheel *i*: it is evident, that by making the arm EG revolve round the axis D, theſe wheels will be made to revolve alſo, and that the number of their revolutions will depend on the proportion between the teeth. *Fg* is an arm carrying the pencil; this arm ſlides backwards and forwards in the box *e d*, in order that the diſtance of the pencil from the centre of the wheel *h* may be eaſily varied; the box *ed* is fitted to the axis of the wheel *h*, and turns round with it, carrying the arm *fg* along with it: it is evident, therefore, that the revolutions will be fewer or greater in proportion to the difference between the numbers of the teeth in the wheels *h* and *i*; this bar and ſocket are eaſily removed for changing the wheels. When two wheels only are uſed, the bar *fg* moves in the ſame direction with the bar EG; but if another wheel is introduced between them they move in contrary directions.

“ The number of teeth in the wheels, and conſequently the relative velocity of the epicycle or arm *fg*, may be varied *in infinitum*. The numbers we have uſed are 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96.

“ The conſtruction and application of this inſtrument is ſo evident from the figure, that nothing more need be pointed out than the combinations by which various figures may be produced. We ſhall take two as examples:

“ The radius of EG (fig. 11.) muſt be to that of *fg* as 10 to 5 nearly; their velocities, or the number of teeth in the wheels, to be equal; the motion to be in the ſame direction.

“ If the length of *fg* be varied, the looped figure delineated at fig. 12. will be produced. A circle may be deſcribed by equal wheels, and any radius but the bars muſt move in contrary directions.

“ *To deſcribe by this circular motion a ſtraight line and an ellipſis.* For a ſtraight line, equal radii, the velocity as 1 to 2, the motion in a contrary direction; the ſame data will give a variety of ellipſes, only the radii muſt be unequal; the ellipſes may be deſcribed in any direction.” See fig. 13.

Pen, or *Penſtock*. See Penstock.

*Sea-*Pen. See Pennatula.

PENANCE, a puniſhment either voluntary or impoſed by authority, for the faults a perſon has committed. Penance is one of the ſeven ſacraments of the Romiſh church. Beſides faſting, alms, abſtinence, and the like, which are the general conditions of penance, there are others of a more particular kind; as the repeating a certain number of ave-marys, paternoſters, and credos, wearing a hair-ſhirt, and giving one's ſelf a certain number of ſtripes. In Italy and Spain it is uſual to ſee Chriſtians almoſt naked, loaded with chains and a croſs, and laſhing themſelves at every ſtep.

PENATES, in Roman antiquity, a kind of tutelar deities, either of countries or particular houſes; in which laſt ſenſe they differed in nothing from the lares. See Lares.

The penates were properly the tutelar gods of the Trojans, and were only adopted by the Romans, who gave them the title of *penates*.

PENCIL, an inſtrument uſed by painters for laying on their colours. Pencils are of various kinds, and made of various materials; the largeſt ſorts are made of boar's briſtles, the thick ends of which are bound to a ſtick, bigger or leſs according to the uſes they are deſigned for: theſe, when large, are called *bruſhes*. The finer ſorts of pencils are made of camels, badgers, and ſquirrels hair, and of the down of ſwans; theſe are tied at the upper end with a piece of ſtrong thread, and incloſed in the barrel of a quill.

All good pencils, on being drawn between the lips, come to a fine point.

Pencil, is alſo an inſtrument uſed in drawing, writing, &c. made of long pieces of black-lead or red-chalk, placed in a groove cut in a ſlip of cedar; on which other pieces of cedar being glued, the whole is planed round, and one of the ends being cut to a point, it is fit for uſe.

Black-lead in fine powder, ſtirred into melted ſulphur, unites with it ſo uniformly, and in ſuch quantity, in virtue perhaps of its abounding with ſulphur, that though the compound remains fluid enough to be poured into moulds, it looks nearly like the coarſer ſorts of black-lead itſelf. Probably the way which Prince Rupert is ſaid to have had, mentioned in the third volume of Dr Birch's Hiſtory of the Royal Society, of making black-lead run like a metal in a mould, ſo as to ſerve for black-lead again, conſiſted in mixing with it ſulphur or ſulphureous bodies.

On this principle the German black-lead pencils are ſaid to be made; and many of thoſe which are hawked about by certain perſons among us are prepared in the ſame manner: their melting or ſoftening, when held to a candle, or applied to a red-hot iron, and yielding a bluiſh flame, with a ſtrong ſmell like that of burning brimſtone, betrays their compoſition; for black-lead itſelf yields no ſmell or fume, and ſuffers no apparent alteration in that heat. Pencils made with ſuch additions are of a very bad kind; they are hard, brittle, and do not caſt or make a mark freely either on paper or wood, rather cutting or ſcratching them than leaving a coloured ſtroke.

The true Engliſh pencils (which Vogel in his mineral ſyſtem, and ſome other foreign writers, imagine to be prepared alſo by melting the black-lead with ſome additional ſubſtances, and caſting it into a mould) are formed of black-lead alone ſawed into ſlips, which are fitted into a groove made in a piece of wood, and another ſlip of wood glued over them: the ſofteſt wood, as cedar, is made choice of, that the pencil may be the eaſier cut; and a part at one end, too ſhort to be conveniently uſed after the reſt has been worn and cut away, is left unfilled with the black-lead, that there may be no waſte of ſo valuable a commodity. Theſe pencils are greatly preferable to the others, though ſeldom ſo perfect as could be wiſhed, being accompanied with ſome degree of the ſame inconveniences, and being very unequal in their quality, on account of different ſorts of the mineral being fraudulently joined together in one pencil, the fore-part being commonly pretty good, and the reſt of an inferior kind. Some, to avoid theſe imperfections, take the finer pieces of black lead itſelf, which they ſaw into ſlips, and fix for uſe in port-crayons: this is doubtleſs the ſureſt way of obtaining black-lead crayons, whoſe goodneſs can be depended on.

PENDANT, an ornament hanging at the ear, frequently compoſed of diamonds, pearls, and other jewels.

Pendants, in heraldry, parts hanging down from the label, to the number of three, four, five, or ſix at moſt, reſembling the drops in the Doric freeze. When they are more than three, they muſt be ſpecified in blazoning.

Pendants of a Ship, are thoſe ſtreamers, or long colours, which are ſplit and divided into two parts, ending in points, and hung at the head of maſts, or at the yard-arm ends.

PENDENE-Vow, in Cornwall, in England, on the north coaſt, by Morvah. There is here an unfathomable cave under the earth, into which the ſea flows at high water. The cliffs between this and St Ives ſhine as if they had ſtore of copper, of which indeed there is abundance within-land.

PENDENNIS, in Cornwall, at the mouth of Falmouth-haven, is a peninſula of a mile and a half in compaſs. On this Henry VIII. erected a caſtle, oppoſite to that of St Maw's, which he likewiſe built. It was fortified by Queen Elizabeth, and ſerved then for the governor's houſe. It is one of the largeſt caſtles in Britain, and is built on a high rock. It is ſtronger by land than St Maw's, being regularly fortified, and having good outworks.

PENDULOUS, a term applied to any thing that bends or hangs downwards.

PENDULUM, a vibrating body ſuſpended from a fixed point. For the hiſtory of this invention, ſee the article Clock.

The theory of the pendulum depends on that of the inclined plane. Hence, in order to underſtand the nature of the pendulum, it will be neceſſary to premiſe ſome of the properties of this plane; referring, however, to *Inclined Plane*, and Section VI. in the article Mechanics, for the demonſtration.

Plate CCCLXXX.

I. Let AC (fig. 1.) be an inclined plane, AB its perpendicular height, and D any heavy body: then the force which impels the body D to deſcend along the inclined plane AC, is to the abſolute force of gravity as the height of the plane AB is to its length AC; and the motion of the body will be uniformly accelerated.

II. The velocity acquired in any given time by a body deſcending on an inclined plane AC, is to the velocity acquired in the ſame time by a body falling freely and perpendicularly as the height of the plane AB to its length AC. The final velocities will be the ſame; the ſpaces deſcribed will be in the ſame ratio; and the times of deſcription are as the ſpaces deſcribed.

III. If a body deſcend along ſeveral contiguous planes, AB, BC, CD, (fig. 2.) the final velocity, namely, that at the point D, will be equal to the final velocity in deſcending through the perpendicular AE, the perpendicular heights being equal. Hence, if theſe planes be ſuppoſed indefinitely ſhort and numerous, they may be conceived to form a curve; and therefore the final velocity acquired by a body in deſcending through any curve AF, will be equal to the final velocity acquired in deſcending through the planes AB, BC, CD, or to that in deſcending through AE, the perpendicular heights being equal.

IV. If from the upper or lower extremity of the vertical diameter of a circle a cord be drawn, the time of deſcent along this cord will be equal to the time of deſcent through the vertical diameter; and therefore the times of deſcent through all cords in the ſame circle, drawn from the extremity of the vertical diameter, will be equal.

V. The times of deſcent of two bodies through two planes equally elevated will be in the ſubduplicate ratio of the lengths of the planes. If, inſtead of one plane, each be compoſed of ſeveral contiguous planes ſimilarly placed, the times of deſcent along theſe planes will be in the ſame ratio. Hence, alſo, the times of deſcribing ſimilar arches of circles ſimilarly placed will be in the ſubduplicate ratio of the lengths of the arches.

VI. The ſame things hold good with regard to bodies projected upward, whether they aſcend upon inclined planes or along the arches of circles.

The point or axis of ſuſpenſion of a pendulum is that point about which it performs its vibrations, or from which it is ſuſpended.

The centre of oſcillation is a point in which, if all the matter in a pendulum were collected, any force applied at this centre would generate the ſame angular velocity in a given time as the ſame force when applied at the centre of gravity.

The length of a pendulum is equal to the diſtance between the axis of ſuſpenſion and centre of oſcillation.

Plate CCCLXXX.

Let PN (fig. 3.) repreſent a pendulum ſuſpended from the point P; if the lower part N of the pendulum be raiſed to A, and let fall, it will by its own gravity deſcend through the circular arch AN, and will have acquired the ſame velocity at the point N that a body would acquire in falling perpendicularly from C to N, and will endeavour to go off with that velocity in the tangent ND; but being prevented by the rod or cord, will move through the arch NB to B, where, loſing all its velocity, it will by its gravity deſcend through the arch BN, and, having acquired the ſame velocity as before, will aſcend to A. In this manner it will continue its motion forward and backward along the arch ANB, which is called an *oſcillatory* or *vibratory* motion; and each ſwing is called a *vibration.*

Prop. I. If a pendulum vibrates in very ſmall circular arches, the times of vibration may be conſidered as equal, whatever be the proportion of the arches.

Let PN (fig. 4.) be a pendulum; the time of deſcribing the arch AB will be equal to the time of deſcribing CD, theſe arches being ſuppoſed very ſmall.

Join AN, CN; then ſince the times of deſcent along all cords in the ſame circles, drawn from one extremity of the vertical diameter, are equal; therefore the cords AN, CN, and conſequently their doubles, will be deſcribed in the ſame time; but the arches AN, CN being ſuppoſed very ſmall, will therefore be nearly equal to their cords: hence the times of vibrations in theſe arches will be nearly equal.

Prop. II. Pendulums which are of the ſame length vibrate in the ſame time, whatever be the proportion of their weights.

This follows from the property of gravity, which is always proportional to the quantity of matter, or to its inertia. When the vibrations of pendulums are compared, it is always underſtood that the pendulums deſcribe either ſimilar finite arcs, or arcs of evaneſcent magnitude, unleſs the contrary is mentioned.

Prop. III. If a pendulum vibrates in the ſmall arc of a circle, the time of one vibration is to the time of a body's falling perpendicularly through half the length of the pendulum as the circumference of a circle is to its diameter.

Let PE (fig. 5.) be the pendulum which deſcribes the arch ANC in the time of one vibration; let PN be perpendicular to the horizon, and draw the cords AC, AN; take the arc E*e* infinitely ſmall, and draw EFG, *efg* perpendicular to PN, or parallel to AC; deſcribe the ſemicircle BGN, and draw *er*, *gs* perpendicular to EG: now let t = time of deſcending through the diameter 2PN, or through the cord AN: Then the velocities gained by falling through 2PN, and by the pendulum's deſcending through the arch AE, will be as $\sqrt{2PN}$ and $\sqrt{BF}$; and the ſpace deſcribed in the time t, after the fall through 2PN, is 4PN. But the times are as the ſpaces divided by the velocities.

Therefore $\frac{4PN}{\sqrt{2PN}}$ or $2\sqrt{2PN} : t :: \frac{Ee}{\sqrt{BF}}$: time of deſcribing $Ee = \frac{e \times Ee}{2\sqrt{2PN \times BF}}$. But in the ſimilar triangles PEF, E*er*, and KGF, G*gs*.

$$\text{As } PE = PN : EF :: Ee : er = \frac{EF}{PN} \times Ee;$$

$$\text{And } KG = KD : FG :: Gg : Gs = \frac{FG}{KD} \times Gg.$$

$$\text{But } er = Gs; \text{ therefore } \frac{EF}{PN} \times Ee = \frac{FG}{KD} \times Gg.$$

$$\text{Hence } Ee = \frac{PN \times FG}{KD \times EF} \times Gg.$$

And by ſubſtituting this value of E*e* in the former equation, we have the time of deſcribing $Ee = \frac{t \times PN \times FG \times Gg}{2KD \times EF \times \sqrt{BF \times 2PN}}$: But by the nature of the circle $FG = \sqrt{BF \times FN}$, and $EF = \sqrt{PN + PF \times FN}$. Hence, by ſubſtitution, we obtain the time of deſcribing

$$Ee = \frac{t \times PN \times \sqrt{BF \times FN} \times Gg}{2KD \times \sqrt{PN + PF} \times FN \times \sqrt{BF \times 2PN}} = \frac{t \times \sqrt{PN} \times Gg}{2KD \times \sqrt{PN + PF} \times \sqrt{2}} = \frac{t \times \sqrt{2PN} \times Gg}{4KD \times \sqrt{PN + PF}} = \frac{t \times \sqrt{2PN}}{2BN \times \sqrt{2PN - NF}} \times Gg.$$

But NF, in its mean quantity for all the arches G*g*, is nearly equal to NK;

For if the ſemicircle deſcribed on the diameter BN, which correſponds to the whole arch AN, be divided into an indefinite number of equal arches G*g*, &c. the ſum of all the lines NF will be equal to as many times NK as there are arches in the ſame circle equal to G*g*. therefore the time of deſcribing $E = \frac{t \times \sqrt{2PN}}{2BN \times \sqrt{2PN - NK}} \times Gg$. Whence the time of deſcribing the arch AED $= \frac{t \times \sqrt{2PN}}{2BN \times \sqrt{2PN - NK}} \times BGN$; and the time of deſcribing the whole arch ADC, or the time of one vibration, is $= \frac{t \times \sqrt{2PN}}{2BN \times \sqrt{2PN - NK}} \times 2BGN$. But when the arch ANC is very ſmall, NK vaniſhes, and then the time of vibration in a very ſmall arc is $=\frac{t\times\sqrt{2\,\overline{PN}}}{2BN\times\sqrt{2PN}}\times 2BGN=\frac{1}{2}t\times\frac{2BGN}{BN}$. Now if t be the time of deſcent through 2 PN; then ſince the ſpaces deſcribed are as the ſquares of the times, $\frac{1}{2}t$ will be the time of deſcent through $\frac{1}{2}$ PN: therefore the diameter BN is to the circumference 2BGN, as the time of falling through half the length of the pendulum is to the time of one vibration.

Prop. IV. The length of a pendulum vibrating ſeconds is to twice the ſpace through which a body falls in one ſecond, as the ſquare of the diameter of a circle is to the ſquare of its circumference.

Let $d=$ diameter of a circle $=1$, $c=$ circumference $=3.14159$, &c. t to the time of one vibration, and p the length of the correſponding pendulum; then by laſt propoſition $c:d::1'':\frac{d}{c}=$ time of ſalling through half the length of the pendulum. Let $s=$ ſpace deſcribed by a body falling perpendicularly in the firſt ſecond: then ſince the ſpaces deſcribed are in the ſubduplicate ratio of the times of deſcription, therefore $1'':\frac{d}{c}::\sqrt{s}:\sqrt{\tfrac{1}{2}p}$. Hence $c^2:d^2::2s:p$.

It has been found by experiment, that in latitude $51\frac{1}{2}°$ a body falls about 16.11 feet in the firſt ſecond: hence the length of a pendulum vibrating ſeconds in that latitude is $=\frac{32.22}{\overline{3.14159}|^2}=3$ feet 3.174 inches.

Prop. V. The times of the vibrations of two pendulums in ſimilar arcs of circles are in a ſubduplicate ratio of the lengths of the pendulums.

Plate CCCLXXX.

Let PN, PO (fig. 6.) be two pendulums vibrating in the ſimilar arcs AB, CD; the time of a vibration of the pendulum PN is to the time of a vibration of the pendulum PO in a ſubduplicate ratio of PN to PO.

Since the arcs AN, CO are ſimilar and ſimilarly placed, the time of deſcent through AN will be to the time of deſcent through CO in the ſubduplicate ratio of AN to CO: but the times of deſcent through the arcs AN and CO are equal to half the times of vibration of the pendulums PN, PO reſpectively. Hence the time of vibration of the pendulum PN in the arch AB is to the time of vibration of the pendulum PO in the ſimilar arc CD in the ſubduplicate ratio of AN to CO: and ſince the radii PN, PO are proportional to the ſimilar arcs AN, CO, therefore the time of vibration of the pendulum PN will be to the time of vibration of the pendulum PO in a ſubduplicate ratio of PN to PO.

If the length of a pendulum vibrating ſeconds be 39.174 inches, then the length of a pendulum vibrating half ſeconds will be 9.793 inches. For $1'':\frac{1}{2}''::\sqrt{39.174}:\sqrt{x}$; and $1:\frac{1}{4}::39.174:x$. Hence $x=\frac{39.174}{4}=9.793$.

Prop. VI. The lengths of pendulums vibrating in the ſame time, in different places, will be as the forces of gravity.

For the velocity generated in any given time is directly as the force of gravity, and inverſely as the quantity of matter *. Now the matter being ſuppoſed the ſame in both pendulums, the velocity is as the force of gravity; and the ſpace paſſed through in a given time will be as the velocity; that is, as the gravity.

Cor. Since the lengths of pendulums vibrating in the ſame time in ſmall arcs are as the gravitating forces, and as gravity increaſes with the latitude on account of the ſpheroidal figure of the earth and its rotation about its axis; hence the length of a pendulum vibrating in a given time will be variable with the latitude, and the ſame pendulum will vibrate ſlower the nearer it is carried to the equator.

Prop. VII. The time of vibrations of pendulums of the ſame length, acted upon by different forces of gravity are reciprocally as the ſquare roots of the forces.

For when the matter is given, the velocity is as the force and time; and the ſpace deſcribed by any given force is as the force and ſquare of the time. Hence the lengths of pendulums are as the forces and the ſquares of the times of falling through them. But theſe times are in a given ratio to the times of vibration; whence the lengths of pendulums are as the forces and the ſquares of the times of vibration. Therefore, when the lengths are given, the forces will be reciprocally as the ſquare of the times, and the times of vibration reciprocally as the ſquare roots of the forces.

Cor. Let $p=$ length of pendulum, $g=$ force of gravity, and $t=$ time of vibration. Then ſince $p=g\times t^2$. Hence $g=p\times\frac{1}{t^2}$; and $=\sqrt{p\times\frac{1}{g}}$.

That is, the forces in different places are directly as the lengths of the pendulums, and inverſely as the ſquare roots of the times of vibration; and the times of vibration are directly as the ſquare roots of the lengths of the pendulums, and inverſely as the ſquare roots of the gravitating forces.

Prop. VIII. A pendulum which vibrates in the arch of a cycloid deſcribes the greateſt and leaſt vibrations in the ſame time.

This property is demonſtrated only on a ſuppoſition that the whole maſs of the pendulum is concentrated in a point: but this cannot take place in any really vibrating body; and when the pendulum is of finite magnitude, there is no point given in poſition which determines the length of the pendulum; on the contrary the centre of oſcillation will not occupy the ſame place in the given body, when deſcribing different parts of the tract it moves through, but will continually be moved in reſpect of the pendulum itſelf during its vibration. This circumſtance has prevented any general determination of the time of vibration in a cycloidal arc, except in the imaginary caſe referred to.

There are many other obſtacles which concur in rendering the application of this curve to the vibration of pendulums deſigned for the meaſures, of time the ſource of errors far greater than thoſe which by its peculiar property it is intended to obviate; and it is now wholly diſuſed in practice.

Although the times of vibration of a pendulum in

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* See Mechanics, p. 774.

different arches be nearly equal, yet from what has been ſaid, it will appear, that if the ratio of the leaſt of theſe arches to the greateſt be conſiderable, the vibrations will be performed in different times; and the difference, though ſmall, will become ſenſible in the courſe of one or more days. In clocks uſed for aſtronomical purpoſes, it will therefore be neceſſary to obſerve the arc of vibration; which if different from that deſcribed by the pendulum when the clock keeps time, there a correction muſt be applied to the time ſhown by the clock. This correction, expreſſed in ſeconds of time, will be equal to the half of three times the difference of the ſquare of the given arc, and of that of the arc deſcribed by the pendulum when the clock keeps time, theſe arcs being expreſſed in degrees *; and ſo much will the clock gain or loſe according as the firſt of theſe arches is leſs or greater than the ſecond.

Thus, if a clock keeps time when the pendulum vibrates in an arch of 3°, it will loſe $10\frac{1}{2}$ ſeconds daily in an arch of 4 degrees.

For $\overline{4^2-3^2} \times \frac{3}{2} = 7 \times \frac{3}{2} = 10\frac{1}{2}$ ſeconds.

The length of a pendulum rod increaſes with heat; and the quantity of expanſion anſwering to any given degree of heat is experimentally found by means of a pyrometer ‡; but the degree of heat at any given time is ſhown by a thermometer: hence that inſtrument ſhould be placed within the clock-caſe at a height nearly equal to that of the middle of the pendulum; and its height, for this purpoſe, ſhould be examined at leaſt once a day. Now by a table conſtructed to exhibit the daily quantity of acceleration or retardation of the clock anſwering to every probable height of the thermometer, the correſponding correction may be obtained. It is alſo neceſſary to obſerve, that the mean height of the thermometer during the interval ought to be uſed. In Six's thermometer this height may be eaſily obtained; but in thermometers of the common conſtruction it will be more difficult to find this mean.

It had been found, by repeated experiments, that a braſs rod equal in length to a ſecond pendulum will expand or contract $\frac{1}{1100}$ part of an inch by a change of temperature of one degree in Farhenheits's thermometer; and ſince the times of vibration are in a ſubduplicate ratio of the lengths of the pendulum, hence an expanſion or contraction of $\frac{1}{1100}$ part of an inch will anſwer nearly to one ſecond daily: therefore a change of one degree in the thermometer will occaſion a difference in the rate of the clock equal to one ſecond daily. Whence, if the clock be ſo adjuſted as to keep time when the thermometer is at 55°, it will loſe 10 ſeconds daily when the thermometer is at 65°, and gain as much when it is at 45°.

Hence the daily variation of the rate of the clock from ſummer to winter will be very conſiderable. It is true indeed that moſt pendulums have a nut or regulator at the lower end, by which the bob may be raiſed or lowered a determinate quantity; and therefore, while the height of the thermometer is the ſame, the rate of the clock will be uniform. But ſince the ſtate of the weather is ever variable, and as it is impoſſible to be raiſing or lowering the bob of the pendulum at every change of the thermometer, therefore the correction formerly mentioned is to be applied. This correction, however, is in ſome meaſure liable to a ſmall degree of uncertainty; and in order to avoid it altogether, ſeveral contrivances have been propoſed by conſtructing a pendulum of different materials, and ſo diſpoſing them that their effects may be in oppoſite directions, and thereby counterbalance each other; and by this means the pendulum will continue of the ſame length.

Mercurial Pendulum.

Mercurial Pendulum. The firſt of theſe inventions is that by the celebrated Mr George Graham. In this, the rod of the pendulum is a hollow tube, in which a ſufficient quantity of mercury is put. Mr Graham firſt uſed a glaſs tube, and the clock to which it was applied was placed in the moſt expoſed part of the houſe. It was kept conſtantly going, without having the hands or pendulum altered, from the 9th of June 1722 to the 14th of October 1725, and its rate was determined by tranſits of fixed ſtars. Another clock made with extraordinary care, having a pendulum about 60 pounds weight, and not vibrating above one degree and a half from the perpendicular, was placed beſide the former, in order the more readily to compare them with each other, and that they might both be equally expoſed. The reſult of all the obſervations was this, that the irregularity of the clock with the quickſilver pendulum exceeded not, when greateſt, a ſixth part of that of the other clock with the common pendulum, but for the greateſt part of the year not above an eighth or ninth part; and even this quantity would have been leſſened, had the column of mercury been a little ſhorter: for it differed a little the contrary way from the other clock, going faſter with heat and ſlower with cold. To confirm this experiment more, about the beginning of July 1723 Mr Graham took off the heavy pendulum from the other clock, and made another with mercury, but with this difference, that inſtead of a glaſs tube he uſed a braſs one, and varniſhed the inſide to ſecure it from being injured by the mercury. This pendulum he uſed afterwards, and found it about the ſame degree of exactneſs as the other.

Gridiron Pendulum.

The *Gridiron* Pendulum is an ingenious contrivance for the ſame purpoſe. Inſtead of one rod, this pendulum is compoſed of any convenient odd number of rods, as five, ſeven, or nine; being ſo connected, that the effect of one ſet of them counteracts that of the other ſet; and therefore, if they are properly adjuſted to each other, the centres of ſuſpenſion and oſcillation will always be equidiſtant. Fig. 7. repreſents a gridiron pendulum compoſed of nine rods, ſteel and braſs alternately. The two outer rods, AB, CD, which are of ſteel, are faſtened to the croſs pieces AC, BD by means of pins. The next two rods, EF, GH, are of braſs, and are faſtened to the lower bar BD, and to the ſecond upper bar EG. The two following rods are of ſteel, and are faſtened to the croſs bars EG and IK. The two rods adjacent to the central rod being of braſs, are faſtened to the croſs pieces IK and LM; and the central rod, to which the ball of the pendulum is attached, is ſuſpended from the croſs piece LM, and paſſes freely through a perforation in each of the croſs bars IK, BD. From this diſpoſition of the rods, it it evident that, by the expanſion of the extreme rods, the croſs piece BD, and the two rods attached to it, will deſcend: but ſince thoſe rods are expanded by the ſame heat, the croſs piece EG will conſequently

Plate CCLXXX.

* Simpſon's Fluxions, p. 541.

‡ See Pyrometer.

Phil. Tranſ. 1726, nº 392.

ly be raiſed and therefore alſo the two next rods; but becauſe theſe rods are alſo expanded, the croſs bar IK will deſcend; and by the expanſion of the two next rods, the piece LM will be raiſed a quantity ſufficient to counteract the expanſion of the central rod. Whence it is obvious, that the effect of the ſteel rods is to increaſe the length of the pendulum in hot weather, and to diminiſh it in cold weather, and that the braſs rods have a contrary effect upon the pendulum. The effect of the braſs rods muſt, however, be equivalent not only to that of the ſteel rods, but alſo to the part above the frame and ſpring, which connects it with the cock, and to that part between the lower part of the frame and the centre of the ball.

M. Thiout

Another excellent contrivance for the ſame purpoſe is deſcribed in a French author on clock-making. It was uſed in the north of England by an ingenious artiſt about 40 years ago. This invention is as follows: A bar of the ſame metal with a rod of the pendulum and of the ſame dimenſions, is placed againſt the back-part of the clock-caſe: from the top of this a part projects, to which the upper part of the pendulum is connected by two fine pliable chains or ſilken ſtrings, which juſt below paſs between two plates of braſs, whoſe lower edges will always terminate the length of the pendulum at the upper end. Theſe plates are ſupported on a pedeſtal fixed to the back of the caſe. The bar reſts upon an immoveable baſe at the lower part of the caſe: and is inſerted into a groove, by which means it is always retained in the ſame poſition. From this conſtruction, it is evident that the extenſion or contraction of this bar, and of the rod of the pendulum, will be equal, and in contrary directions. For ſuppoſe the rod of the pendulum to be expanded any given quantity by heat; then, as the lower end of the bar reſts upon a fixed point, the bar will be expanded upwards, and raiſe the upper end of the pendulum juſt as much as its length was increaſed, and hence its length below the plates will be the ſame as before.

Of this pendulum, ſomewhat improved by Mr Croſthwaite watch and clock-maker, Dublin, we have the following deſcription in the Tranſactions of the Royal Iriſh Academy, 1778.—"A and B (fig. 8.) are two rods of ſteel forged out of the ſame bar, at the ſame time, of the ſame temper, and in every reſpect ſimilar. On the top of B is formed a gibbet C; this rod is firmly ſupported by a ſteel bracket D, fixed on a large piece of marble E, firmly ſet into the wall F, and having liberty to move freely upwards between croſs ſtaples of braſs, 1, 2, 3, 4, which touch only in a point in front and rear (the ſtaples having been carefully formed for that purpoſe); to the other rod is firmly fixed by its centre the lens G; of 24 pounds weight, although it ſhould in ſtrictneſs be a little below it. This pendulum is ſuſpended by a ſhort ſteel ſpring on the gibbet at C; all which is entirely independent of the clock. To the back of the clock-plate I are firmly ſcrewed two cheeks nearly cycloidal at K, exactly in a line with a centre of the verge L. The maintaining power is applied by a cylindrical ſteel-ſtud, in the uſual way of regulators, at M. Now, it is very evident, that any expanſion or contraction that takes place in either of theſe exactly ſimilar rods, is inſtantly counteracted by the other: whereas in all *compenſation* pendulums compoſed of different materials, however juſt a calculation may ſeem to be, that can never be the caſe, as not only different metals, but alſo different bars of the ſame metal that are not manufactured at the ſame time, and exactly in the ſame manner, are found by a good pyrometer to differ materially in their degrees of expanſion and contraction, a very ſmall change affecting one and not the other."

Plate cccLxxx.

Fir pendulum.

The expanſion or contraction of ſtraight-grained fir wood length wiſe, by change of temperature, is ſo ſmall, that it is found to make very good pendulum rods. The wood called *ſpadillo* is ſaid to be ſtill better. There is good reaſon to believe, that the previous baking, varniſhing, gilding, or ſoaking of theſe woods in any melted matter, only tends to impair the property that renders them valuable. They ſhould be ſimply rubbed on the outſide with wax and a cloth. In pendulums of this conſtruction the error is greatly diminiſhed, but not taken away.

Angular Pendulum.

Angular PENDULUM, is formed of two pieces or legs like a ſector, and is ſuſpended by the angular point. This pendulum was invented with a view to diminiſh the length of the common pendulum, but at the ſame time to preſerve or even increaſe the time of vibration. In this pendulum, the time of vibration depends on the length of the legs, and on the angle contained between them conjointly, the duration of the time of vibration increaſing with the angle. Hence a pendulum of this conſtruction may be made to oſcillate in any given time. At the lower extremity of each leg of the pendulum is a ball or bob as uſual. It may be eaſily ſhown, that in this kind of pendulum, the ſquares of the times of vibration are as the ſecants of half the angle contained by the legs: hence if a pendulum of this conſtruction vibrates half ſeconds when its legs are cloſe it will vibrate whole ſeconds when the legs are opened, ſo as to contain an angle equal to $151^\circ\ 2\frac{1}{2}'$.

The Conical or Circular PENDULUM, is ſo called from the figure deſcribed by the ſtring or ball of the pendulum. This pendulum was invented by Mr Huygens, and is alſo claimed by Dr Hook.

Conical or Circular Pendulum.

In order to underſtand the principles of this pendulum, it will be neceſſary to premiſe the following lemma, *viz.* the times of all the circular revolutions of a heavy globular body, revolving within an inverted hollow paraboloid, will be equal whatever be the radii of the circles deſcribed by that body.

In order therefore, to conſtruct the pendulum ſo that its ball may always deſcribe its revolutions in a paraboloid ſurface, it will be neceſſary that the rod of the pendulum be flexible, and that it be ſuſpended in ſuch a manner as to form the evolute of the given parabola. Hence, let KH (fig. 9.) be an axis perpendicular to the horizon, having a pinion at K moved by the laſt wheel in the train of the clock; and a hardened ſteel point at H moving in an agate pivot, to render the motion as free as poſſible. Now, let it be required that the pendulum ſhall perform each revolution in a ſecond, then the paraboloid ſurface it moves in muſt be ſuch whoſe *latus rectum* is double the length of the common half ſecond pendulum. Let O be the focus of the parabola MEC, and MC, the *latus rectum*; and make $AE=MO=\frac{1}{2}MC=$ the length of a common half ſecond pendulum. At the point A of the verge, let a thin plate AB be fixed at one end, and at the other end B let it be faſtened to the bar or arm BD perpendipendicular to DH, and to which it is fixed at the point D. The figure of the plate AB is that of the evolute of the parabola MEC.

The equation of this evolute, being alſo that of the ſemicubical parabola, is $\frac{27}{16}p\,x^2=y^3$.—Let $\frac{27}{16}p=P$; then $Px^2=y^3$, and in the focus $P=2y$. In this caſe $2x^2=y^2=\frac{1}{4}P^2$: hence $x^2=\frac{1}{8}P^2$, and $x=P\sqrt{\frac{1}{8}}=\frac{27}{16}p\sqrt{\frac{1}{8}}$ = the diſtance of the focus from the vertex A.—By aſſuming the value of x, the ordinates of the curve may be found; and hence it may be eaſily drawn.

The ſtring of the pendulum muſt be ſuch a length that when one end is fixed at B, it may lie over the plate AB, and then hang perpendicular from it, ſo that the centre of the bob may be at E when at reſt. Now, the verge KH being put in motion, the ball of the pendulum will begin to gyrate, and thereby conceive a centrifugal force which will carry it out from the axis to ſome point F, where it will circulate ſeconds or half ſeconds, according as the line AE is 89. inches, or 2¼ inches, and AB anſwerable to it.

One advantage poſſeſſed by a clock having a pendulum of this conſtruction is, that the ſecond hand moves in a regular and uniform manner, without being ſubject to thoſe jerks or ſtarts as in common clocks; and the pendulum is entirely ſilent.

Theory has pointed out ſeveral other pendulums, known by the names of *Elliptic*, *Horizontal*, *Rotulary*, &c. pendulums. Theſe, however, have not as yet attained that degree of perfection as to ſupplant the common pendulum.

Beſides the uſe of the pendulum in meaſuring time, it has alſo been ſuggeſted to be a proper ſtandard for meaſures of length. See the article MEASURE.

PENEA, in botany: A genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking with thoſe of which the order is doubtful. The calyx is diphyllous; the corolla campanulated; the ſtyle quadrangular; the capſule tetragonal, quadrilocular, and octoſpermous.

PENELOPE, in fabulous hiſtory, the daughter of Icarus, married Ulyſſes by whom ſhe had Telemachus. During the abſence of Ulyſſes, who was gone to the ſiege of Troy, and who ſtaid 20 years from his dominions, ſeveral princes, charmed with Penelope's beauty, told her that Ulyſſes was dead, offered to marry her, and preſſed her to declare in their favour. She promiſed compliance on condition they would give her time to finiſh a piece of tapeſtry ſhe was weaving; but at the ſame time ſhe undid in the night what ſhe had done in the day, and by this artifice eluded their importunity till Ulyſſes's return.

Plate CCCLXXXI.

PENELOPE, in ornithology: A genus of birds of the order of *gallinæ*, the characters of which are: The beak is bare at the baſe; the head is covered with feathers: the neck is quite bare; the tail conſiſts of twelve principal feathers; and the feet are for the moſt part bare. Linnæus, in the *Syſtema Naturæ*, enumerates ſix ſpecies. 1. *Meleagris ſatyra*, or horned pheaſant. Latham calls it the horned turkey. This ſpecies is larger than a fowl, and ſmaller than a turkey. The colour of the bill is brown; the noſtrils, forehead, and ſpace round the eyes, are covered with ſlender black hairy feathers; the top of the head is red. Behind each eye there is a fleſhy callous blue ſubſtance like a horn, which tends backward. On the fore part of the neck and throat, there is a looſe flap of a fine blue colour, marked with orange ſpots, the lower part of which is beſet with a few hairs; down the middle it is ſomewhat looſer than on the ſides, being wrinkled. The breaſt and upper part of the back are of a full red colour. The neck and breaſt are inclined to yellow. The other parts of the plumage and tail are of a rufous brown marked all over with white ſpots, encompaſſed with black. The legs are ſomewhat white, and furniſhed with a ſpur behind each. A head of this bird, Mr Latham tells us, was ſent to Dr Mead from Bengal, together with a drawing of the bird, which was called *napaul-pheaſant*. It is a native of Bengal.

Latham's Synopſis.

2. The *meleagris criſtata*, called by Ray *penelope jacupeme*, and by Edwards the *guan*, or *quan*, is about the ſize of a fowl, being about two feet ſix inches long.—The bill is two inches long, and of a black colour; the irides are of a dirty orange colour; the ſides of the head are covered with a naked purpliſh blue ſkin, in which the eyes are placed: beneath the throat, for an inch and a half, the ſkin is looſe, of a fine red colour, and covered only with a few hairs. The top of the head is furniſhed with long feathers, which the bird can erect as a creſt at pleaſure; the general colour of the plumage is browniſh black, gloſſed over with copper in ſome lights; but the wing coverts have a greeniſh and violet gloſs. The quills moſtly incline to a purple colour; the fore-part of the neck, breaſt, and belly, are marked with white ſpots; the thighs, under tail coverts, and the tail itſelf, are browniſh black, the legs are red; the claws black. Some of theſe birds have little or no creſt, and are thence ſuppoſed to be females.—They inhabit Braſil and Guiana, where they are often made tame. They frequently make a noiſe not unlike the word *jacu*. Their fleſh is much eſteemed.

3. *Crax Cumanenſis*, called by Latham, &c. *yacou*. It is bigger than a common fowl. The bill is black; the head feathers are long, pointed, and form a creſt, which can be erected at pleaſure. The irides are of a pale rufous colour: the ſpace round the eyes is naked, ſimilar to that of a turkey. It has alſo a naked membrane, or kind of *wattle*, of a dull black colour.—The blue ſkin comes forward on the bill but is not liable to change colour like that of the turkey. The plumage has not much variation; it is chiefly brown, with ſome white markings on the neck, breaſt, wing coverts, and belly; the tail is compoſed of twelve feathers, pretty long, and even at the end; the legs are red. This ſpecies inhabits Cayenne, but is a very rare bird, being met with only in the inner parts, or about the Amazons country, though in much greater plenty up the river Oyapoc, eſpecially towards Camoupi; and indeed thoſe which are ſeen at Cayenne are moſtly tame ones, for it is a familiar bird, and will breed in that ſtate, and mix with other poultry. It makes the neſt on the ground, and hatches the young there, but is at other times moſtly ſeen on trees. It frequently erects the creſt, when pleaſed, or taken notice of, and likewiſe ſpreads the tail upright like a fan, in the manner of the turkey. It has two kinds of cry; one like that

Fig. 1.

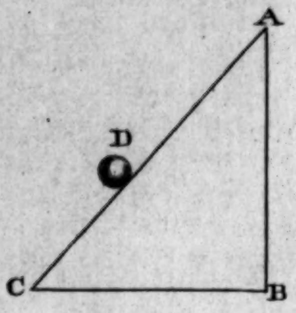
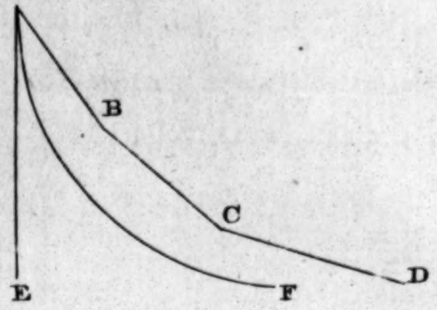


Fig. 2.



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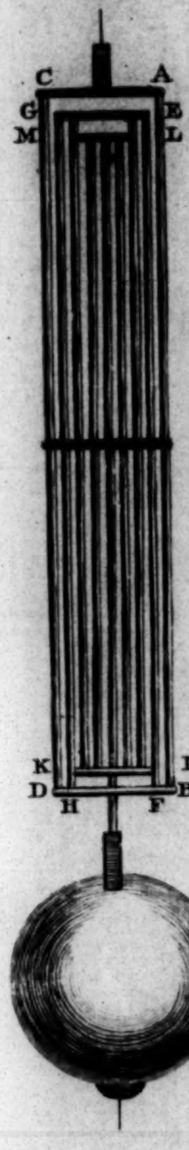
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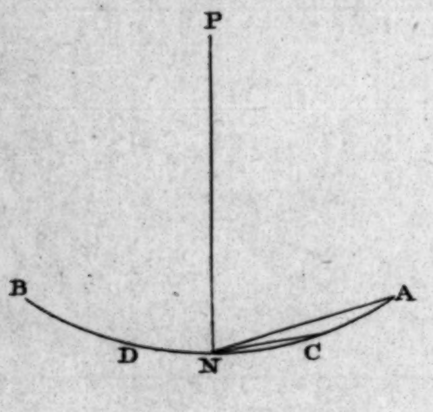
Fig. 4.



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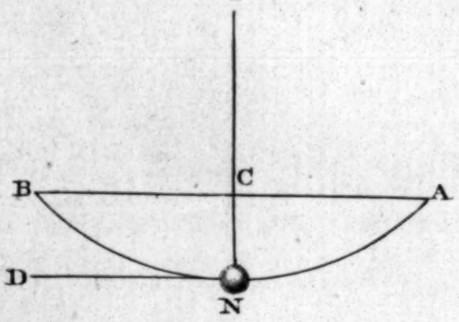

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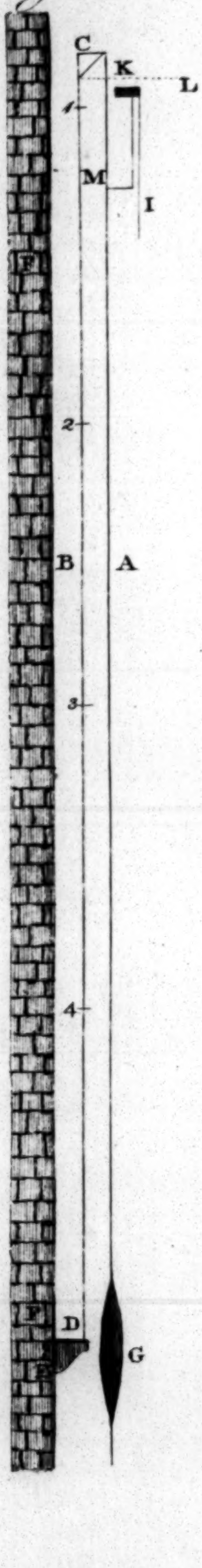
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Fig. 5.

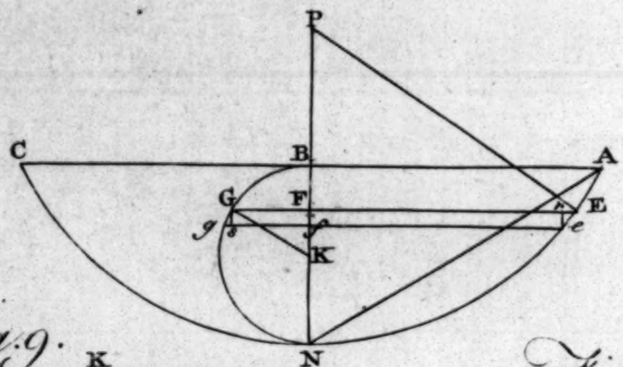
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Fig. 9.

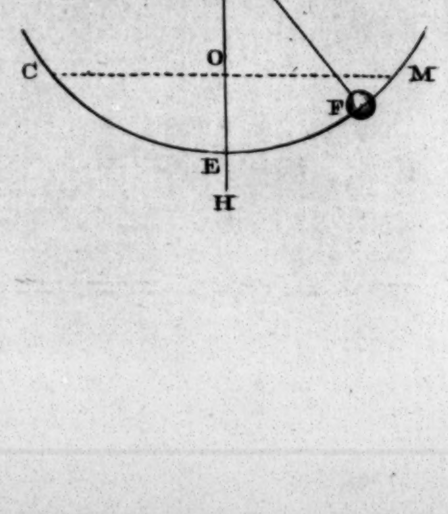
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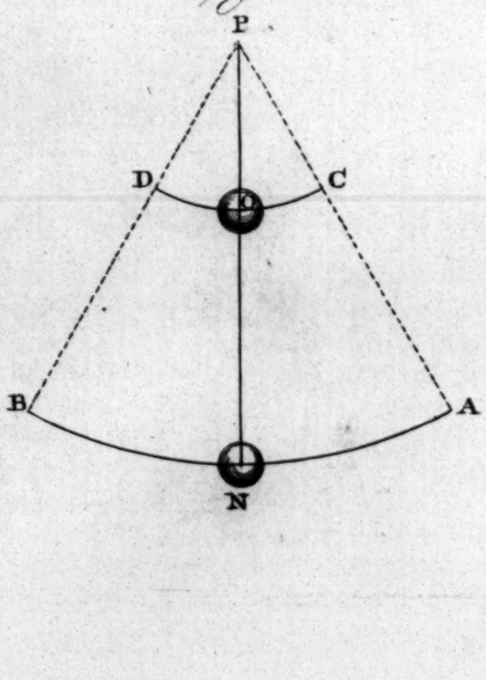
Fig. 6.



BRITISH MUSEUM

that of a young turkey, the other lower and more plaintive; the firſt of theſe is thought by the Indians to expreſs the word *couyovoit*, the other *yacou*.

4. The *pipile*, or as it is called, *crax pipile*, is black in the belly, and the back brown ſtained with black. The fleſh on the neck is of a green colour. It is about the bigneſs of the former, and has a hiſſing noiſe.—The head is partly black and partly white, and is adorned with a ſhort creſt. The ſpace about the eyes, which are black, is white; the feet are red. It inhabits Guiana.

5. The *marail* is about the ſize of a fowl, and ſhaped ſomewhat like it. The bill and irides are blackiſh; the ſpace round the eyes is bare, and of a pale red; the chin, throat, and fore part of the neck, are ſcarcely covered with feathers; but the throat itſelf is bare, and the membrane elongated to half an inch or more; both this and the ſkin round the eyes change colour, and become deeper and thicker when the bird is irritated. The head feathers are longiſh, ſo as to appear like a creſt when raiſed up, which the bird often does when agitated; at which time it alſo erects thoſe of the whole body, and ſo disfigures itſelf as to be ſcarce known: the general colour of the plumage is a greeniſh black; the fore-part of the neck is tipped with white; the wings are ſhort; the tail is long, conſiſting of 12 feathers, which are even at the end, and commonly pendent, but can be lifted up and ſpread out like that of the turkey; the legs and toes are of a bright red; the claws are crooked, and ſomewhat ſharp. In a collection (ſays Latham) from Cayenne was a bird, I believe, of this very ſpecies. It was 28 inches long, the bill is like that of a fowl, brown, and rather hooked; round the eye bare; the head is creſted; the feathers of the fore-part of the neck are tipped with white; the breaſt and belly are rufous brown; the reſt of the plumage is greeniſh brown; the tail is 11 inches long, and rounded at the end: the quills juſt reach beyond the rump; the legs are brown, and claws hooked. This ſpecies is common in the woods of Guiana, at a diſtance from the ſea, though it is much leſs known than could be imagined: and found, in ſmall flocks for the moſt part, except in breeding time when it is only ſeen by pairs, and then frequently on the ground, or on low ſhrubs; at other times on high trees, where it rooſts at night. The female makes her neſt on ſome low buſhy tree, as near the trunk as poſſible, and lays three or four eggs. When the young are hatched, they deſcend with their mother, after 10 or 12 days. The mother acts as other fowls ſcratching on the ground like a hen, and brooding the young, which quit their nurſe the moment they can ſhift for themſelves. They have two broods in a year; one in December or January, the other in May or June. The beſt time of finding theſe birds is morning or evening, being then met with on ſuch trees whoſe fruit they feed on, and are diſcovered by ſome of it falling to the ground. The young birds are eaſily tamed, and ſeldom forſake the places where they have been brought up: they need not be houſed, as they prefer the rooſting on tall trees to any other place. Their cry is not inharmonious, except when irritated or wounded, when it is harſh and loud. Their fleſh is much eſteemed.

Buffon ſuppoſes this bird to be the female of the yacou, or at leaſt a variety; but that this cannot be, the anatomical inſpection will at once determine. The windpipe of this bird has a ſingular conſtruction, paſſing along the neck to the entrance of the breaſt, where it riſes on the outſide of the fleſh, and, after going a little way downwards, returns, and then paſſes into the cavity of the lungs. It is kept in its place on the outſide by a muſcular ligament, which is perceivable quite to the breaſt bone. This is found to be the caſe in both male and female, and plainly proves that it differs from the yacou, whoſe windpipe has no ſuch circumvolution in either ſex.

If this be the bird mentioned by Fermin, in his Hiſtory of Guiana, p. 176. he ſays that the creſt is cuneiform, and of a black and white colour; and obſerves that they are ſcarce at Surinam; but it does not ſeem quite certain whether he means this ſpecies or the yacou.

Bancroft mentions a bird of Guiana by the name of *Marrodée*, which he ſays is wholly of a browniſh black: the bill the ſame; and the legs grey. Theſe, he ſays, are common, and make a noiſe not unlike the name given it, perching on trees. The Indians imitate their cry ſo exactly, as to lead to the diſcovery of the place the birds are in, by their anſwering it. The fleſh of them is like that of a fowl: it is therefore moſt likely the marail.

6. The *vociferating penelope*. The bill of this bird is of a greeniſh colour; the back is brown, the breaſt green, and the belly is of a whitiſh brown. Latham calls it the *crying curaſſaw*. It is about the bigneſs of a crow.

PENESTICA, (Antonine), a town of the Helvetii, ſituated between the Lacus Lauſonius and Salodurum; called *Peteniſca* by Peutinger. Thought now to be *Biel*, (Cluverius); the capital of a ſmall territory in Swiſſerland.

PENEUS, (Strabo); a river running through the middle of Theſſaly, from weſt to eaſt, into the Sinus Thermaicus, between Olympus and Oſſa, near Tempe of Theſſaly, riſing in mount Pindus, (Ovid, Val. Flaccus).

PENETRALE, a ſacred room or chapel in private houſes, which was ſet apart for the worſhip of the houſehold gods among the ancient Romans. In temples alſo there were *penetralia*, or apartments of diſtinguiſhed ſanctity, where the images of the gods were kept, and certain ſolemn ceremonies performed.

PENGUIN, or PINGUIN. See PINGUIN.

PENICILLUS, among ſurgeons is uſed for a tent to be put into wounds or ulcers.

PENIEL, or PENUEL, a city beyond Jordan near the ford of the brook Jabbok. This was the occaſion of its name. Jacob, upon his return from Meſopotamia, (Gen. xxxii. 24, &c.) made a ſtop at the brook Jabbok: and very early the next morning, after he had ſent all the people before, he remained alone, and behold an angel came, and wreſtled with him till the day began to appear. Then the angel ſaid to Jacob, Let me, go for the morning begins to appear. Jacob anſwered, I ſhall not let you go from me till you have given me your bleſſing. The angel bleſſed him then in the ſame place, which Jacob thence called Peniel, ſaying, I have ſeen God face to face, yet continue alive.

In following ages the Iſraelites built a city in this place, which was given to the tribe of Gad. Gideon, returning from the purſuit of the Midianites, overthrew the tower of Peniel, (Judges viii. 17), and put all the inhabitants of the city to death, for having refuſed ſuſtenance to him and his people, and having anſwered him in a very inſulting manner. Jeroboam the ſon of Nebat rebuilt the city of Peniel, (1 Kings xii. 25.) Joſephus ſays, that this prince there built himſelf a palace.

PENINNAH, the ſecond wife of Elkanah, the father of Samuel. Peninnah had ſeveral children, (1 Sam. i. 2, 3, &c.), but Hannah, who afterwards was mother of Samuel, was for a great while barren: Peninnah, inſtead of giving the glory to God, the author of fruitfulneſs, was elevated with pride, and inſulted her rival Hannah. But the Lord having viſited Hannah, Peninnah was thereupon humbled; and ſome interpreters think, that God took away her children from her, or at leaſt that ſhe had no more after this time, according to the words of the ſong of Hannah, (1 Sam. ii. 5.), "The barren hath born ſeven, and ſhe that hath many children is waxed feeble."

PENINSULA, in geography, a portion or extent of land joining to the continent by a narrow neck or iſthmus, the reſt being encompaſſed with water. See Plate CCXII.

PENIS, in anatomy. See there, p. 738. col. 2. &c.

PENITENCE, is ſometimes uſed for a ſtate of repentance, and ſometimes for the act of repenting. See REPENTANCE. It is alſo uſed for a diſcipline, or puniſhment attending repentance; more uſually called *penance*. It alſo gives title to ſeveral religious orders, conſiſting either of converted debauchees, and reformed proſtitutes, or of perſons who devote themſelves to the office of reclaiming them. Of this latter kind is the

Order of PENITENCE *of St Magdalen*, eſtabliſhed about the year 1272, by one Bernard, a citizen of Marſeilles, who devoted himſelf to the work of converting the courtezans of that city. Bernard was ſeconded by ſeveral others; who, forming a kind of ſociety, were at length erected into a religious order by Pope Nicholas III. under the rule of St Auguſtine. F. Geſnay ſays, that they alſo made a religious order of the penitents, or women they converted, giving them the ſame rules and obſervances which they themſelves kept.

Congregation of PENITENCE *of St Magdalen at Paris*, owed its riſe to the preaching of F. Tiſſeran, a Franciſcan, who converted a vaſt number of courtezans about the year 1492. Louis duke of Orleans gave them his houſe for a monaſtery, or rather, as appears by their conſtitutions, Charles VIII. gave them the hotel called *Bochaigne*, whence they were removed to St George's chapel, in 1572. By virtue of a brief of Pope Alexander, Simon biſhop of Paris, in 1497, drew them up a body of Statutes, and gave them the rule of St Auguſtine. It is neceſſary, before a woman could be admitted, that ſhe had firſt committed the ſin of the fleſh. None were admitted who were above 35 years of age. Till the begining of the laſt century, none but penitents were admitted: but ſince its reformation by Mary Alvequin, in 1616, none have been admitted but maids, who however, ſtill retain the ancient name penitents.

PENITENTS, an appellation given to certain fraternities of penitents diſtinguiſhed by the different ſhape and colour of their habits. Theſe are ſecular ſocieties who have their rules, ſtatutes, and churches, and make public proceſſions under their particular croſſes or banners. Of theſe there are more than a hundred, the moſt conſiderable of which are as follow: the white penitents of which there are ſeveral different ſorts at Rome, the moſt ancient of which was conſtituted in 1264; the brethren of this fraternity every year give portions to a certain number of young girls in order to their being married: their habit is a kind of white ſackloth, and on the ſhoulder is a circle, in the middle of which is a red and white croſs. Black penitents the moſt conſiderable of which are the brethren of mercy, inſtituted in 1488 by ſome Florentines, in order to aſſiſt criminals during their impriſonment, and at the time of their death; on the day of execution, they walk in proceſſion before them, ſinging the ſeven penitential pſalms and the litanies; and after they are dead, they take them down from the gibbet and burn them; their habit is black ſackcloth. There are others whoſe buſineſs is to bury ſuch perſons as are found dead in the ſtreets; theſe wear a death's head on one ſide of their habit. There are alſo blue, grey, red, green, and violet penitents; all which are remarkable for little elſe beſides the different colours of their habits.

Mabillon tells us, that at Turin there are a ſet of penitents kept in pay to walk through the ſtreets in proceſſion, and cut their ſhoulders with whips, &c.

PENITENTS, *or Converts of the name of Jeſus*, a congregation of religious at Seville in Spain, conſiſting of women who had led a licentious life, founded in 1550, This monaſtery is divided into three quarters: one for profeſſed religious; another for novices; a third for thoſe who are under correction. When theſe laſt give ſigns of a real repentance, they are removed into the quarter of the novices, where, if they do not behave themſelves well, they are remanded to their correction. They obſerve the rule of St Auguſtine.

PENITENTS *of Orvieto*, are an order of nuns, inſtituted by Antony Simoncelli, a gentleman of Orvieto in Italy. The monaſtery he built was at firſt deſigned for the reception of poor girls, abandoned by their parents, and in danger of loſing their virtue. In 1662 it was erected into a monaſtery, for the reception of ſuch as having abandoned themſelves to impurity, were willing to take up, and conſecrate themſelves to God by ſolemn vows. Their rule is that of the Carmelites.

Theſe religious have this in peculiar, that they undergo no noviciate. All required is, that they continue a few months in the monaſtery in a ſecular habit; after which they are admitted to the vows.

PENITENTIAL, an eccleſiaſtical book retained among the Romaniſts; in which is preſcribed what relates to the impoſition of penance and the reconciliation of penitents. See PENANCE.

There are various penitentials, as the Roman penitential, that of the venerable Bede, that of Pope Gregory III, &c.

PENITENTIARY, in the ancient Chriſtian church, a name given to certain preſbyters or prieſts, appointed in every church to receive the private confeſſions of the people, in order to facilitate public diſcipline, by acquainting them what ſins were to be expiated by public penance, and to appoint private penance for ſuch private crimes as were not proper to be publicly cenſured.

Penitentiary, at the court of Rome, is an office in which are examined and delivered out the ſecret bulls, graces, or diſpenſations relating to caſes of conſcience, confeſſions, &c.

Penitentiary, is alſo an officer in ſome cathedrals, veſted with power from the biſhop to abſolve, in caſes reſerved to him. The pope has at preſent his grand penitentiary, who is a cardinal, and the chief of the other penitentiary prieſts eſtabliſhed in the church or Rome, who conſult him in difficult caſes. He preſides in the penitentiary, diſpatches diſpenſations, abſolutions, &c. and has under him a regent and 24 proctors, or advocates of the ſacred penitentiary.

PENMAN-Mawr, a mountain in Caernarvonſhire, 1400 feet high. It hangs perpendicularly over the ſea, at ſo vaſt a height, that few ſpectators are able to look down the dreadful ſteep. On the ſide which is next the ſea, there is a road cut out of the ſide of the rock, about ſix or ſeven feet wide, which winds up a ſteep aſcent, and uſed to be defended on one ſide only by a ſlight wall, in ſome parts about a yard high, and in others by only a bank, that ſcarce roſe a foot above the road. The ſea was ſeen daſhing its waves 40 fathoms below, with the mountain riſing as much above the traveller's head. This dangerous road was a few years ago ſecured by a wall breaſt-high, to the building of which the city of Dublin largely contributed, it being in the High road to Holyhead.

PENN (Sir William), was born at Briſtol in 1621, and inclined from his youth to maritime affairs. He was made captain at 21 years of age, rear-admiral of Ireland at 23, vice-admiral at 25, admiral of Ireland to the Straits at 29, vice-admiral of England at 31, and General in the firſt Dutch war at 32. Whence returning in 1655, he was choſen repreſentative for the town of Weymouth; and in 1660 was made commiſſioner of the admiralty and navy, governor of the town and fort of Kinſale, vice-admiral of Munſter, and a member of that provincial council. In 1664 he was choſen great captain-commander under the duke of York, and diſtinguiſhed himſelf in an engagement againſt the Dutch fleet; after which he took leave of the ſea, but continued in his other employments till 1669. He died in 1670.

Penn (William), an eminent writer among the Quakers, and the planter and legiſlator of Pennſylvania, was the ſon of the above Sir William Penn, and was born at London in 1644. In 1660, he was entered a gentleman commoner of Chriſt-church, in Oxford; but having before received an impreſſion from the preaching of one Thomas Loe a Quaker, withdrew with ſome other ſtudents from the national worſhip, and held private meetings, where they preached and prayed among themſelves. This giving great offence to the heads of the college, Mr Penn, though but 16 years of age, was fined for nonconformity; and continuing his religious exerciſes, was at length expelled his college. Upon his return home, he was, on the ſame account, treated with great ſeverity by his father, who at laſt turned him out of doors; but his reſentment afterwards abating, he ſent him to France in company with ſome perſons of quality; where he continued a conſiderable time, and returned not only well ſkilled in the French language, but a polite and accompliſhed gentleman. About the year 1666, his father committed to his care a conſiderable eſtate in Ireland. Being found in one of the Quakers meetings in Cork, he, with many others was thrown into priſon; but, on his writing to the earl of Orrery, was ſoon diſcharged. However, his father being informed he ſtill adhered to his opinions, ſent for him to England, and finding him inflexible to all his arguments, turned him out of doors a ſecond time. About the year 1668, he became a public preacher among the Quakers: and that year was committed cloſe priſoner to the Tower, where he wrote ſeveral treatiſes. Being diſcharged after ſeven months impriſonment, he went to Ireland, where he alſo preached amongſt the Quakers. Returning to England, he was in 1670 committed to Newgate, for preaching in Gracechurch-ſtreet meeting-houſe, London; but being tried at the ſeſſions-houſe in the Old Bailey, he was acquitted. In September the ſame year, his father died; and being perfectly reconciled to him, left him both his paternal bleſſing and a plentiful eſtate. But his perſecutions were not yet at an end: for in 1671 he was committed to Newgate for preaching at a meeting in a Wheeler-ſtreet, London; and during his impriſonment, which continued ſix months, he alſo wrote ſeveral treatiſes. After his diſcharge, he went into Holland and Germany; and in the beginning of the year 1672, married and ſettled with his family at Rickmanſworth in Hertfordſhire. The ſame year he publiſhed ſeveral pieces; and particularly one againſt Reeve and Muggleton. In 1677, he again travelled into Holland and Germany in order to propagate his opinions: and had frequent converſations, with the princeſs Elizabeth, daughter to the queen of Bohemia and ſiſter to the princeſs Sophia, mother to king Geo. I. In 1681, king Charles II. in conſideration of the ſervices of Mr Penn's father, and ſeveral debts due to him from the crown at the time of his deceaſe, granted Mr Penn and his heirs the province lying on the weſt ſide of the river Delaware in North America, which from thence obtained the name of *Pennſylvania.* Upon this Mr Penn publiſhed a brief account of that province, with the king's patent; and propoſing an eaſy purchaſe of land, and good terms of ſettlement for ſuch as were inclined to remove thither, many went over. Theſe having made and improved their plantations to good advantage, the governor, in order to ſecure the planters from the native Indians, appointed commiſſioners to purchaſe the land he had received, from the king of the native Indians, and concluded a peace with them. The city of Philadelphia was planned and built; and he himſelf drew up the fundamental conſtitutions of Penſylvania in 24 articles. In 1681, he was elected a member of the Royal Society; and the next year he embarked for Pennſylvania, where he continued about two years and returned to England in Auguſt 1684. Upon the acceſſion of King James to the throne, he was taken into a great degree of favour with his Majeſty, which expoſed him to the imputation of being a Papiſt; but from which he fully vindicated himſelf. However, upon the Revolution, he was examined before the council in 1688, and obliged to give ſecurity for his appearance on the firſt day of next term, which was afterwards continued. He was ſeveral times diſcharged

Penn, Pennatula.

charged and examined; and at length warrants being iſſued out againſt him, he was obliged to conceal himſelf for two or three years. Being at laſt permitted to appear before the king and council, he repreſented his innocence ſo effectually that he was acquitted. In Auguſt 1699, he, with his wife and family, embarked for Pennſylvania; whence he returned in 1701, in order to vindicate his proprietary right, which had been attacked during his abſence. Upon Queen Anne's acceſſion to the crown, he was in great favour with her, and was often at court, But in, 1707, he was involved in a lawſuit with the executors of a perſon who had been formerly his ſteward: and though many thought him aggrieved, the court of chancery did not think proper to relieve him; upon which account he was obliged to live within the rules of the Fleet for ſeveral months, till the matter in diſpute was accommodated. He died in 1718.

At one period of his life, Mr Penn lodged in a houſe in Norfolk-ſtreet in the Strand In the entrance to it he had a peeping-hole, through which he could ſee any perſon that came to him. A creditor one day ſent in his name, and having been made to wait more than a reaſonable time, he knocked for the ſervant whom he aſked, "Will not thy maſter ſee me?" "Friend (anſwered the ſervant) he has ſeen thee, but he does not like thee."

Mr Penn's friendly and pacific manner of treating the Indians produced in them an extraordinary love for him and his people; ſo that they have maintained a perfect amity with the Quakers in Pennſylvania ever ſince. He was the greateſt bulwark of the Quakers. in whoſe defence he wrote numberleſs Pieces. Beſides the above works, he wrote a great number of others; the moſt eſteemed of which are, 1. His primitive Chriſtianity revived. 2. His defence of a paper, intitled *Goſpel Truths againſt the Exceptions of the Biſhop of Cork*. 3. His perſuaſive to Moderation. His Good advice to the Church of England, Roman Catholic, and Proteſtant Diſſenters. 5. The Sandy Foundation ſhaken. 6. No Croſs, no Crown. 7. The great Caſe of Liberty of Conſcience debated. 8. The Chriſtian Quaker and his Teſtimony ſtated and vindicated. 9. A diſcourſe of the general Rule of Faith and Practice, and Judge of Controverſy. 10. England's preſent Intereſt conſidered. 11. An Addreſs to Proteſtants. 12. His Reflections and Maxims 13. His advice to his Children. 14. His Riſe and Progreſs of the People called *Quakers*, 15. A Treatiſe on Oaths. Moſt of theſe have paſſed ſeveral editions, ſome of them many. The letters between William Penn and Dr Tillotſon, and William Penn and William Popple, Eſq; together with Penn's letters to the princeſs Elizabeth of the Rhine, and the counteſs of Hornes, as alſo one to his wife on his going to Pennſylvania, are inſerted in his works, which were firſt collected and publiſhed in 2 vols folio; and the parts ſince ſelected and abridged into 1 vol folio, are very much and deſervedly admired for the good ſenſe they contain.

PENNATULA, or SEA-PEN, in natural hiſtory, a genus of zoophyte, which, though it ſwims about freely in the ſea, approaches near to the gorgonia. This genus hath a bone along the middle of the inſide, which is its chief ſupport; and this bone receives the ſupply of its oſſeous matter by the ſame polype mouths that furniſh it with nouriſhment. Linnæus reckons ſeven ſpecies. The name *zoophyſes* under which this genus is ranked, it is well known ſignifies, that the creature partakes both of the animal and vegetable nature; but ſome have ſuppoſed it to be nothing more but a fucus or ſea plant. It is certainly an animal, however, and as ſuch is free or locomotive. Its body generally expands into proceſſes on the upper parts, and theſe proceſſes or branches are furniſhed with rows of tubular denticles; they have a polype head proceeding from each tube.

Pennatula.

The ſea-pen is not a coralline, but diſtinguiſhed from it by this ſpecific difference, corals, corallines, alcyoonia, and all that order of beings, adhere ſimply by their baſes to ſubmarine ſubſtances, but the ſea-pen, either ſwims about in the water or floats upon the ſurface.

The Honourable Dr Coote Moleſworth lately ſent one of theſe animals to the ingenious Mr Ellis, the author of many curious papers on the nature of corallines, which was taken in a trawl to 72 fathoms water, near the harbour of Breſt in France; the ſame ſpecies are frequently found in the ocean from the coaſt of Norway to the Mediterranean ſea, ſometimes at conſiderable depths, and ſometimes floating on the ſurface. Mr Ellis's deſcription of that ſent him by Dr Moleſworth is as follows:

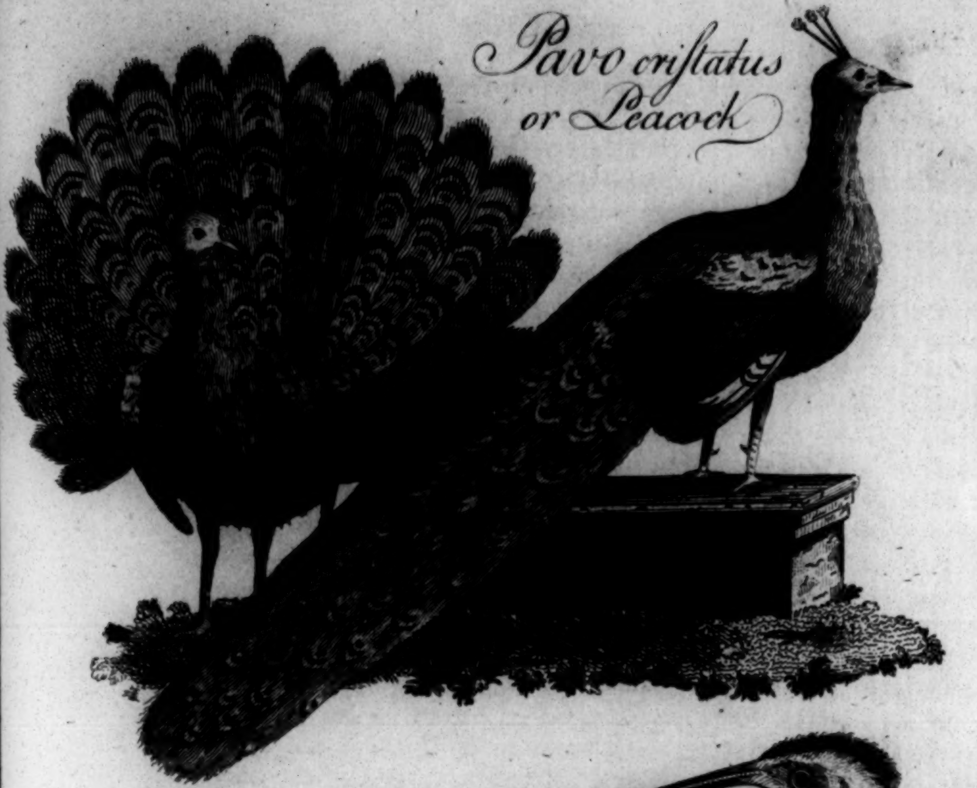
Its general appearance greatly reſembles that of a quill feather of a bird's wing (See Plate CCCLXXXVIII. fig 1.); it is about four inches long, and of a reddiſh colour; along the back there is a groove from the quill part to the extremity of the feathered part, as there is in a pen; the feathered part conſiſts of fins proceeding from the ſtem, as expreſſed in the figure. The fins move the animal backward and forward in the water, and are furniſhed with ſuckers or mouths armed with filaments, which appear magnified as fig. 2. There is no perforation at the bottom, and therefore Mr Ellis is of opinion that the exuvia of the animals upon which it feeds are diſcharged by the ſame apertures at which the food is taken in; and in this it is not ſingular, Nature having obſerved the ſame œconomy in the Greenland polype, deſcribed by Mr Ellis in his Eſſay on Corallines. Each ſucker has eight filaments, which are protruded when prey is to be caught; but at other times they are drawn back into their caſes, which are furniſhed at the end with *ſpiculæ*, that cloſe together round the entrance, and defend this tender part from external injuries.

Dr Bohadſch, of Prague had an opportunity of obſerving one of theſe animals alive in the water, and he gives the following account of what he ſaw; "A portion of the ſtem contracted, and became of a ſtrong purple colour, ſo as to have the appearance of a ligature round it; this apparent ligature, or zone, moved upwards and downwards ſucceſſively through the whole length of the ſtem, as well the feathered as the naked part; it began at the bottom, and moving upwards to the other extremity, it there diſappeared, and at the ſame inſtant appeared again at the bottom, and aſcended as before; but as it aſcended through the feathered or pinnated part, it became paler. When this zone is much conſtricted, the trunk above it ſwells and acquires the form of an onion; the con-

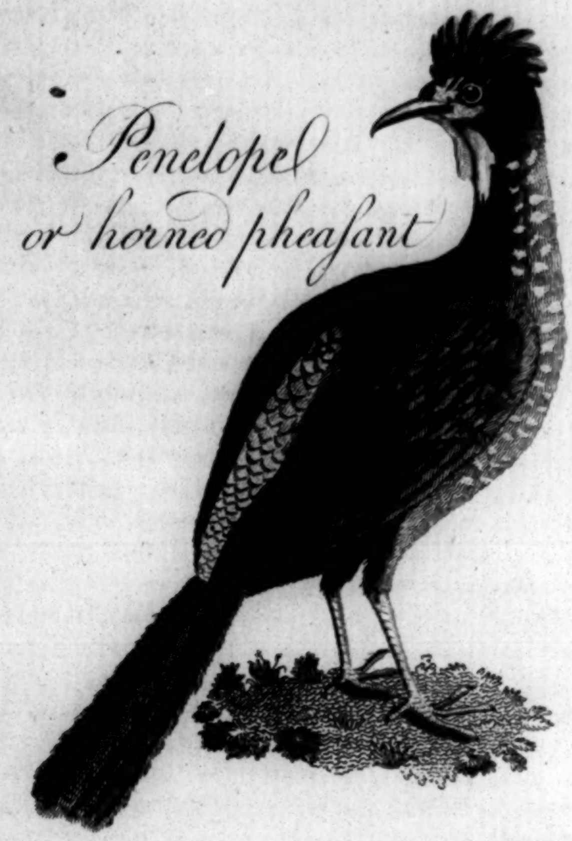
ſtriction

Plate CCCLXXXI

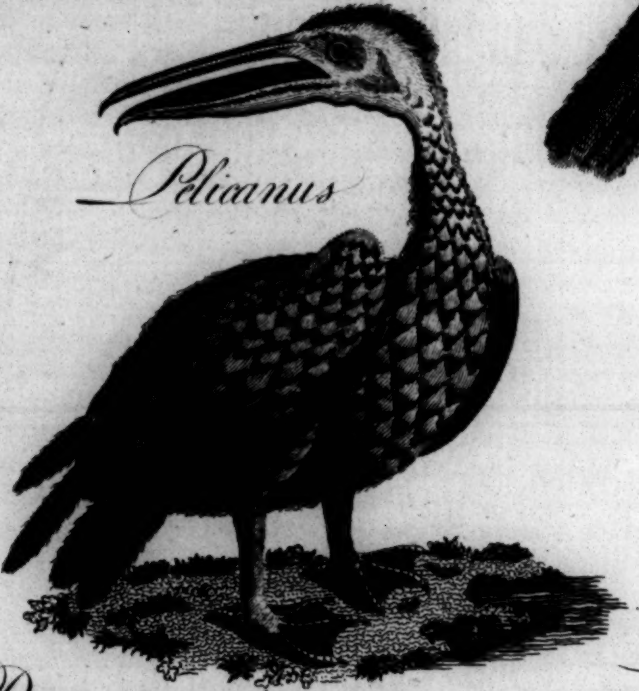
Pavo criſtatus or Peacock



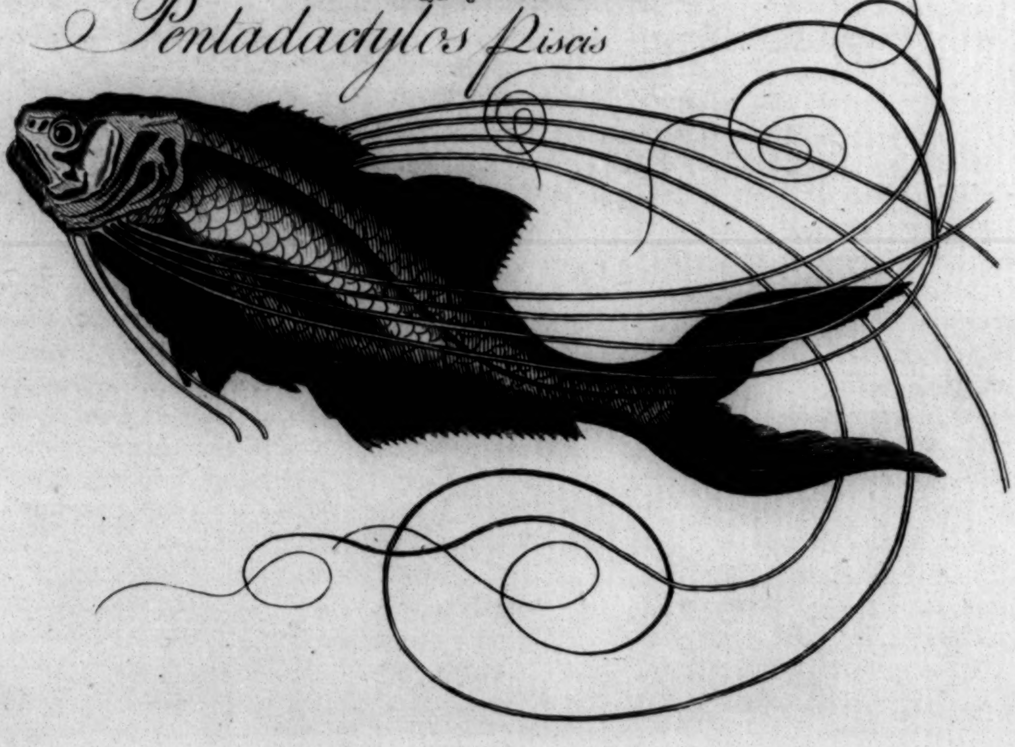
Penelope or horned pheaſant



Pelicanus



Pentadactylos Piscis



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Pennatula.

ſtriction of the trunk gives the colour to the zone, for the intermediate parts are paler in proportion as the zone becomes deeper. The end of the naked trunk is ſometimes curved like a hook; and at its extremity there is a ſinus or chink, which grows deeper while the purple ring is aſcending, and ſhallower as it is coming down. The fins have four motions, upward and downward, and backward and forward, from right to left, and from left to right. The fleſhy filaments, or claws, move in all directions; and with the cylindrical part from which they proceed are ſometimes protruded from the fins, and ſometimes hidden with them.

Upon diſſecting this animal the following phenomena were diſcovered. When the trunk was opened lengthwiſe, a ſaltiſh liquor flowed out of it, ſo viſcid as to hang down an inch. The whole trunk of the ſtem was found to be hollow, the outward membrane being very ſtrong, and about a tenth part of an inch thick: within this membrane appeared another much thinner: and between theſe two membranes, in the pinnated part of the trunk, innumerable little yellowiſh eggs, about the ſize of a white poppy ſeed, were ſeen floating in a whitiſh liquor; about three parts of the cavity within the inner membrane is filled by a kind of yellowiſh bone: this bone is about two inches and an half long, and one twentieth of an inch thick; in the middle it is four ſquare, but towards the ends it grows round and very taper, that end being fineſt which is next the pinnated part of the trunk. This bone is covered in its whole length with a clear yellowiſh ſkin, which at each end runs out into a ligament; one is inſerted in the top of the pinnated trunk, and the other in the top of the naked trunk: by the help of the upper ligament the end of the bone is either bent into an arch, or diſpoſed in a ſtraight line. The fins are compoſed of two ſkins; the outward one is ſtrong and leathery, and covered over with an infinite number of crimſon ſtreaks; the inner ſkin is thin and tranſparent: the ſuckers are alſo in the ſame manner compoſed of two ſkins, but the outward ſkin is ſomething ſofter. Both the fins and ſuckers are hollow, ſo that the cavity of the ſuckers may communicate with thoſe of the fins, as the cavity of the fins does with that of the trunk.

Dr Shaw, in the Hiſtory of Algiers, ſays, that theſe animals are ſo luminous in the water, that in the night the fiſhermen diſcover fiſhes ſwimming about in various depth of the ſea by the light they give: From this extraordinary quality Linnæus calls this ſpecies of the ſea pen, *pinnatula phoſphorea*, and remarks, after giving the ſynonyms of other authors, *Habitat in oceano fundum illuminans*.

Plate CCCLXXXVIII.

There are other kinds of ſea-pens, or ſpecies of this animal, which have not a reſemblance to a pen. There is the kidney ſhaped ſea pen (ſee fig. 3), the feather of the peacock fiſh (ſee fig. 4.), the pennatula filoſa of Linnæus (ſee fig. 5.), his pennatula ſagita (ſee fig 6.), his pennatula mirabilis (ſee fig. 7), and the finger-ſhaped ſea-pen (ſee fig. 8.). The kidney ſhaped ſea-pen was diſcovered ſome time ago on the coaſt of South Carolina, and ſent to Mr Ellis by John Gregg, Eſq; of Charleſtown. It is of a fine purple colour; the kidney part is about an inch from end to end, and about half an inch wide in the narroweſt part; a tail proceeds from the middle of the body, which is roundiſh, and about an inch long; is alſo full of rings like an earth-worm, and along the middle both of the upper and under part of it there is a ſmall grove which runs from one end to the other, but there is no perforation at either extremity. The upper part of the body is convex, and about an inch thick; the whole ſurface is covered with ſmall yellow ſtarry openings, through which little ſuckers are protruded, each furniſhed with ſix tentacula, or filaments, like what are obſerved on ſome corals; the under part of the body is quite flat, and is full of ramifications of fleſhy fibres, which proceeding from the inſertion of the tail, as a common centre, branch out ſo as to communicate with the ſtarry openings on the exterior edge and upper ſurface of the animal. Of all the pennatulæ yet known the feather ſhaped one, or as it is called the *ſilver-ſea pen* (ſee fig. 1), is the largeſt as well as the moſt ſpecious in its appearance. It is of a beautiful ſilvery white, elegantly ſtriated on each of the feather-like proceſſes with lines or ſtreaks of the deepeſt black. It is very rare, and is a native of the Indian ſeas. There is a very fine ſpecimen of this ſpecies in the Britiſh Muſeum.

Penni, Penny.

PENNI (Giovanni Franciſco), born at Florence in 1488, was the diſciple of Raphael, who obſerving his genius and integrity, intruſted his domeſtic concerns entirely to his management; by which means he got the appellation of *il fatore*, or the "ſteward," which he retained ever after. The genius of Penni was univerſal; but his greateſt pleaſure was in painting landſcapes and buildings: he was an excellent deſigner, and coloured extremely well in oil, diſtemper, and freſco. He painted portraits in an exquiſite ſtyle; and had ſuch happy natural talents, that Raphael left him heir to his fortune in partnerſhip with Julio Romano his fellow-diſciple. After Raphael's death, Penni painted many pictures at Rome, particularly in the palace of Chigi, ſo exactly in the ſtyle of his maſter, that they might not undeſervedly have been imputed to him: he finiſhed, in conjunction with Julio and Pierino del Vaga, the celebrated deſigns of the battles of Conſtantine, and others which Raphael had left imperfect; but differing with them about a copy of the transfiguration, which the pope intended for the king of France, they ſeparated. Penni went to Naples; but the air of that country diſagreeing with his conſtitution, he died ſoon after in 1528. He had a brother called *Lucca, Penni*, who worked at Genoa and other parts of Italy in conjunction with Pierino del Vaga, who married his ſiſter; he went thence to England, where he worked for Henry VIII. and for ſeveral merchants; was employed by Francis I. at Fountainbleau; but at laſt quitted the pencil and devoted himſelf to engraving.

PENNY, or PENY, in commerce, an ancient Engliſh coin, which had formerly conſiderable courſe; but is now generally dwindled into an imaginary money, or money of account. Camden derives the word from the Latin *pecunia*, "money."

The ancient Engliſh penny, penig, or pening, was the firſt ſilver coin ſtruck in England; nay, and the only one current among our Saxon anceſtors: as is agreed by Camden, Spelman, Dr Hicks, &c.

The penny was equal in weight to our three-pence; five of them made one ſhilling, or ſcilling Saxon; 30 a mark or mancuſe, equal to our 7 *s.* 6 *d.*

Till the time of King Edw. I. the penny was ſtruck with a croſs ſo deeply indented in it, that it might be

Penny, Penrith.

eaſily broke, and parted, on occaſion, into two parts, thence called *half-pennies*; or into four, thence called *fourthings*, or *farthings*.—But that prince coined it without indenture: in lieu of which, he firſt ſtruck round halfpence and farthings.

He alſo reduced the weight of the penny to a ſtandard; ordering that it ſhould weigh 32 grains of wheat, taken out of the middle of the ear.—This penny was called the *penny ſterling*.—Twenty of theſe pence were to weigh an ounce; whence the penny became a weight as well as a coin. See STERLING and *Penny-Weight*.

The penny ſterling is now nigh diſuſed as a coin; and ſcarce ſubſiſts, but as a money of account, containing the twelfth part of a ſhilling, or the 240th part of a pound.

PENNY, in ancient ſtatutes, &c. is uſed for all ſilver money. and hence the *ward penny, awr penny, hundred penny, tithing penny*, and *brothal penny*.

Penny Weight, a Troy weight, containing 24 grains; each grain weighing a grain of wheat gathered out of the middle of the ear, well dried. The name took its riſe hence, that this was anciently the weight of one of our ancient ſilver pennies. See PENNY.

Twenty of theſe penny-weights make an ounce Troy.

PENRITH, an ancient town of the county of Cumberland in England, ſeated under a hill called *Penrith-Fell*, near the rivers Eamont and Lowther. It is a great thoroughfare for travellers; but has little other trade, except tanning, and a ſmall manufacture of checks. Formerly it had a caſtle, but it is now in ruins. In the church yard is a monument of great antiquity, conſiſting of two ſtone-pillars 11 feet 6 inches high, and 5 in circumference in the lower part, which is rounded; the upper is ſquare, and tapers to a point; in the ſquare part is ſome fret-work, and the relievo of a croſs: and on the interior ſide of one is the faint repreſentation of ſome animal. But theſe ſtones are mortiſed at their lower part in a round one: they are about 15 feet aſunder, and the ſpace between them is incloſed on each ſide with two very large but thin ſemicircular ſtones; ſo that there is left between pillar and pillar a walk of two feet in breadth. Two of theſe leſſer ſtones are plain, the others have certain figures, at preſent ſcarce intelligible. Not far from theſe pillars is another called the *giant's thumb*, five feet eight inches high, with an expanded head, perforated on both ſides; from the middle the ſtone riſes again into a leſſer head, rounded at top; but no part has a tendency to the figure of a croſs, being in no part mutilated. The pillars are ſaid to have been ſet up in memory of Sir Owen Cæſarius, a famous warrior buried here, who killed ſo many wild bears, which much infeſted this county, that the figures of bears, cut out in ſtone, on each ſide of his grave, were ſet there in remembrance of the execution he made among thoſe beaſts; and it is likewiſe ſaid his body extended from one pillar to the other. In the market-place there is a town-houſe of wood, beautified with bears climbing up a ragged ſtaff. There is a memorandum on the north ſide of the veſtry without, that, in 1598, 2266 perſons died here of the plague. There is a charity-ſchool in this place for 20 boys, and another for 30 girls, maintained by 55 l. a year, by the ſacrament money and pariſh-ſtock. In 1715 the Scotch-Highlanders entered this town, and quartered in it for a night in their way to Preſton, without doing much harm; but in the laſt rebellion, in 1745, they were, it is ſaid, very rapacious and cruel. Its handſome ſpacious church has been lately rebuilt, and the roof ſupported by pillars, whoſe ſhafts are of one entire reddiſh ſtone, dug out of a neighbouring quarry. On the eaſt part of the pariſh, upon the north bank of the river Eamont, there are two caves or grottoes, dug out of the ſolid rock and ſufficient to contain 100 men. The paſſage to them is very narrow and dangerous; and it is poſſible that its perilous acceſs may have given it the name of *Iſis Parlis*; though the vulgar tell ſtrange ſtories of one Iſis, a giant, who lived there in former times, and, like Cacus of old, uſed to ſeize men and cattle, and draw them into his den to devour them. But it is highly probable, that theſe ſubterraneous chambers were made for a ſecure retreat in time of ſudden danger; and the iron gates, which were taken away not long ago, ſeem to confirm that ſuppoſition. W. Long. 3. 16. N. Lat. 54. 35.

Penroſe.

PENROSE (Thomas), was the ſon of the Reverend Mr Penroſe, rector of Newbury, Berks, a man of high character and abilities, deſcended from an ancient Corniſh family, beloved and reſpected by all who knew him. Mr Penroſe, jun. being intended for the church, purſued his ſtudies with ſucceſs, at Chriſt-church, Oxon, until the ſummer of 1762, when his eager turn to the naval and military line overpowering his attachment to his real intereſt, he left his college, and embarked in the unfortunate expedition againſt Nova Colonia, in South America, under the command of Captain Macnamara. The iſſue was fatal. The Clive, (the largeſt veſſel) was burnt; and though the Ambuſcade eſcaped (on board of which Mr Penroſe, acting as lieutenant of marines, was wounded), yet the hardſhips which he afterwards ſuſtained in a prize ſloop, in which he was ſtationed, utterly ruined his conſtitution. Returning to England with ample teſtimonials of his gallantry and good behaviour, he finiſhed, at Hertford College Oxon, his courſe of ſtudies; and having taken orders accepted the curacy of Newbury, the income of which, by the voluntary ſubſcription of the inhabitants, was conſiderably augmented. After he had continued in that ſtation about nine years, it ſeemed as if the clouds of diſappointment, which had hitherto overſhadowed his proſpects, and tinctured his poetical eſſays with gloom, were clearing away; for he was then preſented by a friend, who knew his worth and honoured his abilities, to a living worth near 500 l. *per annum*. It came, however, too late; for the ſtate of Mr Penroſe's health was now ſuch as left little hope except in the aſſiſtance of the waters of Briſtol. Thither he went; and there he died in 1779, aged 36 years. In 1768 he married Miſs Mary Slocock of Newbury, by whom he had one child, Thomas, who was educated at Winton College.

Mr Penroſe was reſpected for his extenſive erudition, admired for his eloquence, and equally beloved and eſteemed for his ſocial qualities. By the poor towards whom he was liberal to his utmoſt ability, he was venerated to the higheſt degree. In oratory and compoſition his talents were great. His pencil was ready as his pen, and on ſubjects of humour had uncommon merit. To his poetical abilities the public, by their reception of his Flights of Fancy, &c. have given a favourable teſtimony. To ſum up the whole, his figure and addreſs were as pleaſing as his mind was ornamented.

PENRYN, a town of Cornwall, in England, ſeated on a hill at the entrance of Falmouth-haven by Pendennis caſtle. It conſiſts of about 300 houſes; and the ſtreets are broad and well paved. There are ſo many gardens and orchards in it, that it reſembles very much a town in a wood. It is well watered with rivulets, and has an arm of the ſea on each ſide of it, with a good cuſtomhouſe and quay, and other neat buildings. It drives a conſiderable trade in pilchards, and in the Newfoundland fiſhery. It was anciently governed by a portreeve; but James I. made it a corporation, conſiſting of a mayor, 11 aldermen, 12 common-councilmen, with a recorder, ſteward, &c. an office of record every three weeks, with a priſon, and power to try felons in their juriſdiction. And he granted, that the mayor and two aldermen ſhould be juſtices of the peace, and that they ſhould have a guildhall. There was once a monaſtery in this place, which was a cell to Kirton; and there are ſtill to be ſeen a tower, and part of the garden walls, the ruins of a collegiate church. It has neither church nor chapel, but belongs to the pariſh of Gluvias, a quarter of a mile off. It has ſent members to parliament ever ſince the firſt year of Queen Mary; and James II. granted it a new charter, whereby their election was veſted in the magiſtracy only; but it was never made uſe of, all the inhabitants that pay ſcot and lot, who are not much above 100, being the electors. Mr Rymer gives a very remarkable account how Penryn was once ſaved by a company of ſtrolling players. He ſays, that towards the latter end of the 16th century the Spaniards were landing to burn the town juſt as the players were ſetting Sampſon upon the Philiſtines; which performance was accompanied with ſuch drumming and ſhouting, that the Spaniards thought ſome ambuſh was laid for them, and ſcampered back to their ſhips. Queen Elizabeth founded a free-ſchool in this place. W. Long. 5. 35. N. Lat. 50. 23.

PENSACOLA, a ſettlement in North America, ſituated at the mouth of a river on the gulf of Mexico, It was eſtabliſhed by the French, and ceded to Great Britain in 1763. Its firſt diſcoverer was Sebaſtian Cabot in 1497.

The year 1781, ſo diſaſtrous to Britain in other reſpects, was alſo remarkable for the reduction of Penſacola by the Spaniards under Don Bernardo Galvez. Great preparations for this expedition had been making at the Havannah; but it was for ſome time retarded by a dreadful hurricane which attacked the Spaniſh fleet, and by which four ſhips of the line, beſides others of inferior note, were loſt, together with the people on board, to the amount of more than 2000. By this diſaſter the remainder were obliged to put back to the Havannah to repair; but as ſoon as the fleet was again judged capable of putting to ſea, an embarkation was made of near 8000 men, with Don Bernardo at their head, together with five ſhips of the line, who arrived at Penſacola on the 9th of March 1781. This force was ſoon augmented by ten ſhips of the line and ſix frigates; while General Campbell, the Britiſh governor, could oppoſe ſuch a formidable armament with few more than 1000 men, conſiſting of ſome regulars and ſeamen, with the inhabitants. The entrance of the harbour, which was the principal object of defence, was guarded by two ſmall armed veſſels, but they were inſufficient to ſecond the batteries that had been erected for its protection; and theſe, without the aſſiſtance of ſome ſhips of force, were incapable of reſiſting a vigorous attack. Notwithſtanding this prodigious odds, however, the Spaniards met with the moſt determined oppoſition. Every inch of ground was diſputed with the greateſt reſolution. The harbour was not forced without the greateſt difficulty, nor could the veſſels be taken that defended it; the companies belonging to them, after ſetting them on fire, retired on ſhore.

The Spaniards, now in poſſeſſion of the harbour, inveſted the place in form, and made their approaches in a cautious and regular manner; while, on the other hand, the beſieged were no leſs active and vigilant in their own defence. Sallies were made occaſionally with great ſucceſs, at the ſame time that an uninterrupted fire was kept up in ſuch a manner as not only greatly to annoy, but even to ſtrike the beſiegers with aſtoniſhment. This incenſed the Spaniſh general the more, as he knew that the garriſon could expect no relief, and therefore that all their efforts could only prolong the date of their ſurrender. The reſiſtance was the more mortifying, as he was perfectly conſcious of the bravery of his troops; and he had artillery fit, as his officers expreſſed themſelves, "to be employed againſt Gibraltar." With all theſe advantages, however, ſo reſolute was the defence of the garriſon, that after the ſiege had continued for two months, very little hope could be entertained of its ſpeedy termination. As they deſpaired therefore of making any effectual impreſſion by means of their cannon, they erected a battery of mortars, with which they bombarded a redoubt that commanded the main avenue to the place; and in this they were favoured by an unexpected accident. On the 8th of May a ſhell burſt open the door of the powder magazine under the redoubt, by which it was blown up, with the loſs of near 100 men killed and wounded. Fortunately for the garriſon, however, two flank-works ſtill remained entire, from both which ſo heavy a fire was kept up, that though an aſſault was immediately given, the aſſailants were repulſed with great ſlaughter. This afforded leiſure to the garriſon to carry off the wounded men, with ſome of the artillery, and to ſpike up the reſt. As the enemy, however, ſoon recovered themſelves, and prepared for a general ſtorm, it was thought proper to abandon the flank works, and retire into the body of the place. The poſſeſſion of theſe outworks, however, gave the enemy ſuch advantages, that the place was no longer tenable. Their ſituation, on a riſing ground, enabled them to command the battery oppoſite to their chief approach with ſmall arms, and to ſingle out the men at their guns. A capitulation therefore became abſolutely neceſſary, which was obtained on honourable terms. The town, with the whole province of Weſt Florida, was confirmed to the Spaniards by the treaty of 1783. W. Long. 87. 20. N. Lat. 30. 22.

PENSANCE, a town of Cornwall, in England, at the bottom of Mountſbay, about ten miles from the Land's End. It was burnt in 1595 by the Spaniards, who,

who, with four galleys, ſurpriſed this part of the coaſt, and ſet fire to ſeveral villages and farms; but it was ſoon after rebuilt, made one of the coinage towns, and has now a conſiderable trade. It lies in the pariſh of Madern noted for its reſtorative ſpring, very effectual in the cure of lameneſs as well as the cholic, &c. It is well built and populous, and has many ſhips belonging to it. The ſhore abounds ſo with lead, tin, and copper ore, that the veins thereof appear on the utmoſt extent of land at low-water mark.

PENSILES HORTI, *Hanging Gardens*, in antiquity. See BABYLON, n° 5.

PENNSYLVANIA, or PENSILVANIA, is one of the United States of North America; formerly called the Province of Pennſylvania. It was named from its honorable founder, the firſt proprietary and governor, William Penn; to whom it was granted by King Charles the Second, anno 1680. (See *WILLIAM PENN.*) It is bounded on the eaſt, by the river Delaware; which ſeparates it from New Jerſey; on the ſouth, by an eaſt and weſt line; which divides it from the States of Delaware and Maryland and a part of Virginia, at the diſtance of about fifteen miles ſouth, from the parallel of its capital, *PHILADELPHIA*; extending weſtward, from the ſaid river, 5° of Longitude; and from thence northward to the beginning of the 43° of North Lat. which ſeparates it from part of the State of New York, on the north. It extends about 260 miles eaſt and weſt, and 155 north and ſouth; containing about 41,000 ſquare miles, and near 26 millions of acres of land.

It was intended, by charter, to contain 3° of Lat. between the parallels of 39° and 43° N. and between about 70° and 76° of Long. Weſt from London: but the grant being afterwards found to encroach upon that of Maryland, to lord Baltimore, which was prior to the grant of Pennſylvania, the boundary between them was afterwards, by agreement, ſettled, as above. William Penn likewiſe, in 1682, obtained of the Duke of York, afterwards James II. of England, &c. the three lower counties on Delaware river and bay; which were in conſequence, called the Territories of Pennſylvania; but ſince, the ſtate of Delaware.

The firſt proprietor William Penn, being one of the people called *Quakers*, the province was conſequently ſettled, at firſt, moſtly by people of that religious ſociety; and in the firſt year arrived between 20 and 30 ſhips, with about 3000 ſettlers, or new coloniſts; and within the two next ſucceeding years, about as many more, which afterwards were annually ſucceeded by many others.

Beſides a few families of Engliſh, there were many Dutch and Swedes in the country before; who were the firſt European ſettlers before it, with what is now called the State of New York, was taken from the Dutch by the Engliſh, in 1664. It is likewiſe ſaid to have included about ten Indian nations, containing many thouſands of thoſe Aborigines: all which the proprietor treated with ſuch prudence, juſtice, and kindneſs, on his firſt arrival, in 1682, and afterwards, that he very remarkably attracted and engaged their love and affection; and his memory has ever ſince been revered among the Indians, even after their reſidence has been entirely removed without the limits of the province, or ſtate; for though the country was granted to him by the king, yet he always agreed with, and gave them full ſatisfaction for their lands, before he ſettled them; and the beſt of advice, for their real happineſs, which they remained not only ſenſible of, but alſo frequently acknowledged in their public treaties afterwards, and demonſtrated by a long continued friendſhip, a conduct of great advantage to the future ſettlement and proſperity of the province.

Pennſylvania enjoys a pleaſant and ſalubrious air; though the tranſition from heat to cold, and vice verſa, in the extreme, is ſometimes very ſudden and injurious. The winter is longer, and more ſevere than in England; the ſummer hotter and dryer; the ſpring very ſhort; the autumn long and mild: but, notwithſtanding the length and ſeverity of the winter, it is generally more clear, agreeable and healthy, than in England, but the ſummer leſs ſo; by reaſon of its more intenſe heat, ſudden and greater changes, than are uſual in that country; which ſometimes cauſe dyſenteries, lingering and putrid fevers, in the latter part of ſummer, &c. The ſnows, in winter, are frequently very deep; and the froſts ſo intenſe, that ſometimes the river Delaware, even nigh Philadelphia, where it is near a mile broad, has been ſo hard frozen over, in one night, as to bear people walking upon it the next morning; hence, in that ſeaſon, its navigation is frequently obſtructed; and ſometimes for many weeks together ſucceſſively; and the ſpring commences near a month later, at Philadelphia, than about London; yet the corn harveſt in Pennſylvania, is near a month earlier than in England.

The nature of the land and ſoil muſt neceſſarily be various, in a country ſo extenſive; but there is more of a ſimilarity, in this reſpect, through the whole of it, than is to be found in the ſame extent in England, and it is well watered by rivers and ſprings. It is more of a middling, improvable kind, than very rich:—And, if the whole be divided into three parts, *viz.* grazing, arable, and barren, or leaſt uſeful, the firſt, or, what may be called very rich land, is but a ſmall proportion, compared with the ſecond; which is a middling kind, and compriſes the greater part of the late, or preſent improved lands, in Pennſylvania;—which, in many places, abounds with great plenty of iron ore, as well as with limeſtone, marble, &c. in others; from the firſt of which are made large quantities of pig and bar iron, hollow-ware, &c.

Moſt of the land, if not all, which is capable of improvement, is now ſuppoſed to be taken up, or ſurveyed to private perſons; though much of it ſtill remains unſettled, or in a wilderneſs ſtate. All the improved parts of Pennſylvania, before the revolution, were divided into eleven counties, and ſince into twenty-two.

As to the face of the country, it abounds with hills, vallies, woods and plains, and is croſſed by ſeveral ranges, or chains, of mountains, running from N. E. to S. W. as, the South, North, or Endleſs Mountains, ſo called; which in different places, take different names; as the Kittatinny, and Allegany mountains, &c. It is moſtly covered with woods, and timber of various kinds, where not improved, or entirely barren; among which, it is ſaid, there are above ſeventeen ſpecies, or varieties, of oak.

The principal rivers are the Delaware and Suſquehanna; each ſeveral hundred miles in length; which have

Pennſylvania.

have many large navigable branches, for boats, barges, and ſmall veſſels; beſides the Allegany, which waters the N. W. part of the ſtate, and joins the Monongahela, at Pittſburg; where they form the Ohio; which from thence proceeds out of the bounds of the ſtate, to the Miſſiſſippi. Theſe three rivers take their riſe in the ſtate of New York, a little northward of Pennſylvania; but the rivers generally, in this country, are broader and ſhallower, than in ſome other parts of the world.

The Delaware, on the weſt ſide of which ſtands the flouriſhing city of Philadelphia, in N. Lat. 40° is navigable for ſea veſſels, thirty miles above the city, where it is near a mile broad; and about 130 from the ſea, along the courſe of the river and bay of Delaware; above which are rocks, or falls, in ſeveral places; tho' paſſable for boats, barges, rafts, &c. at certain times, above 100 miles further. The Schuylkill is a large branch of the Delaware; which it joins about four miles below Philadelphia, after having repleniſhed the interior parts of the country; but its navigation, for large veſſels, is obſtructed by a ſand bar, at its mouth; and, in ſome places above, it has rocks or falls; though at certain times, they are paſſable for boats, flats, rafts, and canoes, for many miles.

The Suſquehanna waters much of the interior parts of the ſtate, being in ſome places, very crooked, broad and ſhallow. It empties into the head of Cheſapeake bay, in Maryland: but its navigation is much obſtructed by falls, or rocks and ſhallows, in divers places.

The chief towns in Pennſylvania, next after the city of Philadelphia, beſides the two old boroughs of Cheſter and Briſtol, (which have long ſeemingly been on the decline) are Lancaſter, York, Carliſle, Reading, Germantown, Harriſburg, and Pittſburg, the laſt of which is ſituated above 260 miles weſtward from Philadelphia, at the junction of the rivers Allegany and Monongahela; and each of them may probably contain from about 2000 to 6000 Inhabitants. Beſides, there are many other conſiderable towns in the ſtate: —but, in a country, like Pennſylvania, where, ſo long as the chief employment continues to be agriculture, many large towns are neither ſo proper, convenient nor common, as where the inhabitants, for want of land, become more engaged in manufacturing, &c.

As to the produce of Pennſylvania, Indian corn is an original; and ſtrawberries, with grapes of various kinds, grow naturally in the woods, as well as mulberries. Deer among the quadrupeds, and wild turkeys, among the winged tribe, were formerly very plentiful, but now ſcarce. But moſt kinds of European grain and fruits, as well as domeſtic, or tame animals have been naturalized there; ſome of the fruits have been meliorated by the change, while others degenerate. But the principal ſtaple of Pennſylvania, and its vicinity, is wheat, flour, rye, and Indian corn. And the quantity of grain, of different kinds, manufactured and unmanufactured, exported from the port of Philadelphia, in 1774, before the revolution, has been computed at above two millions of buſhels;—and in 1772, the quantity of flour alone, exported from thence, amounted to above 325,000 barrels each containing $1\frac{1}{4}$ cwt. In which year, the value of the exports from the port of Philadelphia, when the chief ſtaple or principal of them, was only at about half the the price, to which it has ſince advanced, was eſtimated at near 800,000 l. ſterling; which employed near 800 ſea veſſels. And in the year 1765, were built 5,430 tons of ſhipping, or new veſſels; which employment afterwards, as well as before, was conſtantly upon the increaſe every year:—But the province was very early famed for the fineneſs of its flour aud bread, and the goodneſs of its beer, &c.

Reſpecting the product and trade of Pennſylvania, in a judicious Tract, publiſhed in London, anno 1731, among other things, is the following account, though they have ſince greatly increaſed both in quantity and variety, *viz.*—"The product of Pennſylvania, *for exportation*, is wheat, flour, biſcuit, barrelled beef, and pork, bacon hams, butter, cheeſe, cider, apples, ſoap, myrtle-wax and tallow candles, ſtrong beer, linſeed oil, ſtrong waters, deer-ſkins, and other peltry, hemp, ſome little tobacco, lumber; (i. e. ſawed boards, and timber, for building houſes, cypreſs wood, ſhingles, caſk-ſtaves and heading, maſts, and other ſhip-timber) alſo drugs of various ſorts; (as ſaſſafras, calamus aromaticus, ſnake root, &c.) Laſtly, the Pennſylvanians build about 2000 tons of ſhipping a year, for ſale, over and above what they employ in their own trade; which may be about 6000 tons more. They ſend great quantities of corn to Portugal and Spain, and frequently ſell their ſhips, as well as cargo; and the produce of both is ſent thence to England, where it is always laid out in goods, and ſent home to Pennſylvania. They receive no leſs than from 4000 to 6000 piſtoles from the Dutch iſle of Curraço alone, for proviſions and liquors. And they trade to Surinam, in the like manner, and to the French part of Hiſpaniola, as alſo to the other French ſugar iſlands; from whence they bring back molaſſes, and alſo ſome money. From Jamaica they ſometimes return with all money, and no goods; becauſe their rum and molaſſes are too dear there. And all the money they can get from all parts; as alſo ſugar, rice, tar, pitch, &c. is brought to England, to pay for the manufactures, &c. They carry home from us, which has been for many years paſt, 150,000 l. per annum. They trade to our provinces of New England, Virginia, Maryland, Carolina, and to all the iſlands, in the weſt Indies, (excepting the Spaniſh ones) as alſo to the Canaries, Madeira, and the Azores Iſles; likewiſe to Newfoundland for fiſh; which they carry to Spain, Portugal, and up the Mediterranean; and remit the money to England; which, one way or other, may amount to 60,000 l. yearly."

Hence, as the trade of Pennſylvania, particularly its exports, as well as the number of its inhabitants, before the revolution, in 1776, uſually doubled, at leaſt, every twenty years, ſome idea of its great increaſe, improvement and proſperity, before that time, as well as ſince, may be formed; which, in the ſpace of forty-five years, between theſe two periods, muſt conſequently, at leaſt, have been doubled twice; beſides the advancement made ſince the revolution.

The firſt conſtitution and government of Pennſylvania, under William Penn, was formed on ſuch a generous plan of liberty, and prudent religious toleration; and the moderation and manners of the early ſettlers and inhabitants were ſo remarkably amiable and inviting, that the province was ſettled and improved, with very extraordinary rapidity; and in a manner almoſt unparalleled in any other country, where force, or compulſion, has not been uſed: for it was founded entirely upon the pacific plan. It affords a very remarkable example of the happy effects of the peaceable principle of forbearance, juſtice and moderation, as well as good policy of that people (the Quakers) who firſt eſtabliſhed, and for ſo many years directed and conducted the government and public affairs, &c. Reſpecting which ſays the tract, laſt quoted "That Pennſylvania, which has not any peculiar ſtaple, (like Carolina, Virginia and Maryland, and was begun to be planted ſo late as 1680) ſhould at preſent, in 1731, have more white people in it, than all Virginia, Maryland, and both the Carolinas, is extremely remarkable! And although the youngeſt colony on the continent, they have by far, the fineſt capital city of all Britiſh America."

By the laſt conſtitution of Pennſylvania, ſince the revolution, eſtabliſhed in September 1790, and, as at preſent exiſting in 1795, all legiſlative powers are veſted in a ſenate, and houſe of repreſentatives; elected by the citizens of Philadelphia, and the ſeveral counties in the ſtate, in proportion to their number of taxable inhabitants. The repreſentatives can never be fewer than ſixty, nor more than one hundred. The ſtate is divided into diſtricts, (each conſiſting of one or more contiguous counties) for the choice of ſenators; who cannot be more than one third, nor leſs than one fourth of the number of the repreſentatives. The preſent houſe of repreſentatives conſiſts of 78 members, and the ſenate of 24. The qualifications of the electors are full age, and two years reſidence in the ſtate, with payment of taxes, aſſeſſed at leaſt ſix months before exerciſing the rights of an elector; but the ſons of freeholders are entitled to vote for ſenators and repreſentatives without any qualification except full age (A). The ſupreme executive power is lodged in a governor, choſen every three years by the people; he muſt be, at leaſt, thirty years of age, and have been a citizen or inhabitant of the ſtate for ſeven years next preceeding his election; and no one perſon can be governor more than nine years in twelve (B). The governor has the appointment of all officers, not otherwiſe provided for by the conſtitution; which excluſion only applies to the ſtate treaſurer, who is appointed by the legiſlature; and the ſheriffs and coroners, who are elected by the people of the reſpective counties once in three years.

The inhabitants of Pennſylvania moſtly conſiſt of ſuch people as have removed thither from Europe, and of their deſcendants; many of whom ſtill have connections there; hence they are generally in the practice of the cuſtoms and manners of the different countries from which they originally came, according to their rank in life. The firſt and early ſettlers, or coloniſts, for many years, as before obſerved, were moſtly *Friends*, or the People called *Quakers*, a ſober, induſtrious, and peaceable people; but they have ſince been long exceeded, in number, by thoſe of other religious ſocieties; and the *Preſbyterians* alone, are now ſuppoſed to be more numerous than they. The *Germans*, and their deſcendants, were ſuppoſed, before the revolution, to compoſe near one third part of the inhabitants. They were an honeſt and induſtrious people; and have contributed much to cultivate and improve the country. In the year 1749, about twenty five ſail of ſhips arrived with German paſſengers alone; which brought about 12,000 ſouls; and in ſome other years near as many came annually. Before the year 1776, when their importation was ſuſpended, it appears near 40,000 of them, at different times, had arrived in the province, ſince the firſt ſettlement of it; and their internal increaſe has been very great. Beſides, the people, who arrived from Ireland, were very numerous, before the revolution, ſometimes about 10,000 in a year. Before which period, the inhabitants were thought to double, in number, at leaſt, every twenty years. They were computed at above 300,000, prior to that time; and ſince, in the year 1795, they are ſuppoſed to be about 450,000, in number: for it cannot be reaſonably expected they ſhould long continue to increaſe in ſo great proportion as they have done. As to the *Aborigines* or *Indians*, there have been few, or none of them, reſident within the ſtate for many years laſt paſt: For, as the country improves and becomes more occupied, they remove further back into the wilderneſs. The Negroes, or black people, were never very numerous in the province; as the Quakers were always adverſe to the deteſtable traffic in thoſe people; and at preſent, the total abolition of holding them in bondage is faſt advancing, among all ſorts of people in the ſtate; the importation of them, for ſale, having long ſince ceaſed; ſo that there are but few, or no ſlaves, now in the country, except ſuch as are introduced by ſtrangers.

The Dutch and Swedes, who were ſettled here before Mr Penn became proprietor, chooſing ſtill to reſide in this country, as they did in New York and the Jerſeys, obtained the ſame privileges as the reſt of his majeſty's ſubjects; and their deſcendants are now in a manner the ſame people with the Engliſh, ſpeaking their language, and being governed by their laws and cuſtoms. Mr Penn, however, not ſatisfied with the title granted him by King Charles II. and his brother, bought the lands alſo of the Indians for a valuable conſideration, or what they eſteemed ſuch (though 20 miles were purchaſed, at firſt, for leſs than an acre about Philadelphia would pay now), paying them in cloth, tools, and

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(A) The qualifications of a repreſentative, ſo far as they differ from thoſe of an elector, are, that the former ſhall have been a citizen, or inhabitant of the ſtate, three years next preceeding his election, and the laſt year thereof an inhabitant of the city or county for which he ſhall be choſen. Every ſenator muſt have attained to the age of twenty-five years, and have been a citizen or inhabitant of the ſtate four years next before his election; and the laſt year thereof an inhabitant of the diſtrict for which he ſhall be choſen.

(B) He has a negative on every bill; but if after ſuch negative, two thirds of each houſe agree to paſs the bill, it ſhall be a law; and if any bill ſent to the governor, be not returned within ten days, it ſhall be a law.

Pennſylvania.

and utenſils, to their entire ſatisfaction; for they had not hands to cultivate the hundreth part of their lands. and if they could have raiſed a product, there was nobody to buy; the purchaſe, therefore, was all clear gain to them; and, by the coming of the Engliſh, their peltry trade became ſo profitable, that they ſoon found their condition much altered for the better; and are now as well clothed and fed as the European peaſantry in many places.

Pennſylvania was one of the moſt flouriſhing colonies in North America, having never had any quarrel with the natives. Whenever they deſired to extend their ſettlements, they purchaſed new lands of the ſachems, never taking any by force; but the Indians now ſet a very high price upon their lands, in compariſon of what they did at firſt, and will hardly part with them at any rate. In an eſtimate of the proprietary eſtate of the'province, publiſhed above 40 years ago, we find, that the proprietaries, who alone could purchaſe lands here from the natives, had bought ſeven millons of acres for no more than 750 l. ſterling, which the proprietaries afterwards ſold at the rate of 15 l. for every 100 acres. The Indian council at Onandago, however, diſapproved of their deputies parting with ſo much land; and, in the year 1755, obliged the proprietaries to reconvey great part of the ſame to the Indians.

A diſpute ſubſiſted a long time between the proprietaries of this province and Lord Baltimore, proprietary of Maryland, about the right to certain lands; which was at laſt amicably adjuſted, though greatly in favour of the Penns.

About the year 1704 there happened ſome alteration in the conſtitution of the province. The eſtabliſhment that took place, and ſubſiſted till the American war broke out, conſiſted of ag overnor, council, and aſſembly, each with much the ſame power and privileges as in the neighbouring colony of New York. The lieutenant governor and council were appointed by the proprietors Thomas and Richard Penn, with his majeſty's approbation; but if the laws enacted here were not repealed within ſix months after they had been preſented to the king for his approbation or diſallowance, they were not repealable by the crown after that time.

As to the different religious ſocieties, in Pennſylvania, they are numerous. They conſiſt of the *Friends* or *Quakers;* who were the firſt ſettlers of the province as before obſerved: and have ever ſince flouriſhed in the free enjoyment of their religion. They neither give titles nor uſe compliments in their converſation or writings, believing that *whatſoever is more than yea, yea, and nay, nay, cometh of evil.* They conſcientiouſly avoid, as unlawful, kneeling, bowing, or uncovering the head to any perſon. They diſcard all ſuperfluities in dreſs or equipage; all games, ſports, and plays, as unbecoming the Chriſtian. *Swear not at all,* is an article of their creed literally obſerved in its utmoſt extent. They believe it unlawful to fight in any caſe whatever; and think that if their enemy *ſmite them on the one cheek, they ought to turn to him the other alſo.* They are generally honeſt, punctual, and even punctilious in their dealings; provident for the neceſſities of their poor; friends to humanity, and of courſe enemies to ſlavery; ſtrict in their diſcipline; careful in their obſervance even of the punctilios in dreſs, ſpeech, and manners, which their religion enjoins; faithful in the education of their children; induſtrious in their ſeveral occupations. In ſhort, whatever peculiarities and miſtakes thoſe of other denominations have ſuppoſed they have fallen into, in point of religious doctrines, they have proved themſelves to be good citizens. The *Epiſcopalians,* according to the manner of the Church of England, with the German and Swediſh *Lutherans;* the *Preſbyterians,* with the German *Calviniſts;* the *Church of Rome,* and the *Jews;* the *Baptiſts,* with thoſe among the Germans, called *Mennoniſts* and *Dunkards;* the *Moravians,* or *United Brethren,* and *Schwenkfelders;* beſides the *Methodiſts,* &c all of which have generally lived there always in much friendſhip and harmony, notwithſtanding their different religious opinions. (All which ſee in their proper places.)

Pennſylvania.

In the Philoſophical Tranſactions for 1757, there is an account of a copper ſpring in Pennſylvania. This ſpring riſes from a copper mine, and will diſſolve iron in leſs time by three-fourths than the waters of Wicklow in Ireland, lately deſcribed by Dr William Henry and Dr Bond. From the ſolution of iron in theſe waters, about half the quantity of pure copper is procured by melting it in a crucible: but though theſe waters melt iron ſooner than the Iriſh waters, yet the ſolution does not produce ſo great a proportion of copper; for the pure copper procured from the ſolution of iron in the Iriſh waters is to the ſolution as 16 to 20. In the neighbourhood of this ſpring, which ſupplies 800 hhds. in 24 hours, are many ores of vitriol and ſulphur; the water is of a pale green colour, of an acid, ſweet, auſtere, inky, and nauſeous taſte. It is very heavy; for the hydrometer, which was immerſed in it, ſtood at the ſame height as in a ſolution of one ounce ſix drachms of Engliſh vitriol in a quart of water. A very ſmall quantity of the ſolution of pot aſhes inſtantly precipitates the metallic parts of this water in three different colours; ochre at the top, green in the middle, and white at bottom; a clean knife kept in it a few minutes, is covered with a bright copper colour. But beſides a large proportion of copper, this water contains alſo a large proportion of vitriol of iron. A pint of it exhaled by a ſlow fire left 400 grains of ſolid contents, which appeared to be chiefly ſaline; for 196 grains of it, diſſolved and filtered, did not leave above four grains of indiſſoluble matter. It appears therefore, that the proportion of vitriolic parts in this water is ſix drams to a pint; conſequently it is a ſtronger ſolution of vitriol than ſea-water is of marine ſalt. So that, beſides the copper to be obtained by a ſolution of iron, it will afford great quantities of vitriol, and the great plenty both of water and fuel will make the eſtabliſhment of a copperas work extremely cheap and commodious. This water mixed with common water is frequently uſed as an emetic and cathartic by the country people, and is found very efficacious in the cure of cutaneous diſorders and ſore eyes.

Amongſt the other curioſities of this ſtate may be reckoned another ſpring about 14 feet deep and about 100 ſquare, in the neighbourhood of Reading. A full mill ſtream iſſues from it. The waters are clear and full of fiſhes. From appearances it is probable that this ſpring is the opening or outlet of a very conſiderable river, which a mile and a half or two miles above this place ſinks into the earth, and is conveyed to this outlet in a ſubterranean channel. In the northern parts of Pennſylvania there is a creek called *Oil creek*, which empties into the Allegany river. It iſſues from a ſpring, on the top of which floats an oil ſimilar to that called Barbadoes tar, and from which one man may gather ſeveral gallons in a day. The troops ſent to guard the weſtern poſts halted at this ſpring, collected ſome of the oil, and bathed their joints with it. This gave them great relief from the rheumatic complaints with which they were affected. The waters, of which the troops drank freely, operated as a gentle purge.

PENSION, a ſum of money paid annually for ſervices or conſiderations already paſt. The yearly payment of each member to the houſes of the inns of courts are likewiſe named *penſions*; and the yearly aſſembly of the ſociety of Gray's Inn, to conſult on the affairs of the houſe, is alſo called a *penſion.*

PENSIONARY, or Pensioner, a perſon who has an appointment or yearly ſum, payable during life, by way of acknowledgment, charged on the eſtate of a prince, company, or particular perſon.

Grand Pensionary, an appellation given to the firſt miniſter of the ſtates of Holland. The grand penſionary is chairman in the aſſemblies of the ſtates of that province: he propoſes the matters to be conſulted on; collects the votes; forms and pronounces the reſolutions of the ſtates; opens letters; confers with foreign miniſters, &c. His buſineſs is alſo to inſpect the finances, to maintain the authority of the ſtates, and to ſee that the laws are obſerved; and he is perpetual deputy of the ſtates general of the United Provinces. His commiſſion is, however, given him only for five years; after which it is deliberated whether or not it ſhall be renewed; but there is no inſtance of its being revoked; therefore death only puts an end to the functions of this important miniſter.

Pensionary, is alſo the firſt miniſter of the regency of each city in Holland. His office is to give his advice in affairs relating to the government, either of the ſtate in general, or of the city in particular; and in aſſemblies of the ſtates of the province, he is ſpeaker in behalf of his city. The function, however, of theſe penſionaries is not everywhere alike; in ſome cities they only give their advice, and are never found in aſſemblies of the magiſtrates, except when expreſsly called thither: in others they attend conſtantly; and in others they make the propoſitions on the part of the burgomaſters, draw up their concluſions, &c. They are called *penſionaries*, becauſe they receive an appointment or penſion.

PENSIONER, in general, denotes a perſon who receives a penſion, yearly ſalary, or allowance. Hence

The band of Gentlemen Pensioners, the nobleſt ſort of guard to the king's perſon, conſiſts of 40 gentlemen, who receive a yearly penſion of 100 l.

This honourable band was firſt inſtituted by King Henry VIII. and their office is to attend the king's perſon, with their battle-axes, to and from his chapel-royal, and to receive him in the preſence-chamber, or coming out of his privy-lodgings; they are alſo to attend at all great ſolemnities, as coronations, St George's feaſt, public audiences of ambaſſadors, at the ſovereign's going to parliament, &c.

They are each obliged to keep three double horſes and a ſervant, and ſo are properly a troop of horſe. They wait half at a time quarterly; but on Chriſtmaſ-day, Eaſter-day, Whitſunday, &c. and on extraordinary occaſions, they are all obliged to give their attendance. They have likewiſe the honour to carry up the ſovereign's dinner on the coronation-day and St George's feaſt; at which times the king or queen uſually confer the honour of knighthood on two ſuch gentlemen of the band as their captain preſents.

Their arms are gilt battle-axes; and their weapons, on horſeback, in time of war, are curaſſiers-arms, with ſword and piſtols. Their ſtandard in time of war is, argent, a croſs gules. Their captain is always a nobleman, who has under him a lieutenant, a ſtandard-bearer, a clerk of the check, ſecretary, paymaſter, and harbinger.

Pensioner, in the univerſity of Cambridge and in that of Dublin, has a very peculiar meaning; for thoſe ſtudents, either under graduates or bachelors of arts, are called *penſioners* who live wholly at their own expence, and who receive no emolument whatever from the college of which they are members. They are divided into two kinds, the *greater* and the *leſs*; the former of which are generally called *fellow-commoners*, becauſe they eat with the fellows of their college; the latter are always called *penſioners*, and eat with the ſcholars, who are thoſe ſtudents of the college, either under-graduates or bachelors who are upon the foundation, who receive emoluments from the ſociety, and who are capable of being elected fellows. See Servitor and Sizar.

PENSTOCK, a ſluice or flood-gate, ſerving to retain or let go at pleaſure the water of a mill-pond, or the like.

PENTACEROS, in natural hiſtory, a name given by Linkius and ſome other authors to a kind of *ſtella marina* or ſea ſtar-fiſh, compoſed of five principal rays, with ſeveral tranſverſe hairy or downy proceſſes.

PENTACHORD (compounded of πεντε *five*, and χορδη *ſtring*), an ancient muſical inſtrument with five ſtrings. The invention of the pentachord is referred to the Scythians; the ſtrings were of bullock's leather, and they were ſtruck with a plectrum made of goats horn.

PENTACROSTIC, in poetry, a ſet of verſes ſo diſpoſed, as that there are always five acroſtics of the ſame name, in five diviſions of each verſe. See Acrostic.

PENTACTINODOS, in natural hiſtory, a name given by ſome authors to thoſe ſpecies of ſtar-fiſh which are compoſed of a body divided into five rays.

PENTADACTYLON, five fingers, in botany, a name given by ſome authors to the *ricinus* or *palma Chriſti*, from the figure of its leaf.

PENTADACTYLOS piscis, the *five-fingered fiſh*, in ichthyology, the name of a fiſh common in all the ſeas about the Eaſt Indies, and called by the Duch there *viif vinger viſch*. Plate CCCLXXXI.

It has this name from five black ſtreaks which it has on each ſide, reſembling the prints of five fingers. Its head is flat, convex at the bottom, plain in the ſides, and inclined in the fore part, The ſnout is thick, obtuſe, and round; the lower jaw at its extremity bent and

Patellæ.

Plate CCCLXXXII

Fig. 9.

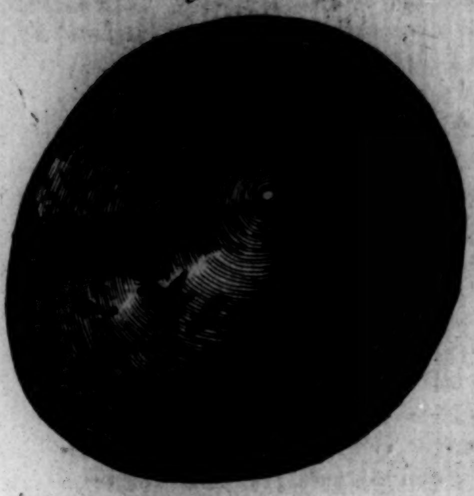


Fig. 8.

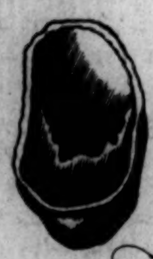


Fig. 5.

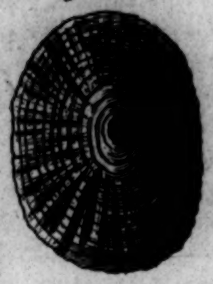
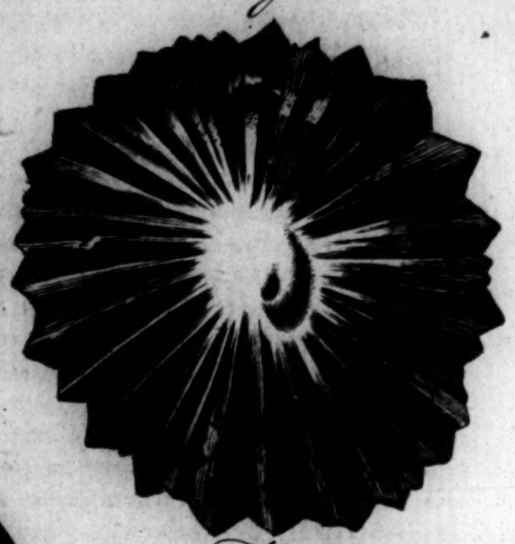


Fig. 1.



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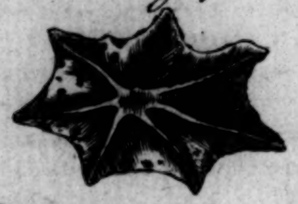


Fig. 2.

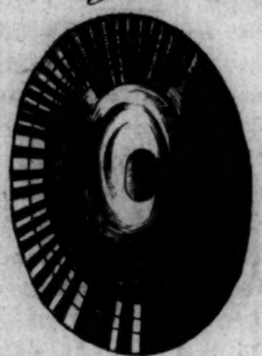


Fig. 6.

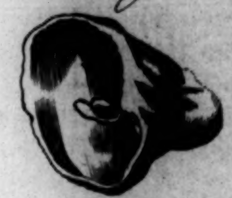


Fig. 4.

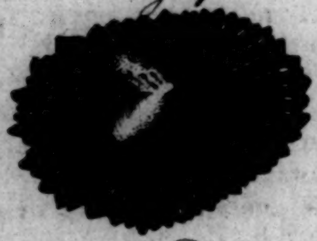


Fig. 3.

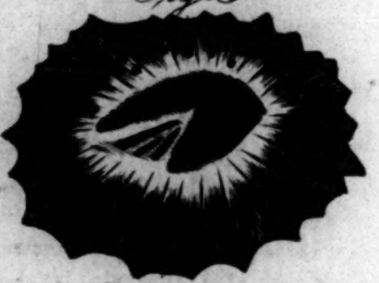


Fig. 13.

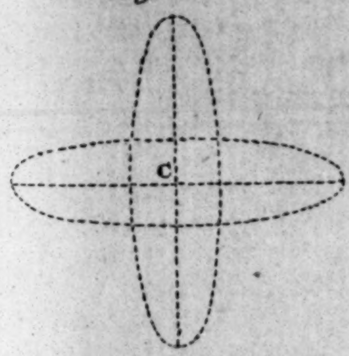


Fig. 12.

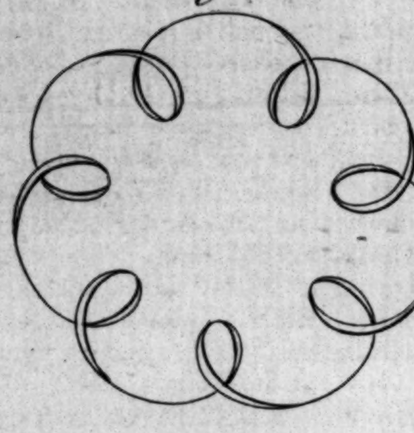


Fig. 11.

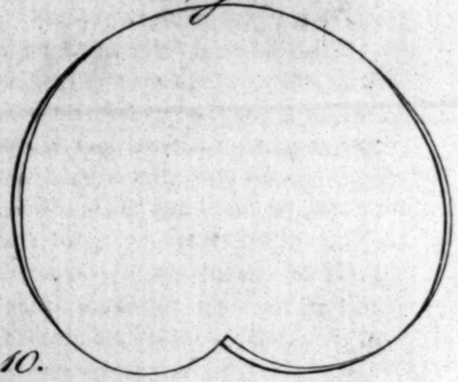
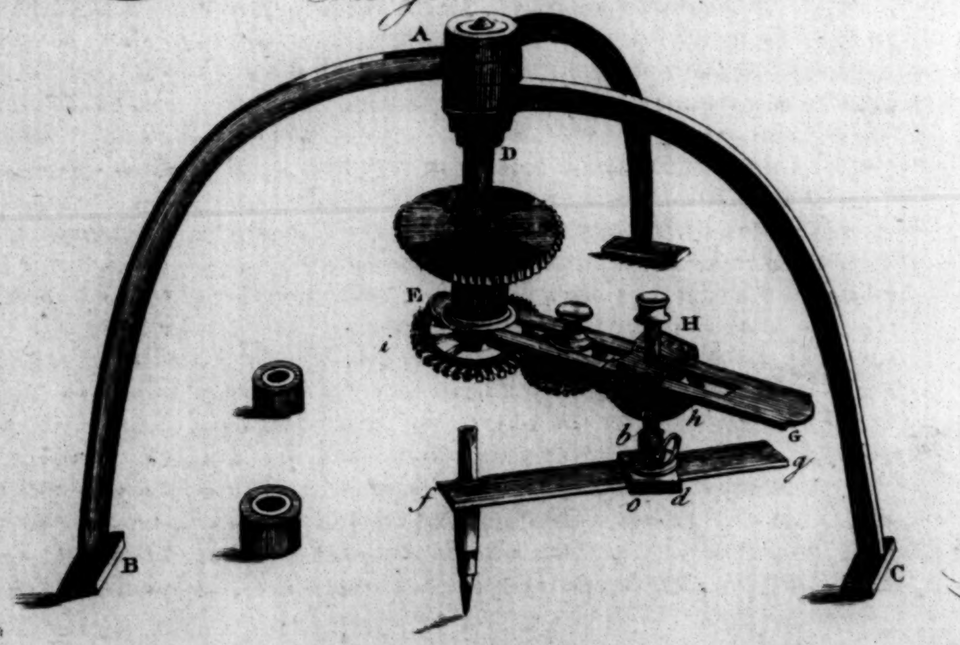


Fig. 10.

The Geometric Pen.


A
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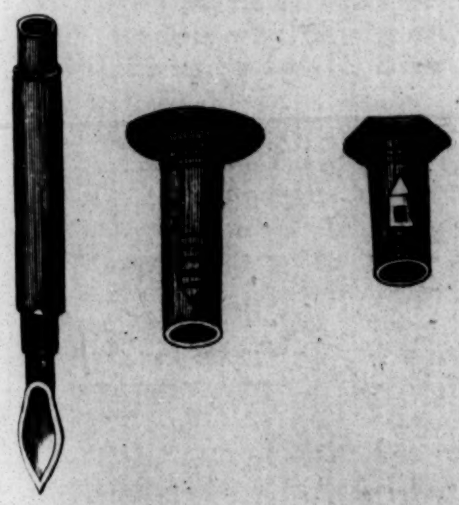
The Fountain Pen.



Ralph sc.

BRITISH MUSEUM

The modern Jews celebrate the pentecoſt for two days. They deck the ſynagogue and their own houſes with garlands of flowers. They hear a ſermon or oration in praiſe of the law, which they ſuppoſe to have been delivered on this day. The Jews of Germany make a very thick cake, conſiſting of ſeven layers of paſte, which they call *Sinai*. The ſeven layers repreſent the ſeven heavens, which they think God was obliged to reaſcend from the top of this mountain. See *Leo of Modena et Buxtorf's ſynag. Jud.*

It was on the feaſt of pentecoſt that the Holy Ghoſt miraculouſly deſcended on the apoſtles of our Lord, who were aſſembled together after his aſcenſion in a houſe at Jeruſalem (Acts ii.)

PENTHESILEA, queen of the Amazons, ſucceeded Orythia, and gave proofs of her courage at the ſiege of Troy, where ſhe was killed by Achilles. Pliny ſays that ſhe invented the battle-ax.

PENTHORUM, in botany; a genus of the pentagynia order, belonging to the pentandria claſs of plants. The calyx is quinquefid; there are either five petals or none; the capſule is five-pointed and quinquelocular.

PENTLAND or PICTLAND FRITH, is a narrow ſtrait of ſix miles between the main land of Scotland and the Orkney iſles. This ſtrait is the great thoroughfare of ſhipping between the eaſtern and weſtern ſeas, the terror of the boldeſt mariners, and the grave of thouſands; where the winter's ſtorms afford many natives on the oppoſite ſhores a better livelihood than they could obtain by fiſhing or huſbandry. They ſearch from place to place, and from one cavern to another, in the hopes of finding timber, caſks, and other floating articles of the wrecked veſſels, of whom ſix or eight are thus ſacrificed ſometimes in one night. The navigation of this paſs is rendered more dangerous by the iſland of Stroma, and two rocks called the *Skerries*, lying near the middle of it.

PENULA, among the ancient Romans, was a coarſe garment or cloak worn in cold or rainy weather. It was ſhorter than the lacerna, and therefore more proper for travelers. It was generally brown, and ſucceeded the toga after the ſtate became monarchial. Auguſtus aboliſhed the cuſtom of wearing the penula over the toga, conſidering it as too effeminate for Romans; and the ædiles had orders to ſuffer none to appear in the circus or forum with the lacerna or penula. Writers are not agreed as to the preciſe difference between theſe two articles of dreſs; but we are all told that they were chiefly worn by the lower orders of people. See LACERNA.

PENULTIMA, or PENULTIMATE *Syllable*, in grammar, denotes the laſt ſyllable but one of a word; and hence the antepenultimate ſyllable is the laſt but two, or that immediately before the penultima.

PENUMBRA, in aſtronomy, a partial ſhade obſerved between the perfect ſhadow and the full light in an eclipſe. It ariſes from the magnitude of the ſun's body: for were he only a luminous point, the ſhadow would be all perfect; but, by reaſon of the diameter of the ſun, it happens, that a place which is not illuminated by the whole body of the ſun, does yet receive rays from a part thereof.

PEON, in the language of Hindoſtan, means a foot ſoldier, armed with ſword and target. In common uſe it is a footman, ſo armed, employed to run before a palanquin. *Piadah* is the proper word, from which *peon* is a corruption.

PEOR, a famous mountain beyond Jordan, which Euſebius places between Heſhbon and Livias. The mountains Nebo, Piſgah, and Peor, were near one another, and probably made but the ſame chain of mountains. It is very likely that Peor took its name from ſome deity of the ſame name, which was worſhipped there; for Peor, Phegor, or Baal-peor, was known in this country. See Numb. xxv. 3. Deut. iv. 3. Pſal. cv. 28.

PEOR, was a city of the tribe of Judah, which is not read in the Hebrew, nor in the Vulgate, but only in the Greek of the Septuagint (Joſh. xv. 60.) Euſebius ſays it was near Bethlehem, and Jerom adds, that in his time it was called *Paora*.

PEPIN DE HERISTAL, or LE GROS, mayor of the palace under Clovis III. Childebert, and Dagobert. The power of theſe mayors in France was ſo great, that they left the ſovereign only the empty title, and in the end ſeized on the throne itſelf.

PEPIN le Brief, or *le Petit*, grandſon to Pepin le Gros, and firſt king of the ſecond race of French monarchs, was mayor of the palace to Childeric III. a weak prince: he contrived to confine him and his ſon Thierri in different monaſteries; and then, with the aſſiſtance of pope Stephen III. he uſurped the ſovereign power. He died in 768, aged 54.

PEPLIS, in botany: A genus of the monogynia order, belonging to the hexandria claſs of plants; and in the natural method ranking under the 17th order *Calycanthemæ*. The perianthium is campanulated; the mouth cleft in 12 parts; there are ſix petals inſerted into the calyx: the capſule is bilocular.

PEPLUS, a long robe worn by the women in ancient times, reaching down to the feet, without ſleeves, and ſo very fine, that the ſhape of the body might be ſeen through it. The Athenians uſed much ceremony in making the peplus, and dreſſing the ſtatue of Minerva with it. Homer makes frequent mention of the peplus of that goddeſs.

PEPPER, PIPER, in natural hiſtory, an aromatic berry of a hot dry quality, chiefly uſed in ſeaſoning. We have three kinds of pepper at preſent uſed in the ſhops, the black, the white, and the long pepper.

Black pepper is the fruit of the piper, and is brought from the Dutch ſettlements in the Eaſt Indies. See PIPER.

The common white pepper is factitious, being prepared from the black in the following manner; they ſteep this in ſea-water, expoſed to the heat of the ſun for ſeveral days, till the rind or outer bark looſens; they then take it out, and, when it is half dry, rub it til the rind falls off; then they dry the white fruit, and the remains of the rind blow away like chaff. A great deal of the heat of the pepper is taken off by this proceſs, ſo that the white kind is more fit for many purpoſes than the black. However, there is a ſort of native white pepper produced on a ſpecies of the ſame plant; which is much better than the factitious, and indeed little inferior to the black.

The long pepper is a dried fruit, of an inch or an inch and an half in length, and about the thickneſs of a large gooſe quill: it is of a browniſh grey colour, cylindrical in figure, and ſaid to be produced on a plant of the ſame genus.

Pepper is principally uſed by us in food, to aſſiſt digeſtion; but the people in the Eaſt Indies eſteem it as a ſtomachic, and drink a ſtrong infuſion of it in water by way of giving them an appetite: they have alſo a way of making a fiery ſpirit of fermented freſh pepper with water, which they uſe for the ſame purpoſes. They have alſo a way of preſerving the common and long pepper in vinegar, and eating them afterwards at meals.

Jamaica Pepper, or *Pimento*. See Pimento.

Pepper-Mint. See Mentha.

Pepper-Pot. See Capsicum.

Pepper-Water, a liquor prepared in the following manner, for microſcopical obſervations: put common black pepper, groſsly powdered, into an open veſſel ſo as to cover the bottom of it half an inch thick, and put to it rain or river-water, till it covers it an inch; ſhake or ſtir the whole well together at the firſt mixing, but never diſturb it afterwards; let the veſſel be expoſed to the air uncovered; and in a few days there will be ſeen a pellicle or thin ſkin ſwimming on the ſurface of the liquor, looking of ſeveral colours.

This is a congeries of multitudes of ſmall animals; and being examined by the microſcope, will be ſeen all in motion: the animals, at firſt ſight, are ſo ſmall as not to be diſtinguiſhable, unleſs to the greateſt magnifiers; but they grow daily till they arrive at their full ſize. Their numbers are alſo continually increaſing, till the whole ſurface of the liquor is full of them, to a conſiderable depth. When diſturbed, they will ſometimes all dart down to the bottom; but they ſoon after come up to the ſurface again. The ſkin appears ſooneſt in warm weather, and the animals grow the quickeſt: but in the ſevereſt cold it would ſucceed, unleſs the water freezes.

About the quantity of a pin's head of this ſcum, taken up on the nib of a new pen, or the tip of a hair-pencil, is to be laid on a plate of clear glaſs; and if applied firſt to the third magnifier, then to the ſecond, and finally to the firſt, will ſhow the different animalcules it contains, of ſeveral kinds and ſhapes as well as ſizes.

PEPPERMINT-Tree, in botany; the *Eucalyptus piperita*.

In a journal of a voyage to New South Wales, by John White, Eſq; we have a plate of this tree, with the following account of it: "This tree grows to the height of more than 100 feet, and is above 30 feet in circumference. The bark is very ſmooth, like that of the poplar. The young branches are long and ſlender, angulated near the top; but as they grow older, the angles diſappear. Their bark is ſmooth, and of a reddiſh brown. The leaves are alternate, lanceolate, pointed, very entire, ſmooth on both ſides, and remarkably unequal or oblique at their baſe; the veins alternate, and not very conſpicuous. The whole ſurface of both ſides of the leaves is marked with numerous minute reſinous ſpots, in which the eſſential oil reſides. The footſtalks are about half an inch in length, round on the under ſide, angular above, quite ſmooth. The flowers we have not ſeen. What Mr White has ſent as the ripe capſules of this tree (although not attached to the ſpecimens of the leaves) grow in cluſters, from ſix to eight in each, ſeſſile and conglomerated. Theſe cluſters are ſupported on angular alternate footſtalks, which form a kind of panicle. Each capſule is about the ſize of an hawthorn-berry, globular, but as it were cut off at the top, rugged on the outſide, hard and woody, and of a dark-brown colour. At the top is a large orifice, which ſhows the internal part of the capſule divided into four cells, and having a ſquare column in the centre, from which the partitions of the cell ariſe. Theſe partitions extend to the rim of the capſule, and terminate in four ſmall projections, which look like the teeth of a calyx. The ſeeds are numerous, ſmall, and angular.

Plate CCCLXXXVIII.

"The name of *peppermint-tree* has been given to this plant by Mr White, on account of the very great reſemblance between the eſſential oil drawn from its leaves and that obtained from the peppermint (*mentha piperita*) which grows in England. This oil was found by Mr White to be much more efficacious in removing all cholicky complaints than that of the Engliſh peppermint, which he attributes to its being leſs pungent and more aromatic. A quart of the oil has been ſent by him to Mr Wilſon.

"The tree above deſcribed appears to be undoubtedly of the ſame genus with that cultivated in ſome greenhouſes in England, which Mr L'Heritier has deſcribed in his *Sertum Anglicum* by the name of *Eucalyptus obliqua*, though it is commonly called in the gardens *Metroſideros obliqua*; but we dare not aſſert it to be the ſame ſpecies, nor can this point be determined till the flowers and every part of both be ſeen and compared; we have compared the beſt ſpecimens we could procure of each, and find no ſpecific difference. The eucalyptus obliqua has, when dried, an aromatic flavour, ſomewhat ſimilar to our plant. We have remarked, indeed, innumerable minute white ſpots, beſides the reſinous ones, on both ſurfaces of the leaves in ſome ſpecimens of the garden plant, which are not to be ſeen in ours; and the branches of the former are rough, with ſmall ſcaly tubercles. But how far theſe are conſtant, we cannot tell. The obliquity in the leaves, one ſide being ſhorter at the baſe than the other, as well as ſomewhat narrower all the way up, as in the *Begonia nitida* of the *Hortus Kewenſis*, is remarkable in both plants.

"The figure repreſents a branch of the peppermint tree in leaf: on one ſide of it part of a leaf ſeperate, bearing the gall of ſome inſect; on the other the fruit above deſcribed."

PERA, one of the ſubburbs of Conſtantinople, where ambaſſadors and Chriſtians uſually reſide. See Constantinople.

PERAMBULATOR, in ſurveying, an inſtrument for meaſuring diſtances, called alſo *pedometer*, *way-wiſer* and *ſurveying-wheel*. See Pedometer.

Plate CCCLXXVII.

It conſiſts of a wheel AA, two feet ſeven inches and a half in diameter: conſequently half a pole, or eight feet three inches, in circumference. On one end of the axis is a nut, three quarters of an inch in diameter, and divided into eight teeth; which, upon moving the wheel round, fall into the eight teeth of another nut *c*, fixed on one end of an iron-rod Q, and thus turn the rod once round in the time the wheel makes one revolution. This rod, lying along a groove in the ſide of the carriage of the inſtrument, under the doted line, has at its other end a ſquare hole, into which is fitted the end *b* of a ſmall cylinder P. This cylinder is diſpoſed under the dial-plate of a movement, at the end of the carriage B, in ſuch a manner as to be moveable about its axis: its end *a* is cut into a perpetual ſcrew, which falling into the 32 teeth of a wheel perpendicular thereto, upon driving the inſtrument forward, that wheel makes a revolution each 16th pole. On the axis of this wheel is a pinion with ſix teeth, which, falling into the teeth of another wheel of 60 teeth, carries it round every 160th pole, or half a mile.

This laſt wheel, carrying a hand or index round with it over the diviſions of a dial-plate, whoſe outer limb is divided into 160 parts, correſponding to the 160 poles, points out the number of poles paſſed over. Again, on the axis of this laſt wheel is a pinion, containing 20 teeth, which falling into the teeth of a third wheel which hath 40 teeth, drives it once round in 320 poles, or a mile. On the axis of this wheel is a pinion of 12 teeth, which, falling into the teeth of a fourth wheel having 72 teeth, drives it once round in 12 miles.

This fourth wheel, carrying another index over the inner limb of the dial-plate, divided into 12 for miles, and each mile ſubdivided into halves, quarters, and furlongs, ſerves to regiſter the revolutions of the other hand, and to keep account of the half miles and miles paſſed over as far as 12 miles.

The uſe of this inſtrument is obvious from its conſtruction. Its proper office is in the ſurveying of roads and large diſtances, where a great deal of expedition, and not much accuracy is required. It is evident, that driving it along and obſerving the hands, has the ſame effect as dragging the chain and taking account of the chains and links.

Its advantages are its hardineſs and expedition; its contrivance is ſuch, that they may be fitted to the wheel of a coach, in which ſtate it performs its office, and meaſures the road without any trouble at all.

PERCA, the Perch; a genus of fiſhes belonging to the order of thoracici. The head is furniſhed with ſcaly and ſerrated opercula; there are ſeven rays in the membrane of the gills; and the fins on the back are prickly. There are 38 ſpecies, principally diſtinguiſhed by peculiarities in the back fin. The moſt remarkable are,

1. The fluviatilis, or common perch, hath a deep body, very rough ſcales, and the back much arched. The colours are beautiful; the back and part of the ſides being of a deep green, marked with five broad black bars pointing downwards; the belly is white, tinged with red; the ventral fins of a fine ſcarlet; the anal fins and tail of the ſame colour, but rather paler. In a lake called *Llyn Raithlyn*, in Merionethſhire in Wales, is a very ſingular variety of this fiſh; the back part is quite hunched, and the lower part of the backbone next the tail ſtrangely diſtorted: in colour and other reſpects it reſembles the common perch, which are as numerous in this lake as the deformed fiſh. They are not peculiar to this water; for Linnæus takes notice of them in a lake at Fahlun in his country. It is ſaid that they are alſo met with in the Thames near Marlow.

The perch was much eſteemed as food by the Romans, nor is it leſs admired at preſent as a firm and delicate fiſh; and the Dutch are particularly fond of it when made into a diſh called *water-ſouchy*. It is a gregarious fiſh; and loves deep holes and gentle ſtreams; is is exceedingly voracious, and an eager biter: if the angler meets with a ſhoal of them, he is ſure of taking every one.—It is a common notion that the pike will not attack this fiſh, on account of the ſpiny fins which the perch erects on its approach. This may be true of large fiſh; but it is well known that ſmall perches are the moſt tempting bait which can be laid for the pike. The perch is very tenacious of life, and has been known to ſurvive a journey of 60 miles in dry ſtraw. It ſeldom grows to a large ſize, though Mr Pennant mentions one that weighed nine pounds; but this, he tells us, is very uncommon.

2. The labrax, or baſſe, is a very voracious, ſtrong, and active fiſh. Ovid calls them *rabidi lupi*, a name continued to them by after writers; and they are ſaid to grow to the weight of fifteen pounds. The irides are ſilvery; the mouth large; the teeth are ſituated in the jaws, and are very ſmall: in the roof of the mouth is a triangular rough ſpace, and juſt at the gullet are two others of a roundiſh form. The ſcales are of a middling ſize, are very thick ſet, and adhere cloſely. The body is formed ſomewhat like that of a ſalmon. The colour of the back is duſky, tinged with blue. The belly is white. In young fiſh the ſpace above the ſide-line is marked with ſmall black ſpots.—It is eſteemed a very delicate fiſh.

3. The perca marina, or ſea-perch, is about a foot long: the head large and deformed; eyes great; teeth ſmall and numerous. On the head and covers of the gills are ſtrong ſpines. The colour red, with a black ſpot on the covers of the gills, and ſome tranſverſe duſky lines on the ſides. It is a fiſh held in ſome eſteem at the table.

4. The cernua, or ruffe, is found in ſeveral of the Engliſh ſtreams: it is gregarious, aſſembling in large ſhoals, and keeping in the deepeſt part of the water. It is of a much more ſlender form than the perch, and ſeldom exceeds ſix inches in length. The teeth are very ſmall, and diſpoſed in rows. It has only one dorſal fin, extending along the greateſt part of the back; the firſt rays, like thoſe of the perch, are ſtrong, ſharp, and ſpiny; the others ſoft. The body is covered with rough compact ſcales. The back and ſides are of a dirty green, the laſt inclining to yellow, but both ſpotted with black. The dorſal fin is ſpotted with black; the tail marked with tranſverſe bars.

5. The nilotica, or perch of the Nile, is taken about Cairo. The fleſh has a ſweet and exquiſite flavour, and is not hard, but very white. It is one of the beſt fiſhes in the Nile; and as it is of the largeſt ſize in Egypt, it adorns a table if brought upon it entire and well fried. See Pilot-*Fiſh*.

PERCEPTION, is a word which is ſo well underſtood, that it is difficult for the lexicographer to give any explanation of it. It has been called the firſt and moſt ſimple act of the mind by which it is conſcious of its own ideas. This definition, however, is improper, as it confounds perception with conſciouſneſs; although the objects of the former faculty are things without us, thoſe of the latter the energies of our own minds. Perception is that power or faculty by which, through the medium of the ſenſes, we have the cognizance of objects diſtinct and apart from ourſelves, and learn that we are but a ſmall part in the ſyſtem of nature. By what proceſs the ſenſes give us this information, we have endeavoured to ſhow elſewhere, (See METAPHYSICS, Part I. Chap. i.); and we ſhould not again introduce the ſubject, but to notice a ſingular opinion of a very able writer, whoſe work has been given to the public ſince our article alluded to had iſſued from the preſs.

Dr Sayers, who is an ornament to that ſchool in which we are ſtrongly inclined to enliſt ourſelves, has endeavoured to prove that no man can perceive two objects, or be conſcious of two ideas at the ſame inſtant. If this be true, not only our theory of time (ſee METAPHYSICS, Part II. Chap. vii.) is groſsly abſurd, but even memory itſelf ſeems to be an imaginary faculty. If a man be not conſcious of his preſent exiſtence, at the very inſtant when he thinks of a paſt event, or reviews a ſeries of paſt tranſactions, it is difficult, to us indeed impoſſible, to conceive what idea he can have of time, or what he can mean when he ſays that he remembers a thing. But let us examine the reaſoning by which the ingenious author endeavours to eſtabliſh his opinion.

“ If we reflect (ſays he †) upon the ſurpriſing velocity with which ideas paſs through the mind, and the remarkable rapidity with which the mind turns itſelf, or is directed from one object of contemplation to another, this might alone give us ſome ſuſpicion that we may probably be miſtaken in ſuppoſing ideas to be ſynchronouſly perceived. Other arguments may be adduced to ſtrengthen this ſuſpicion. It will be granted, I believe, that the mind, whether immaterial or the reſult of organization, has certainly a wholeneſs or unity belonging to it, and that it is either not compoſed of parts, or that no one of the parts from which it originates is itſelf mind: in this caſe, it is difficult to conceive how two ideas ſhould be impreſſed upon the mind at the ſame inſtant; for this would be ſuppoſing that part of the mind could receive one idea, and part another, at the ſame time; but if the parts do not perceive ſingly, this is evidently impoſſible. If, on the other hand, this ſelf-diviſion of the mind does not take place, then if two ideas are nevertheleſs to be perceived at the ſame inſtant, it would ſeem that thoſe ideas muſt be ſo blended with each other, that neither of them could appear diſtinct. If we examine the manner in which a complex idea is perceived, we ſhall find very clearly, that the whole of ſuch an idea is never preſent to the mind at once. In thinking of a centaur, for inſtance, can we at the ſame moment be thinking of the parts of a man and the parts of a horſe? Can we not almoſt detect the gliding of the mind from the one to the other? In contemplating the complex idea of gold, are the ideas of its colour, ductility, hardneſs, and weight, all preſent to the mind at the ſame inſtant? I think, if we accurately attend to it, we ſhall find a perceptible time has elapſed before this complex idea has been perfectly formed in our mind: but if all the parts of a complex idea cannot be recalled at the ſame inſtant, is it not reaſonable to infer that theſe parts are alſo ſingly impreſſed, and not all originally perceived at the ſame inſtant?”

This reaſoning is plauſible, but perhaps not convincing. Surely we have all been conſcious of bodily pain or pleaſure with our eyes open, and been offended by diſagreeable ſmells at the very inſtant that we looked at objects beautifully coloured. That our ideas paſs through the mind with great velocity, and that the mind can rapidly turn itſelf from one ſubject of contemplation to another, are truths which cannot be controverted; but inſtead of leading us to ſuppoſe that two or more objects cannot be ſynchronouſly perceived, or two or more ideas ſynchronouſly apprehended, they appear to furniſh a complete proof of the reverſe of all this. For we beg leave to aſk how we come to know that ideas paſs with velocity through the mind, if we be not all the while conſcious of ſomething that is permanent? If we can contemplate but one idea at once, it is plainly impoſſible that two or more can be compared together; and therefore we cannot poſſibly ſay that any particular train has paſſed through the mind with a degree of velocity greater or leſs than that which we have uſually experienced; nay, we cannot ſay that we have ever experienced a train of ideas at all, or even been conſcious of a ſingle idea, beſides the immediate object of preſent apprehenſion. That the mind is an individual, we moſt readily grant; but that it ſhould therefore be incapable of having *two* ideas ſynchronouſly excited in it, is a propoſition for which the author has brought no evidence. That it is difficult to conceive *how* this is done, we acknowledge; but not that it is more difficult than to conceive how a *ſingle* idea is excited in the mind; for of the mode in which mind and matter mutually operate upon each other, we can form no conception. We know that objects make an impreſſion on the organs of ſenſe; that this impreſſion is by the nerves communicated to the brain, and that the agitation of the brain excites ſenſation in the mind: but in *what way* it excites ſenſation we know not; and therefore have no reaſon to ſuppoſe that two or more different agitations may not excite two or more ſynchronous ſenſations, as well as one agitation excites one ſenſation. That the agitation given to the brain operates on the mind, is known by experience; but experience gives us no information reſpecting the *mode* of that operation. If the mind be, as our author and we ſuppoſe, one individual, it cannot, as mind, be either diviſible or extended; and therefore it is certain that the operation in queſtion cannot be, in the proper ſenſe of the word, impreſſion. Hence we have no right to infer, if two objects be perceived at once, either that the idea of the one muſt be impreſſed on a part of the mind different from that which receives the impreſſion of the other, or that the two impreſſions muſt be ſo blended with each other, that neither of them could appear diſtinct; for this would be to reaſon from one mode of operation to another; with which, upon acknowledged principles, it can have nothing in common.

By far the greater part of our ideas are relicts of *viſible* ſenſations; and of every thing which we can actually ſee at once, we may at once contemplate the idea. That he could at once perceive a centaur, if ſuch a being were preſented to us, cannot ſurely be doubted by any one who has ever looked at a man on horſeback; and therefore that we can at the ſame moment contemplate the whole idea of a centaur, is a fact of which conſciouſneſs will not permit us to doubt.—If, indeed, we chooſe to analyze this complex idea into

† Diſquiſitions Metaphyſical and Literary.

to its component parts, it is ſelf-evident that the mind muſt glide from the one to the other, becauſe the very analyſis conſiſts in the ſeparation of the parts, of which, if after that proceſs we think of them, we muſt think in ſucceſſion: but that we may have at the ſame inſtant, either an actual or ideal view of all the parts of the centaur united, is a propoſition ſo evident as to admit of no other proof than an appeal to experience. In contemplating what the author calls the complex idea of gold, it cannot be denied that the ideas of its colour, ductility, hardneſs, and weight, are never all preſent to the mind at the ſame inſtant: but the reaſon is obvious. Theſe are not all *ideas*, in the proper ſenſe of the word, but ſome of them are ideas, and ſome notions, acquired by very different proceſſes and very different faculties. Colour is an idea of ſenſation, immediately ſuggeſted through the organ of ſight; ductility is a relative notion, acquired by repeated experiments; and gold might be made the object of every ſenſe, without ſuggeſting any ſuch notion. The writer of this article never ſaw an experiment made on the ductility of gold, and has therefore a very obſcure and indiſtinct notion of that property of the metal; but he is conſcious, that he can perceive, at the ſame inſtant, the yellow colour and circular figure of a guinea, and have a very diſtinct, though relative notion, of its hardneſs.

We conclude, therefore, that the mind is capable of two or more ſynchronous perceptions, or ſynchronous ideas; that, during every train which paſſes through it, it is conſcious of its own permanent exiſtence; and that if it were limited to the apprehenſion of but one idea at once, it could have no remembrance of the paſt, or anticipation of the future, but would appear to itſelf, could it make any compariſon, to paſs away like a flaſh of lightning.

PERCH, in land-meaſuring, a rod or pole of 16½ feet in length, of which 40 in length and 4 in breadth make an acre of ground. But, by the cuſtoms of ſeveral counties, there is a difference in this meaſure. In Staffordſhire it is 24 feet; and in the foreſt of Sherwood 25 feet; the foot being there 18 inches long; and in Hertfordſhire a perch of ditching is 21 feet, the perch of walling 16½ feet, and a pole of denſhiered ground is 12 feet, &c.

PERCHE, a territory of Orleannois in France, 35 miles long, and 30 broad; bounded on the north by Normandy; on the ſouth, by Maine and Dunois on the eaſt, by Beauce; and on the weſt, by Maine. It takes its name from a foreſt, and is pretty fertile. The inhabitants carry on a pretty good trade; and the principal town is Belleſme.

PERCOLATION, the ſame with Filtration. See Chemistry, n° 568.

PERCUSSION, in mechanics, the impreſſion a body makes in falling or ſtriking upon another; or the ſhock of two bodies in motion.

PERDICIUM, in botany: A genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked; the pappus is ſimple; the florets bilabiate.

PERDIX. See Tetrao.

PEREASLAW, a ſtrong populous town of Poland, in the palatinate of Kiovia, ſituated on the river Tribecz; in E. Long. 32. 44. N. Lat. 49. 46.

PERENNIALS, or Perennial Flowers, in botany, a term applied to thoſe plants whoſe roots will abide many years, whether they retain their leaves in winter or not. Thoſe which retain their leaves are called *evergreens*; but ſuch as caſt their leaves are named *deciduous*, or *perditols*.

PERFECT, ſomething to which nothing is wanting, or that has all the requiſites of its nature and kind.

Perfect Cadence, in muſic. See Cadence.

Perfect Tenſe, in grammar. See Preterite.

PERFECTION, the ſtate or quality of a thing perfect.

Perfection is divided, according to Chauvinus, into phyſical, moral, and metaphyſical.

Phyſical or natural perfection, is that whereby a thing has all its powers and faculties, and thoſe too in full vigour; and all its parts both principal and ſecondary, and thoſe in their due proportion, conſtitution, &c. in which ſenſe man is ſaid to be perfect when he has a ſound mind in a ſound body. This perfection is by the ſchools frequently termed ενεργητικη, becauſe a thing is enabled thereby to perform all its operations.

Moral perfection is an eminent degree of virtue or moral goodneſs, to which men arrived by repeated acts of piety, beneficence, &c. This is uſually ſubdivided into abſolute or inherent, which is actually in him to whom we attribute it; and imputative, which exiſts in ſome other, and not in him it is attributed to.

Metaphyſical, tranſcendental, or eſſential perfection, is the poſſeſſion of all the eſſential attributes, or of all the parts neceſſary to the integrity of a ſubſtance; or it is that whereby a thing has or is provided of every thing belonging to its nature. This is either abſolute, where all imperfection is excluded, ſuch is the perfection of God; or *ſecundum quid*, and in its kind.

PERFORANS Manus, } See Anatomy, *Table of the Muſcles*.
Perforans Pedis
PERFORATUS Manus.
Perforatus Pedis.

PERFUME, denotes either the volatile effluvia from any body affecting the organ of ſmelling, or the ſubſtance emitting thoſe effluvia; in which laſt ſenſe the word is moſt commonly uſed. The generality of perfumes are made up of muſk, ambergris, civet, roſe and cedar woods, orange-flowers, jeſſamines, jonquils, tuberoſes, and other odoriferous flowers. Thoſe drugs commonly called aromatics, ſuch as ſtorax, frankincenſe, benzoin, cloves, mace, &c. enter the compoſition of a perfume; ſome are alſo compoſed of aromatic herbs or leaves, as lavender, marjoram, ſage, thyme, hyſſop, &c.

The uſe of perfumes was frequent among the Hebrews, and among the orientals in general, before it was known to the Greeks and Romans. In the time of Moſes perfumes muſt have been known in Egypt, ſince he ſpeaks of the art of the perfumer, and gives the compoſition of two kinds of perfumes (Exod. xxx. 25.), of which one was to be offered to the Lord upon the golden altar which was in the holy place; and the other was appointed for the anointing of the high prieſt and his ſons (*ibid.* 34, &c.), as alſo of the tabernacle, and all the veſſels that were uſed in divine ſervice.

The Hebrews had alſo perfumes which they made uſe of in embalming their dead. The compoſition is not known, but it is certain that they generally made uſe of myrrh, aloes, and other ſtrong and aſtringent drugs, proper to prevent putrefaction (John xix. 49.) See the article EMBALMING.

Beſides the perfumes for theſe purpoſes, the ſcripture mentions other occaſions whereon the Hebrews uſed perfumes. The ſpouſe in the Canticles (i. 3.) commends the ſcent of the perfumes of her lover; and her lover in return ſays, that the ſcent of the perfumes of his ſpouſe ſurpaſſes the moſt excellent odours (*id.* iv. 10—14.) He names particularly the ſpikenard, the calamus, the cinnamon, the myrrh, and the aloes, as making a part of theſe perfumes. The voluptuous woman deſcribed by Solomon (Prov. vii. 17.) ſays, that ſhe had perfumed her bed with myrrh, aloes, and cinnamon. The epicures in the book of Wiſdom (ii. 7.) encourage one another to the luxuriant uſe of odours and coſtly perfumes.

Iſaiah (lvii. 9.) reproaches Judea, whom he deſcribes as a ſpouſe faithleſs to God, with being painted and perfumed to pleaſe ſtrangers, "Thou wenteſt to the king with ointment, and didſt increaſe thy perfumes." Ezekiel (xxiii. 41.) ſeems to accuſe the Jews with having profaned the odours and perfumes, the uſe of which was reſerved to ſacred things, by applying them to their own uſe.

They came afterwards to be very common among the Greeks and Romans, eſpecially thoſe compoſed of muſk, ambergris, and civet. The *nardus* and *malobathrum* were held in much eſtimation, and were imported from Syria. The *unguentum nardinum* was variouſly prepared, and contained many ingredients. *Malobathrum* was an Indian plant. Perfumes were alſo uſed at ſacrifices to regale the gods; at feaſts, to increaſe the pleaſures of ſenſation; at funerals, to overpower cadaverous ſmells, and pleaſe the manes of the dead; and in the theatres, to prevent the offenſive effluvia, proceeding from a crowd, from being perceived.

Since people are become ſenſible of the harm they do to the head, perfumes are generally diſuſed among us; however, they are ſtill common in Spain and Italy.

PERGAMA (Virgil), the citadel of Troy; which, becauſe of its extraordinary height, gave name to all high buildings (Servius). Others ſay the walls of Troy were called *Pergama*.

PERGAMUM, (Pliny); called alſo *Pergamea*, (Virgil); *Pergamia*, (Plutarch); a town of Crete, built by Agamemnon in memory of his victory, (Velleius). Here was the burying-place of Lycurgus, (Ariſtoxenus, quoted by Plutarch). It was ſituated near Cydonia (Servius); to what point not ſaid: but Scylax helps him out, who places the Dactynnean temple of Diana, which ſtood near Cydonia (Strabo), to the north of the territory of Pergamia.—Another PERGAMUM (Pliny, Strabo); a town of Myſia, ſituated on the Caicus, which runs by it. It was the royal reſidence of Eumenes, and of the kings of the Attali (Livy). There an ancient temple of Æſculapius ſtood; an aſylum (Tacitus). The ornament of Pergamum was the royal library, vying with that of Alexandria in Egypt; the kings of Pergamum and Egypt rivalling each other in this reſpect (Pliny). Strabo aſcribes this rivalry to Eumenes. Plutarch reckons up 200,000 volumes in the library at Pergamum. Here the *membranæ pergamenæ*, whence the name *parchment*, were invented for the uſe of books, (Varro, quoted by Pliny). The country of Galen, and of Oribaſius chief phyſician to Julian the Apoſtate (Eunapius), called by ſome the *ape of Galen*. Here P. Scipio died (Cicero). Attalus ſon of Eumenes dying without iſſue, bequeathed his kingdom to the Roman people, who reduced it to a province, (Strabo). *Pergameus*, the epithet (Martial). Here was one of the nine *conventus juridici*, or aſſemblies of the *Aſia Romana*, called *Pergamenus*, and the ninth in order (Pliny); which he alſo calls *juriſdictio Pergamena*.

PERGAMUS, an ancient kingdom of Aſia, formed out of the ruins of the empire of Alexander the Great. It commenced about the year 283. The firſt ſovereign was one Philetærus an eunuch, by birth a Paphlagonian, of a mean deſcent, and in his youth a menial ſervant to Antigonus one of Alexander's captains. He afterwards ſerved Lyſimachus king of Macedon and Thrace, who appointed him keeper of his treaſures lodged in Pergamus. While he held this employment, having fallen under the diſpleaſure of Arſinoe wife to Lyſimachus, ſhe found means to make a quarrel between him and his maſter; upon which Philetærus ſeized on the caſtle of Pergamus, together with the treaſures entruſted to his care, amounting to 90,000 talents. At firſt he offered his ſervice, together with his treaſures, to Seleucus king of Syria; but both Seleucus and Lyſimachus dying ſoon after, he kept poſſeſſion of the town and treaſure alſo till his death; which happened 20 years after his revolt from Lyſimachus.

Philetærus left the city of Pergamus to his brother, or, according to ſome, to his brother's ſon Eumenes I. and he, laying hold of the opportunity offered by the diſſenſions among the Seleucidæ, poſſeſſed himſelf of many ſtrong-holds in the province of Aſia; and having hired a body of Galatians, defeated Antiochus, as he was returning from a victory gained over his brother Seleucus Callinicus. By this victory he obtained poſſeſſion of the greater part of Aſia: however, he did not long enjoy his acquiſitions; for he died next year of immoderate drinking, a vice to which he was greatly addicted.

Eumenes was ſucceeded by Attalus I. nephew of Philetærus, and the firſt who took upon him the title of king of Pergamus. He defeated the Gauls, who were deſirous of ſettling in his territory; and, according to Livy, was the firſt of the Aſiatic princes who refuſed to pay a contribution to theſe barbarians. When Seleucus Ceraunus was engaged in other wars, he invaded his territories, and conquered all the provinces on this ſide of Mount Taurus; but was ſoon driven out of his new acquiſitions by Seleucus and his grandfather Achæus, who entering into an alliance againſt him, deprived him of all his newly acquired territories, and even beſieged him in his capital. Upon this

Attalus invited to his aſſiſtance the Gauls who had ſettled in Thrace; and with their help not only obliged the enemy to raiſe the ſiege of Pergamus, but quickly recovered all the provinces he had loſt. After this he invaded Ionia and the neighbouring provinces, where ſeveral cities voluntarily ſubmitted to him. The Teians, Colophonians, with the inhabitants of Egea and Lemnos, ſent duputies declaring themſelves ready to acknowledge him for their ſovereign; the Carſenas, on the other ſide the river Lycus, opened their gates to him, having firſt expelled the governor ſet over them by Achæus. From thence he advanced to Apia, and encamping on the banks of the river Megithus, received homage from the neighbouring nations. But here the Gauls, being frightened by an eclipſe of the moon, refuſed to proceed farther; which obliged Attalus to return to the Helleſpont, where he allowed his allies to ſettle, giving them a large and fruitful territory, and promiſing that he would always aſſiſt and protect them to the utmoſt of his power.

Attalus having thus ſettled his affairs with equal honour and advantage to himſelf, entered into an alliance with Rome, and afterwards joined them in their war againſt Philip king of Macedon. Here he had the command of the Rhodian fleet; with which he not only drove the Macedonians quite out of the ſeas, but having landed his men, he, in conjunction with the Athenians, invaded Macedon, and obliged Philip to raiſe the ſiege of Athens, which he had greatly diſtreſſed; for which ſervices the Athenians not only heaped on him all the favours they could, but called one of their tribes by his name; an honour they had never beſtowed on any foreigner before.

Attalus, not contented with all he had yet done againſt Philip, attempted to form a general confederacy of the Greeks againſt him. But while he was haranguing the Bœotians to this purpoſe, and exhorting them with great vehemence to enter into an alliance with the Romans againſt their common enemy, he fell down ſpeechleſs. However, he came to himſelf again, and deſired to be carried by ſea from Thebes to Pergamus, where he died ſoon after his arrival, in the 72d year of his age and 43d of his reign.

This prince was a man of great generoſity, and ſuch an enthuſiaſt in learning and learned men, that he cauſed a grammarian named *Daphidas* to be thrown into the ſea from the top of a high rock, becauſe he ſpoke diſreſpectfully of Homer.

Attalus was ſucceeded by his eldeſt ſon Eumenes II. He was exceedingly attached to the Romans, inſomuch that he refuſed the daughter of Antiochus the Great in marriage, leſt he ſhould thus have been led into a difference with that people. He alſo gave notice to the Roman ſenate of the tranſactions of Ariarathes king of Cappadocia, who was making great preparations both by ſea and land. Nor did Eumenes ſtop here; for when he ſaw the war about to break out between Antiochus and the Romans, he ſent his brother Attalus to Rome to give information of the proceedings of Antiochus. The ſenate heaped honours both on Eumenes and his brother; and in the war which followed, gave the command of their fleet to the king of Pergamus in conjunction with C Livius Salinator. The victory gained on this occaſion was in great meauſure owing to Eumenes, who boarded ſome of the enemy's ſhips in perſon, and during the whole action behaved with uncommon bravery. Some time afterwards Eumenes, entering the territories of Antiochus with a body of 5000 men, ravaged all the country about Thyatira, and returned with an immenſe booty. But in the mean time Antiochus invading Pergamus in his turn, ravaged the whole country, and even laid ſiege to the capital. Attalus, the king's brother, held out with an handful of men till the Achæans, who were in alliance with Eumenes, ſent 1000 foot and 100 horſe to his aſſiſtance. As this ſmall body of auxiliaries were all choſen men, and commanded by an experienced officer, they behaved with ſuch bravery that the Syrians were obliged to raiſe the ſiege. At the battle of Magneſia, too, Eumenes behaved with the greateſt bravery; not only ſuſtaining the firſt attack of the enemy's elephants, but driving them back again on their own troops, which put the ranks in diſorder, and gave the Romans an opportunity of giving them a total defeat by attacking them opportunely with their horſe. In conſequence of this defeat, Antiochus was obliged to conclude a peace with the Romans on ſuch terms as they pleaſed to preſcribe; one of which was, that he ſhould pay Eumenes 400 talents, and a quantity of corn, in recompence for the damage he had done him.

Eumenes now thought of obtaining ſome reward from the Romans equivalent to the ſervices he had done them. Having gone to Rome, he told the ſenate, that he was come to beg of them that the Greek cities which had belonged to Antiochus before the commencement of the late war, might now be added to his dominions; but his demand was warmly oppoſed by the ambaſſadors from Rhodes, as well as by deputies from all the Greek cities in Aſia. The ſenate, however, after hearing both parties, decided the matter in favour of Eumenes, adding to his dominions all the countries on this ſide of Mount Taurus which belonged to Antiochus; the other provinces lying between that mountain and the river Mæander, excepting Lycia and Caria, were beſtowed on the Rhodians. All the cities, which had paid tribute to Attalus, were ordered to pay the ſame to Eumenes; but ſuch as had been tributary to Antiochus were declared free.

Soon after this Eumenes was engaged in a war with Pruſias king of Bithynia, who made war upon him by the advice of Hannibal the celebrated Carthaginian general. But Eumenes, being aſſiſted by the Romans, defeated Pruſias in an engagement by ſea, and another by land; which ſo diſheartened him, that he was ready to accept of peace on any terms. However, before the treaty was concluded, Hannibal found means to draw Philip of Macedon into the confederacy, who ſent Philocles, an old and experienced officer, with a conſiderable body of troops to join Pruſias Hereupon Eumenes ſent his brother Attalus to Rome with a golden crown, worth 15,000 talents, to complain of Pruſias for making war on the allies of the Roman people without any provocation. The ſenate accepted the preſent, and promiſed to adjuſt every thing to the ſatisfaction of their friend Eumenes, whom they looked upon to be the moſt ſteady ally they had in Aſia. But in the mean time Pruſias, having ventured another ſea-fight, by a contrivance of Hannibal's, gained a complete victory. The Carthaginian commander adviſed him to fill a great many earthen veſſels with various kinds of ſerpents and other poiſonous reptiles, and in the heat of the fight to throw them into the enemies ſhips ſo as to break the pots and let the ſerpents looſe. All the ſoldiers and ſeamen were commanded to attack the ſhip in which Eumenes was, and only to defend themſelves as well as they could againſt the reſt; and that they might be in no danger of miſtaking the ſhip, an herald was ſent before the engagement with a letter to the king. As ſoon as the two fleets drew near, all the ſhips of Pruſias, ſingling out that of Eumenes, diſcharged ſuch a quantity of ſerpents into it, that neither ſoldiers nor ſailors could do their duty, but were forced to fly to the ſhore, leſt they ſhould fall into the enemy's hands. The other ſhips, after a faint reſiſtance, followed the king's example, and were all driven aſhore with great ſlaughter, the ſoldiers being no leſs annoyed by the ſtings of the ſerpents, than by the weapons of the enemy. The greateſt part of the ſhips of Eumenes were burnt, ſeveral taken, and the others ſo much ſhattered that they became quite unſerviceable. The ſame year Pruſias gained two remarkable victories over Eumenes by land, both of which were entirely owing to ſtratagems of Hannibal. But, while matters were thus going on to the diſadvantage of Eumenes, the Romans interfered, and by their deputies not only put an end to the differences between the two kings, but prevailed on Pruſias to betray Hannibal; upon which he poiſoned himſelf, as hath been related under the article HANNIBAL.

Eumenes being thus freed from ſuch a dangerous enemy, engaged in a new war with the kings of Cappadocia and Pontus, in which alſo he proved victorious. His friendſhip for the Romans he carried to ſuch a degree of enthuſiaſm, that he went in perſon to Rome to inform them of the machinations of Perſes king of Macedon. He had before quarrelled with the Rhodians, who ſent ambaſſadors to Rome to complain of him. But as the ambaſſadors happened to arrive while the king himſelf was preſent in the city, the Rhodian ambaſſadors could not obtain any hearing, and Eumenes was diſmiſſed with new marks of favour. This journey, however, had almoſt proved fatal to him; for, on his return, as he was going to perform a ſacrifice at Delphi, two aſſaſſins, ſent by Perſes, rolled down two great ſtones upon him as he entered the ſtraits of the mountains. With one he was dangerouſly wounded on the head and with the other on the ſhoulder. He fell with the blows from a ſteep place, and thus received many other bruiſes; ſo that he was carried on board his ſhip when it could not well be known whether he was dead or alive. His people, however, ſoon finding that he was ſtill alive, conveyed him to Corinth, and from Corinth to Ægina, having cauſed their veſſels to be carried over the Iſthmus.

Eumenes remained at Ægina till his wounds were cured, which was done with ſuch ſecrecy, that a report of his death was ſpread all over Aſia, and even believed at Rome; nay, his brother Attalus was ſo convinced of the truth of this report, that he not only aſſumed the government, but even married Stratonice the wife of Eumenes. But in a ſhort time Eumenes convinced them both of his being alive, by returning to his kingdom. On the receipt of this news, Attalus reſigned the ſovereignty in great haſte, and went to meet his brother; carrying an halberd, as one of his guards. Eumenes received both him and the queen with great tenderneſs, nor did he ever ſay any thing which might tend to make them uneaſy; only it is ſaid he whiſpered in his brother's ear when he firſt ſaw him, "Be in no haſte to marry my wife again till you are ſure that I am dead."

The king being now more than ever exaſperated againſt Perſes, joined the Romans in their war againſt him; but during the courſe of it he ſuddenly cooled in his affection towards thoſe allies whom he had hitherto ſerved with ſo much zeal, and that to ſuch a degree, that he admitted ambaſſadors from Perſes, and offered to ſtand neuter if he would pay him 1000 talents, and for 1500, to influence the Romans to grant him a ſafe and honourable peace. But thoſe negociations were broke off without effect, by reaſon of the diſtruſt which the two kings had of one another. Eumenes could not truſt Perſes unleſs he paid him the money beforehand; while, on the other hand, Perſes did not care to part with the money before Eumenes had performed what he promiſed; neither could he be induced to pay the ſum in queſtion, though the king of Pergamus offered to give hoſtages for the performance of his promiſe. What the reaſon of ſuch a ſudden change in the diſpoſition of Eumenes was, is nowhere told; however, the fact is certain. The negociations abovementioned were concealed from the Romans as long as poſſible; but they ſoon came to be known; after which the republic began to entertain no ſmall jealouſy of their old friend, and therefore heaped favours on his brother Attalus, without taking any notice of the king himſelf. Eumenes had ſent him to Rome to congratulate the ſenate on the happy iſſue of the war with Perſes, not thinking that his practices had been diſcovered. However, the ſenate, without taking any notice of their diſaffection to Eumenes at firſt, entertained Attalus with the greateſt magnificence; then ſeveral of the ſenators who viſited him proceeded to acquaint him with their ſuſpicions of the king, and deſired Attalus to treat with them in his own name, aſſuring him, that the kingdom of Pergamus would be granted him, if he demanded it, by the ſenate. Theſe ſpeeches had at firſt ſome effect; but Attalus, being of an honeſt diſpoſition, and aſſiſted by the advice of a phyſician called *Stratius*, a man of great probity, reſolved not to comply with their deſire. When he was admitted to the ſenate, therefore, he firſt congratulated them on the happy iſſue of the Macedonian war, then modeſtly recounted his own ſervices; and laſtly, acquainted them with the motive of his journey; intreated them to ſend ambaſſadors to the Gauls, who by their authority might ſecure his brother from any danger of their hoſtilities; and he requeſted them alſo, that the two cities of Ænus and Maronea might be beſtowed on himſelf. The ſenate, imagining that Attalus deſigned to chooſe ſome other day to ſue for his brothers's kingdom, not only granted all his requeſts, but ſent him richer and more magnificent preſents than they had ever done before. Upon this Attalus immediately ſet out on his return to Pergamus; which ſo provoked the ſenators, that they declared the cities free which they had promiſed to Attalus, thus rendering ineffectual their promiſe which they were aſhamed openly to revoke; and as for the Gauls, who were on all occaſions ready to invade the kingdom of Pergamus, they ſent ambaſſadors to them, with inſtructions to behave in ſuch a manner as would rather tend to encourage them in their deſign than diſſuade them from it.

Eumenes, being alarmed at theſe proceedings, reſolved to go in perſon to Rome, in order to juſtify himſelf. But the ſenate, having already condemned him in their own minds, reſolved not to hear his vindication. For this reaſon, as ſoon as they heard of his deſign, they made an act that no king ſhould be permitted to enter the gates of Rome. Eumenes, however, who knew nothing of this act, ſet forward on his journey, and landed at Brunduſium; but no ſooner did the Roman ſenate get intelligence of his arrival there, than they ſent a quæſtor acquainting him with the decree of the ſenate; and telling him at the ſame time, that if he had any buſineſs to tranſact with the ſenate he was appointed to hear it, and tranſmit it to them; but if not, that the king muſt leave Italy without delay. To this Eumenes replied, that he had no buſineſs of any conſequence to tranſact, and that he did not ſtand in need of any of their aſſiſtance; and without ſaying a word more, went on board his ſhip, and returned to Pergamus.

On his return home, the Gauls, being encouraged by the cold reception which he had met with at Rome, invaded his teritories, but were repulſed with great loſs by the king, who afterwards invaded the dominions of Pruſias, and poſſeſſed himſelf of ſeveral cities. This produced new complaints at Rome; and Eumenes was accuſed, not only by the ambaſſadors of Pruſias, but alſo by thoſe of the Gauls and many cities in Aſia, of keeping a ſecret correſpondence with Perſes king of Macedon. This laſt charge was confirmed by ſome letters which the Romans themſelves had intercepted; ſo that Eumenes found it impoſſible to keep up his credit any longer at Rome, though he ſent his brothers Athenæus and Attalus thither to intercede for him. The ſenators, in ſhort, had conceived the moſt implacable hatred againſt him, and ſeemed abſolutely bent on his deſtruction, when he died, in the 39 year of his reign, leaving his kingdom and his wife to his brother Attalus. He left one ſon, bnt he was an infant, and incapable of governing the kingdom; for which reaſon Eumenes choſe rather to give the preſent poſſeſſion of the crown to his brother, reſerving the ſucceſſion to his ſon, than to endanger the whole by committing the management of affairs to his ſon's tutors.

Attalus, in the beginning of his reign, found himſelf greatly diſtreſſed by Pruſias king of Bithynia, who not only overthrew him in a pitched battle, but advanced to the very walls of Pergamus, ravaging the country as he marched along; and at laſt reduced the royal city itſelf. The king, however, ſaved himſelf by a timely flight, and diſpatched ambaſſadors to Rome, complaining of the bad uſage of Pruſias. The latter endeavoured to defend himſelf, and to throw the blame on Attalus. But, after a proper inquiry was made into the matter, Pruſias was found to be entirely in the wrong; in conſequence of which, he was at laſt obliged to conclude a peace with his adverſary on the following terms. 1. That he ſhould immediately deliver up to Attalus 20 ſhips with decks. 2. That he ſhould pay 500 talents to Attalus within the ſpace of 20 years. 3. That he ſhould pay 100 talents to ſome of the other Aſiatic nations by way of reparation for the damages they had ſuſtained from him. And, 4. Both parties ſhould be content with what they had before the beginning of the war.

Some time after this, Pruſias having made an unnatural attempt on the life of his ſon Nicomedes, the latter rebelled, and, with the aſſiſtance of Attalus, drove his father from the throne, and, as is ſaid, even murdered him in the temple of Jupiter. The Romans took no notice of theſe tranſactions, but ſhowed the ſame kindneſs to Attalus as formerly. The laſt enterpriſe in which we find Attalus engaged, was againſt Andriſeus the pretended ſon of Perſes king of Macedon, when he aſſiſted the Romans; after which he gave himſelf up entirely to eaſe and luxury, committing ſtate affairs entirely to his miniſters; and thus continued to his death, which happened in the 82d year of his age, about 138 B. C.

Attalus II. was ſucceeded by Attalus III. the ſon of Eumenes; for the late king, conſidering that he only held the crown as a truſt for his nephew, paſſed by his own children in order to give it to him, tho' he appears to have been by no means worthy of it. He is ſaid to have been deprived of his ſenſes thro' the violence of his grief for his mother's death; and indeed, throughout his whole reign, he behaved more like a madman than any thing elſe. Many of his ſubjects of the higheſt quality were cut off with their wives and children, upon the moſt groundleſs ſuſpicions; and for theſe executions he made uſe of mercenaries hired out from among the moſt barbarous nations. Thus he proceeded till he had cut off all the beſt men in the kingdom; after which he fell into a deep melancholy, imagining that the ghoſts of thoſe whom he had murdered were perpetually haunting him. On this he ſhut himſelf up in his palace, put on a mean apparel, let his hair and beard grow, and ſequeſtered himſelf from all mankind. At laſt he withdrew from the palace, and retired into a garden, which he cultivated with his own hands, and filled with all ſorts of poiſonous herbs. Theſe he uſed to mix with wholeſome pulſe, and ſend packets of them to ſuch as he ſuſpected. At laſt, being weary of his amuſement, and living in ſolitude, becauſe no body durſt approach him, he took it in his head to follow the trade of a founder, and make a brazen monument. But, while he laboured at melting and caſting the braſs, the heat of the ſun and furnace threw him into a fever, which in ſeven days put an end to his tyranny, after he had ſat on the throne five years.

On the death of the king, a will was found, by which he left the Roman people heirs of all his goods; upon which they ſeized on the kingdom, and reduced it to a province of their empire by the name of *Aſia Proper*. But Ariſtonicus, a ſon of Eumenes by an Epheſian courteſan reckoning himſelf the lawful heir to the crown, could by no means be ſatisfied with this uſurpation of the Romans, and therefore aſſembled a conſiderable army to maintain his pretenſions. The people in general, having been accuſtomed to a monarchy, dreaded a republican form of government; in conſequence of which, they aſſiſted Ariſtonicus, and ſoon put him in a condition to reduce the whole kingdom. The news, however, were ſoon carried to Rome; and Licinius Craſſus, the pontifex maximus, was ſent into the eaſt, with orders to enforce obedience to the king's will. Hiſtorians take no notice of any forces which were ſent along with this commander; whence it is ſuppoſed, that he depended on aſſiſtance from the Aſiatics, who were in alliance with Rome, or from the Egyptians. But when he came thither, he found both the Syrians and Egyptians ſo reduced, that he could not expect any aſſiſtance from them. However, he was ſoon ſupplied with troops in plenty by the kings of Pontus, Bithynia, Cappadocia, and Paphlagonia; but managed matters ſo ill, that he was entirely defeated and taken priſoner. Thoſe who took him, deſigned to carry him to Ariſtonicus; but he, not able to endure the diſgrace, would have laid violent hands on himſelf if he had not been diſarmed. However, being allowed to keep a rod for managing the horſe on which he ſat, he ſtruck a Thracian ſoldier who ſtood near him ſo violently with it, that he beat out one of his eyes; upon which the other drew his ſword, and run him thro' on the ſpot. His head was brought to Ariſtonicus, who expoſed it to public view; but the body was honourably buried.

Ariſtonicus had no great time to enjoy the fruits of his victory. Indeed he behaved very improperly after it; for, inſtead of preparing to oppoſe the next army, which he might have been aſſured the Romans would ſend againſt him, he ſpent his time in feaſting and revelling. But he was ſoon rouſed out of his lethargy by Perpenna the new conſul, who having aſſembled with incredible expedition the troops of the allies, came unexpectedly upon him, obliged him to venture an engagement at a diſadvantage, and entirely defeated him. Ariſtonicus fled to a city called *Stratonice;* but was ſo cloſely purſued by the conqueror, that the garriſon, having no method of ſupplying themſelves with proviſions, delivered up their leader, as well as a philoſopher named *Bloſius*, who had been the companion and counſellor of Ariſtonicus. The philoſopher behaved with great reſolution after being taken, and openly defended his ſiding with Ariſtonicus, becauſe he thought his cauſe juſt. He exhorted the latter to prevent the diſgrace and miſery of captivity by a voluntary death; but Ariſtonicus, looking upon death as a greater miſery than any captivity, ſuffered himſelf to be treated as his conquerors pleaſed,

In the mean time, a new conſul, named *Manius Aquilius*, being arrived from Rome, ſent a moſt haughty meſſage to Perpenna, requiring him immediately to deliver up Ariſtonicus, as a captive belonging to his triumph when the war ſhould be ended. With this demand Perpenna refuſed to comply, and his refuſal had almoſt produced a civil war. However, this was prevented by the death of Perpenna, which happened ſoon after the diſpute commenced. The Pergamenians, notwithſtanding the defeat and captivity of their leader, ſtill held out with ſuch obſtinacy that Aquilius was obliged to beſiege, and take by force, almoſt every city in the kingdom. In doing this, he took a very effectual, though exceeding cruel method. Moſt of the cities in the kingdom had no other water than what was brought from a conſiderable diſtance in aqueducts. Theſe Aquilius did not demoliſh but poiſoned the water, which produced the greateſt abhorrence of him throughout all the eaſt. At laſt, however, the whole country being reduced, Aquilius triumphed, the unhappy Ariſtonicus was led in chains before his chariot, and probably ended his miſerable life in a dungeon. The country remained ſubject to the Romans while their empire laſted, but is now in the hands of the Turks. The city is half ruined, and is ſtill known by the name of *Pergamus*. It is inhabited by about 3000 Turks, and a few families of poor Chriſtians. E. Long. 27. 27. N. Lat. 30. 3.

PERGUNNAH, in the language of Hindoſtan, means the largeſt ſubdiviſion of a province, whereof the revenues are brought to one particular *head Cutchery*, from whence the accounts and caſh are tranſmitted to the general *Cutchery* of the province.

PERIAGOGE, in rhetoric, is uſed where many things are accumulated into one period which might have been divided into ſeveral.

PERIAGUA, a ſort of large canoe made uſe of in the Leeward iſlands, South America, and the gulf of Mexico. It is compoſed of the trunks of two trees hollowed and united together; and thus differs from the canoe, which is formed of one tree.

PERIANDER, tyrant of Corinth and Corcyra, was reckoned among the ſeven wiſe men of Greece; though he might rather have been reckoned among the moſt wicked men, ſince he changed the government of his country, deprived his countrymen of their liberty, uſurped the ſovereignty, and committed the moſt ſhocking crimes. In the beginning of his reign he behaved with mildneſs; but after his having ſent to the tyrant of Syracuſe to conſult him on the ſafeſt method of government, he abandoned himſelf to cruelty. The latter, having heard Periander's envoys, took them into a field, and, inſtead of anſwering them, pulled up before them the ears of corn which exceeded the reſt in height. Periander, on being told of this action, underſtood what was meant by it. He firſt ſecured himſelf by a good guard and then put the moſt powerful Corinthians to death. He abandoned himſelf to the moſt enormous crimes; committed inceſt with his mother, kicked to death his wife Meliſſa, daughter of Procles king of Epidaurus, notwithſtanding her being with child; and was ſo enraged at Lycophron, his ſecond ſon, for lamenting his mother's death, that he baniſhed him into the iſland of Corcyra. Yet he paſſed for one of the greateſt politicians of his time; and Heraclides tells us, that he forbad voluptuouſneſs; that he impoſed no taxes, contenting himſelf with the cuſtom ariſing from the ſale and the import and export of commodities; that, tho' wicked himſelf, he hated the wicked, and cauſed all pimps to be drowned; laſtly, that he eſtabliſhed a ſenate, and ſettled the expence of its members. He died 585 B. C.

PERIANTHIUM, (from περι "round," and ανθος "the flower,") the flower cup properly ſo called, the moſt common ſpecies of calyx, placed immediately under the flower, which is contained in it as in a cup. See Botany. p. 433, col. 1.

PERICARDIUM, in anatomy, a membranous bag filled with water, which contains the heart in man and many other animals. It is formed by a duplicature of the mediaſtinum, or membrane which divides the thorax into two unequal parts. See Anatomy, n° 121.

PERICARPIUM, (from περι "round," and καρπος "fruit,") the ſeed veſſel; an entrail of the plant big with ſeeds, which it diſcharges when ripe. The ſeed-veſſel is in fact the developed ſeed bud, and may very properly be compared to the fecundated ovary in animals; for it does not exiſt till after the fertilizing of the ſeeds by the male-duſt, and the conſequent fall of the flower. All plants, however, are not furniſhed with a ſeed-veſſel; in ſuch as are deprived of it, the receptacle or calyx performs its functions by incloſing the ſeeds, as in a matrix, and accompanying them to perfect maturity.

PERICHORUS, in antiquity, a name given by the Greeks to their profane games or combats, that is, to ſuch as were not conſecrated to any of the gods.

PERICLES, was one of the greateſt men that ever flouriſhed in Greece. He was educated with all imaginable care; and beſide other maſters, he had for his tutors Zeno, Eleates, and Anaxagoras. He learned from the laſt of theſe to fear the gods without ſuperſtition, and to account for an eclipſe from a natural cauſe. Many were unjuſt enough to ſuſpect him of atheiſm, becauſe he had perfectly ſtudied the doctrine of that philoſopher. He was a man of undoubted courage; and of ſuch extraordinary eloquence, ſupported and improved by knowledge, that he gained almoſt as great an authority under a republican government as if he had been a monarch; but yet he could not eſcape the ſatirical ſtrokes of the comic poets. His diſſoluteneſs with the women was one of the vices with which he was chiefly charged. He died the third year of the Peloponneſian war, after long ſickneſs, which had weakened his underſtanding. Aſpaſia, Pericles's favourite, was a learned woman of Miletus: ſhe taught Socrates rhetoric and politics. As Pericles cared not much for his wife, he willingly gave her up to another, and married Aſpaſia, whom he paſſionately loved.

PERICRANIUM, in anatomy, a thick ſolid coat or membrane covering the outſide of the cranium or ſkull. See Anatomy, n° 4.

PERIGEE, in aſtronomy, that point of the ſun or moon's orbit wherein they are at the leaſt diſtance from the earth, in which ſenſe it ſtands oppoſed to apogee.

PERIGEUX, an ancient epiſcopal town of France, capital of the province of Perigord, ſeated on the river Iſle, in E. Lon. 0. 33. N. Lat. 45. 18. It is remarkable for the ruins of the temple of Venus, and an amphitheatre.

PERIGORD, a province of France, which makes part of Guienne, bounded on the north by Angoumois and a part of Marche, and on the eaſt by Quercy and Limoſin; on the ſouth by Agenois and Bazadois; and on the weſt, by Bourledois, Angoumois, and a part of Saintonge. It is about 83 miles in length, and 60 in breadth. It abounds in iron mines, and the air is pure and healthy. Perigeux is the capital town.

Perigord-Stone, an ore of manganeſe, of a dark grey colour, like the baſaltes or trapp. It may be ſcraped with a knife, but is extremely difficult to be broken. It is found of no regular figure, is very compact, heavy, and as black as charcoal. Its appearance is glittering and ſtriated, like the ore of antimony; its particles being diſpoſed in the form of needles, croſſing one another without any agglutination, inſomuch that ſome are looſe as iron-filings when ſtuck to a loadſtone; reſembling the ſcoria from a blackſmith's furnace. By calcination it becomes harder and of a reddiſh-brown colour, but is not attracted by the magnet. It has a conſiderable ſpecific gravity, does not melt *per ſe*, but with borax runs into a glaſs of the colour of an amethyſt. It is ſcarcely affected by nitrous acid without the addition of ſugar. It ſeems alſo to contain ſome argil and iron. It is met with in Gaſcony and Dauphiny in France, and in ſome parts of England. It is employed by the French potters and enamellers in the glaſſy varniſh of their earthen wares.

PERIGRAPHE, a word uſually underſtood to expreſs a careleſs or inaccurate delineation of any thing; but in Veſalius it is uſed to expreſs the white lines or impreſſions that appear on the muſculus rectus of the abdomen.

PERIHELIUM, in aſtronomy, that part of a planet or comet's orbit wherein it is in its leaſt diſtance from the ſun, in which ſenſe it ſtands in oppoſition to aphelium.

PERIMETER, in geometry, the bounds or limits of any figure or body. The perimeters of ſurfaces or figures are lines; thoſe of bodies are ſurfaces. In circular figures, inſtead of perimeter, we ſay circumference, or periphery.

PERINÆUM, or Perineum, in anatomy, the ſpace between the anus and the parts of generation, divided into two equal lateral diviſions by a very diſtinct line, which is longer in males than in females.

PERINSKIOLD (John), a learned Swediſh writer, born at Stregneſia in Sudermania, in 1654, ſtudied under his father, who was profeſſor of eloquence and poetry, and afterwards became well ſkilled in the antiquities of the north. He was made profeſſor at Upſal, ſecretary antiquary of the king of Sweden, and councellor of the chancery of antiquities. He died in 1720. His principal works are; 1. A Hiſtory of the Kings of Norway. 2. A Hiſtory of the Kings of the North. 3. An Edition of John Meſſenius on the Kings of Sweden, Norway, and Denmark, in 14 vols folio, &c. All Perinſkiold's works are excellent, and highly eſteemed.

PERIOD, in aſtronomy, the time taken up by a ſtar or planet in making a revolution round the ſun; or the duration of its courſe till it return to the ſame part of its orbit. See Planet.

The different periods and mean diſtances of the ſeveral plants are as follow:

	Days	h.	′	″	mean Diſt.
Saturn	10579	6	36	26	953800
Jupiter	4332	12	20	35	520110
Mars	686	23	27	30	152309
Earth	365	6	9	30	100000
Venus	224	16	49	24	72333
Mercury	87	23	15	53	36710

There is a wonderfull harmony between the diſtances of the planets from the ſun, and their periods round him; the great law whereof is, that the ſquares of the periodical times of the primary planets, are to each other as the cubes of their diſtances from the ſun: and likewiſe, the ſquares of the periodical times of the ſecondaries of any planet are to each other as the cubes of their diſtances from that primary. This harmony among the planets is one of the greateſt confirmations of the Copernican hypotheſis. See Astronomy, n° 414.

For the periods of the moon, ſee Astronomy, n° 422, and obſerve *Index* to aſtronomy.

The periods of ſeveral comets are now pretty well aſcertained. See Astronomy, n° 171, &c.

Period, in chronology, denotes a revolution of a certain number of years, or a ſeries of years, whereby, in different nations, and on different occaſions, time is meaſured; ſuch are the following.

Calippic Period, a ſyſtem of ſeventy-ſix years. See Calippic, and Astronomy, n° 11, &c.

Dionyſian Period, or *Victorian Period*, a ſyſtem of 532 lunæ-ſolian and Julian years; which being elapſed, the characters of the moon fall again upon the ſame day and feria, and revolve in the ſame order, according to the opinion of the ancients.

This period is otherwiſe called the *great paſchal cycle*, becauſe the Chriſtian church firſt uſed it to find the true time of the paſcha or eaſter. The ſum of theſe years ariſe by multiplying together the cycles of the ſun and moon.

Hipparchus's Period, is a ſeries of 304 ſolar years, returning in a conſtant round, and reſtoring the new and full moons to the ſame day of the ſolar year, according to the ſentiment of Hipparchus. This period ariſes by multiplying the Calippic period by four.—Hipparchus aſſumed the quantity of the ſolar year to be 365 days 5 hours 55′ 12″; and hence concluded, that in 104 years Calippus's period would err a whole day. He therefore multiplied the period by four, and from the product caſt away an entire day. But even this does not reſtore the new and full moons to the ſame day throughout the whole period; but they are ſometimes anticipated 1 day 8 hours 23′ 29″ 20‴. See Astronomy, n° 14.

Julian Period. See Julian.

Period, in grammar, denotes a ſmall compaſs of diſcourſe, containing a perfect ſentence, and diſtinguiſhed at the end by a point, or full ſtop, thus (.); and in members of diviſion marked by commas, colons, &c.

Father Buffier obſerves two difficulties in the uſe of the period, or point; i. e. in diſtinguiſhing it from the colon, or double point; and in determining juſtly the end of a period, or perfect ſentence. It is remarked, that the ſupernumerary members of a period, ſeparated from the reſt by colons and ſemicolons, uſually commence with a conjunction: yet it is true theſe ſame conjunctions ſometimes rather begin new periods than ſupernumerary members of old ones. It is the ſenſe of things, and the author's own diſcretion, that muſt make the proper diſtinction which of the two in effect it is. No rules will be of any ſervice, unleſs this be admitted as one, that when what follows the conjunction is of as much extent as what precedes it, it is uſually a new period; otherwiſe not.

The ſecond difficulty ariſes hence, that the ſenſe appears perfect in ſeveral ſhort detached phraſes, wherein it does not ſeem there ſhould be periods; a thing frequent in free diſcourſe: as, *We are all in ſuſpenſe: make your propoſals immediately: you will be to blame for detaining us longer.* Where it is evident, that ſimple phraſes have perfect ſenſes like periods, and ought to be marked accordingly; but the ſhortneſs of the diſcourſe making them eaſily comprehended, the pointing is neglected.

De Colonia defines period a ſhort but perfect ſentence, conſiſting of certain parts or members, depending one on another, and connected together by ſome common vinculum. The celebrated definition of Ariſtotle is, a period is a diſcourſe which has a beginning, a middle, and an end, all viſible at one view. Rhetoricians conſider period, which treats of the ſtructure of ſentences, as one of the four parts of compoſition. The periods allowed in oratory are three: A period of two members, called by the Greeks *dicolos*, and by the Latins *bimembris*; a period of three members, *tricolos*, *trimembris*; and a period of four, *quadrimembris*, *tetracolos*. See Punctuation.

Period, in numbers, is a diſtinction made by a point or comma, after every ſixth place, or figure; and is uſed in numeration, for the readier diſtinguiſhing and naming the ſeveral figures or places; which ſee under Numeration.

Period, in medicine, is applied to certain diſeaſes which have intervals, and returns, to denote an entire courſe or circle of ſuch diſeaſe; or its progreſs from any ſtate through all the reſt till it return to the ſame again.

Galen deſcribes period as a time compoſed of an intenſion and remiſſion; whence it is uſually divided into two parts, the paroxyſm or exacerbation, and remiſſion.

In intermitting fevers, the periods are uſually ſtated and regular; in other diſeaſes, as the epilepſy, gout, &c. they are vague or irregular.

Period, in oratory. See there, n° 47.

PERIODIC, or Periodical, ſomething that terminates and comprehends a period; ſuch is a periodic month; being the ſpace of time wherein the moon diſpatches her period.

PERIOECI, περιοικοι, in geography, ſuch inhabitants of the earth as have the ſame latitudes, but oppoſite longitudes, or live under the ſame parallel and the ſame meridian, but in different ſemicircles of that meridian, or in oppoſite points of the parallel. Theſe have the ſame common ſeaſons throughout the year, and the ſame phenomena of the heavenly bodies; but when it is noon-day with the one, it is midnight with the other, there being twelve hours in an eaſt and weſt direction. Theſe are found on the globe by the hour-index, or by turning the globe half round, that is, 180 degrees either way.

PERIOSTEUM, or Perioſtium, in anatomy, a nervous vaſcular membrane, endued with a very quick ſenſe, immediately ſurrounding, in every part, both the internal and external ſurfaces of all the bones in the body, excepting only ſo much of the teeth as ſtand above the gums, and the peculiar places on the bones, in which the muſcles are inſerted. It is hence divided into the external and internal perioſteum; and where it externally ſurrounds the bones of the ſkull, it is generally called the *pericranium*. See Anatomy, n° 4.

PERIPATETICS, philoſophers, followers of Ariſtotle, and maintainers of the peripatetic philoſophy; called alſo *Ariſtotelians*. Cicero ſays, that Plato left two excellent diſciples, Xenocrates and Ariſtotle, who founded two ſects, which only differed in name: the former took the appellation of *Academics*, who were thoſe that continued to hold their conferences in the Academy, as Plato had done before; the others, who followed Ariſtotle, were called *Peripatetics*, from περιπατεω, "I walk;" becauſe they diſputed walking in the Lyceum.

Ammonius derives the name Peripatetic from Plato himſelf, who only taught walking; and adds, that the diſciples of Ariſtotle, and thoſe of Xenocrates, were equally called Peripatetics; the one Peripatetics of the Academy, the other Peripatetics of the Lyceum: but that in time the former quitted the title Peripatetic for that of Academic, on account of the place where they aſſembled; and the latter retained ſimply that of Peripatetic. The greateſt and beſt part of Ariſtotle's philoſophy was borrowed from Plato. Serranus aſſerts, and ſays he could demonſtrate, that there is nothing exquiſite in any part of Ariſtotle's philoſophy, dialectics, ethics, politics, phyſics, or metaphyſics, but is found in Plato. And of this opinion are many of the ancient authors, ſuch as Clemens Alexandrinus, &c. Gale attempts to ſhow, that Ariſtotle borrowed a good deal of his philoſophy, both phyſical, about the firſt matter, and metaphyſical about the firſt being, his affections, truth, unity, goodneſs, &c. from the Scriptures; and adds from Clearchus, one of Ariſtotle's ſcholars, that he made uſe of a certain Jew, who aſſiſted him therein.

Ariſtotle's philoſophy preſerved itſelf *in puris naturalibus* for a long time: in the earlier ages of Chriſtianity, the Platonic philoſophy was generally preferred; but this did not prevent the doctrine of Ariſtotle from forcing its way into the Chriſtian church. Towards the end of the fifth century, it roſe into great credit; the Platonics interpreting in their ſchools ſome of the writings of Ariſtotle, particularly his dialectics, and recommending them to young perſons. This appears to have been the firſt ſtep to that univerſal dominion which Ariſtotle afterwards obtained among the learned, which was at the ſame time much promoted by the controverſies which Origen had occaſioned. This father was zealouſly attached to the Platonic ſyſtem; and therefore, after his condemnation, many, to avoid the imputation of his errors, and to prevent their being counted among the number of his followers, openly adopted the philoſophy of Ariſtotle. Nor was any philoſophy more proper for furniſhing thoſe weapons of ſubtile diſtinctions and captious ſophiſms, which were uſed in the Neſtorian, Arian, and Eutychian controverſies. About the end of the ſixth century, the Ariſtotelian philoſophy, as well as ſcience in general, was almoſt univerſally decried; and it was chiefly owing to Boethius, who explained and recommended it, that it obtained a higher degree of credit among the Latins than it had hitherto enjoyed. Towards the end of the ſeventh century, the Greeks abandoned Plato to the monks, and gave themſelves up entirely to the direction of Ariſtotle; and in the next century, the Peripatetic philoſophy was taught every where in their public ſchools, and propagated in all places with conſiderable ſucceſs. John Damaſcenus very much contributed to its credit and influence, by compoſing a conciſe, plain, and comprehenſive view of the doctrines of the Stagirite, for the inſtruction of the more ignorant, and in a manner adapted to common capacities. Under the patronage of Photius, and the protection of Bardas, the ſtudy of philoſophy for ſome time declined, but was revived again about the end of the ninth century. About the middle of the 11th century, a revolution in philoſophy commenced in France; when ſeveral famous logicians, who followed Ariſtotle as their guide, took nevertheleſs the liberty of illuſtrating and modelling anew his philoſophy, and extending it far beyond its ancient limits. In the 12th century, three methods of teaching philoſophy were in uſe by different doctors: the firſt was the ancient and plain method, which confined its reſearches to the philoſophical notions of Porphyry, and the dialectic ſyſtem, commonly attributed to St Auguſtine, and in which was laid down this general rule, that philoſophical inquiries were to be limited to a ſmall number of ſubjects, leſt, by their becoming too extenſive, religion might ſuffer by a profane mixture of human ſubtilty with its divine wiſdom. The ſecond method was called the Ariſtotelian, becauſe it conſiſted in explications of the works of that philoſopher, ſeveral of whoſe books, being tranſlated into Latin, were almoſt everywhere in the hands of the learned. The third was termed the free method, employed by ſuch as were bold enough to ſearch after truth, in the manner the moſt adapted to render their inquiries ſucceſsful, without rejecting the ſuccours of Ariſtotle and Plato. A reformed ſyſtem of the Peripatetic philoſophy was firſt introduced into the ſchools in the univertſiy of Paris, from whence it ſoon ſpread throughout Europe; and has ſubſiſted in ſome univerſities even to this day, under the name of *ſchool philoſophy*. The foundation thereof is Ariſtotle's doctrine, often miſunderſtood, but ofther miſapplied: whence the retainers thereof may be denominated *Reformed Peripatetics*. Out of theſe have ſprung, at various times, ſeveral branches; the chief are, the Thomists, Scotists, and Nominalists. See theſe articles.

The Peripatetic ſyſtem, after having prevailed with great and extenſive dominion for many centuries, began rapidly to decline towards the cloſe of the 17th, when the diſciples of Ramus attacked it on the one hand, and it had ſtill more formidable adverſaries to encounter in Deſcartes, Gaſſendi, and Newton. See Philosophy.

PERIPATON, in antiquity, the name of that walk in the Lyceum where Ariſtotle taught, and whence the name of Peripatetics given to his followers.

PERIPETIA, in the drama, that part of a tragedy wherein the action is turned, the plot unravelled, and the whole concludes. See Catastrophe.

PERIPHERY, in geometry, the circumference of a circle, ellipſis, or any other regular curvilinear figure. See Geometry.

PERIPHRASIS, circumlocution, formed of περι. "about," and φραζω "I ſpeak," in rhetoric, a circuit or tour of words, much affected by orators, to avoid common and trite manners of expreſſion. The periphraſis is of great uſe on ſome occaſions; and it is often neceſſary to make things be conceived which are not proper to name. It is ſometimes polite to ſuppreſs the names, and only imitate or deſign them. Theſe turns of expreſſion are alſo particularly ſerviceable in oratory; for the ſublime admitting of no direct citations, there muſt be a compaſs taken to inſinuate the authors whoſe authority is borrowed. A periphraſis, by turning round a proper name to make it underſtood, amplifies and raiſes the diſcourſe; but care muſt be taken it be not too much ſwelled, nor extended *mal à propos*; in which caſe it becomes flat and languid.—See Circumlocution and Oratory.

PERIPLOCA, Virginian ſilk, in botany: A genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 30th order, *Contortæ*. The nectarium ſurrounds the genitals, and ſends out five filaments. There are five ſpecies, four of which are natives of warm climates, and can only be raiſed there. The fifth, however, is ſufficiently hardy for this climate. The periploca is a fine climbing plant, that will wind itſelf with its ligneous branches about whatever tree, hedge, pale or pole is near it; and will ariſe, by the aſſiſtance of ſuch ſupport, to the height of above 30 feet; and where no tree or ſupport is at hand to wind about, it will knit or entangle itſelf together in a moſt complicated manner. The ſtalks of the older branches, which are moſt woody, are covered with a dark brown bark, whilſt the younger ſhoots are more mottled with the different colours of brown and grey, and the ends of the youngeſt ſhoots are often of a light green. The ſtalks are round, and the bark is ſmooth. The leaves are the greateſt ornament to this plant; for they are tolerably large, and of a good ſhining green colour on their upper ſurface, and cauſe a variety by exhibiting their under ſurface of an hoary caſt. Their figure is oblong, or rather more inclined to the ſhape of a ſpear, as their ends are pointed, and they ſtand oppoſite by pairs on ſhort footſtalks. Their flowers afford pleaſure to the curious examiner of nature. Each of them ſingly has a ſtar-like appearance; for though it is compoſed of one petal only, yet the rim is divided into ſegments, which expand in ſuch a manner as to form that figure. Their inſide is hairy, as is alſo the nectarium which ſurrounds the petal. Four or five of the flowers grow together, forming a kind of umbel. They are of a chocolate colour, are ſmall, and will be in blow in July and Auguſt, and ſometimes in September. In the country where this genus grows naturally, they are ſucceeded by a long taper pod, with compreſſed ſeeds, having down to their tops.

Dictionary of Planting, &c.

The propagation of this climber is very eaſy; for if the cuttings are planted in a light moiſt ſoil, in the autumn or in the ſpring, they will readily ſtrike root. Three joints at leaſt ſhould be allowed to each cutting: they ſhould be the bottom of the preceding ſummer's ſhoot; and two of the joints ſhould be planted deep in the ſoil. Another, and a never-failing method, is by layers; for if they are laid down in the ground, or a little ſoil only looſely thrown over the young preceding ſummer's ſhoots, they will ſtrike root at the joints, and be good plants for removing the winter following.

PERIPNEUMONY, Περιπνευμονια, formed from περι "about," and πνευμων "lungs," in medicine, an inflammation of ſome part of the thorax, properly of the lungs; attended with an acute fever, and a difficulty of breathing. See Medicine, n° 184.

PERIRRHANTERIUM, a veſſel of ſtone or braſs which was filled with holy water, and with which all thoſe were beſprinkled who were admitted by the ancients to their ſacrifices. Beyond this veſſel no profane perſon was allowed to paſs. We are told by ſome, that it was placed in the *Adytum*, or inmoſt receſs of the temple; others ſay it was placed at the door, which indeed ſeems to be the moſt likely opinion. It was uſed both by Greeks and Romans, and has been evidently borrowed, like many other Pagan ceremonies, by the Church of Rome. The Hebrews had a veſſel for purification.

PERISCII, in geography, the inhabitants of either frigid zone, between the polar circles and the poles, where the ſun, when in the ſummer ſigns, moves only round about them, without ſetting; and conſequently their ſhadows in the ſame day turn to all the points of the horizon.

PERISTALTIC, a vermicular ſpontaneous motion of the inteſtines, performed by the contraction of the circular and longitudinal fibres of which the fleſhy coats of the inteſtines are compoſed; by means whereof the chyle is driven into the orifices of the lacteal veins, and the fæces are protruded towards the anus.

PERISTYLE, in ancient architecture, a building encompaſſed with a row of columns on the inſide.

PERITONÆUM, in anatomy, is a thin, ſmooth, and lubricous membrane, inveſting the whole internal ſurface of the abdomen, and containing moſt of the viſcera of that part as it were in a bag. See Anatomy, n° 89.

PERITROCHIUM, in mechanics, denotes a wheel, or circle, concentric with the baſe of a cylinder, and moveable together with it about its axis. See Mechanics.

PERJURY, in law, is defined by Sir Edward Coke to be a crime committed when a lawful oath is adminiſtered, in ſome judicial proceeding, to a perſon who ſwears wilfully, abſolutely, and falſely, in a matter material to the iſſue or point in queſtion. In ancient times it was in ſome places puniſhed with death; in others it made the falſe ſwearer liable to the puniſhment due to the crime he had charged the innocent perſon with; in others a pecuniary mulct was impoſed. But though it eſcaped human, yet it was thought, amongſt the ancients in general, that the divine vengeance would moſt certainly overtake it; and there are many ſevere inflictions from the hand of God upon record, as monuments of the abhorrence in which this atrocious crime is held by the Deity. The ſouls of the deceaſed were ſuppoſed to be employed in puniſhing perjured perſons. Even the inanimate creation was thought to take revenge for this crime. The Greeks ſuppoſed that no perſon could ſwear falſely by Styx without ſome remarkable puniſhment; and that no perſon guilty of perjury could enter the cave of Palæmon at Corinth without being made a memorable example of divine juſtice. In Sicily, at the temple of the Palici, there were fountains called *Delli*, from which iſſued boiling water, with flames and balls of fire; and we are told that if any perſon ſwore falſely near them, he was inſtantly ſtruck dumb, blind, lame, or dead, or was ſwallowed up by the waters. But although perjury was thus held in general abhorrence, notwithſtanding the credit which was given to ſuch accounts of divine inflictions, it was ſo much practiſed by the Greeks, that *Græca fides* became a proverb. Lovers perjuries, however, were ſuppoſed to paſs unnoticed, or to be very ſlightly puniſhed with blackneſs of the nails, a decayed tooth, or ſome ſmall diminution of beauty.

The ancient philoſophers, however, were ſo afraid of perjury, that even an oath before a judge was never admitted but for want of other proof. Plato's precept was, "Not to adminiſter an oath wantonly, but on deep grounds, and with the ſtricteſt caution." Ulpian gives his opinion thus: "Some are forward to take oaths from a contempt of religion; others, from an extraordinary awe of the Divine Majeſty, carry their fear to an unreaſonable ſuperſtition; ſo make an equitable deciſion of a judge neceſſary." "No man will perjure himſelf (ſays Ariſtotle) who apprehends vengeance from Heaven and diſgrace among men." Clinias was ſo very ſcrupulous, that rather than take an oath (though lawfully), he ſuffered the loſs of three talents. Perjury, in the time of Philo Judeus, was abominated and capitally puniſhed among the Jews; though ſince they have much degenerated, having been poiſoned with the books of the Talmud, which ſays, "He who breaks his promiſſory oath, or any vows he enters into by the year, if he has a mind ſhould be ineffectual and invalid, let him riſe the laſt day of the year, and ſay, Whatever promiſes, oaths, and vows I may think fit to make in the year following, let them be null, void, and of no effect." Tract, iii. part 3. of the *Talmud*, in the treatiſe *Nedharim*, ch. 4. And the modern Jews uſe the ſame artifice, thinking they may then lawfully deceive the Chriſtians. See *Hieron. ex Dictis Talmud*, c. 3. and *Magiſter Joannes de Concor. Legum*, tit. iv. c. 7.

In our law, no notice is taken of any perjury but ſuch as is committed in ſome court of juſtice having power to adminiſter an oath; or before ſome magiſtrate or proper officer inveſted with a ſimilar authority, in ſome proceedings relative to a civil ſuit or a criminal proſecution: for it eſteems all other oaths unneceſſary at leaſt, and therefore would not puniſh the breach of them. For which reaſon it is much to be queſtioned, how far any magiſtrate is juſtifiable in taking a voluntary affidavit in any extrajudicial matter, as is now too frequent upon every petty occaſion; ſince it is more than poſſible that, by ſuch idle oaths, a man may frequently, *in foro conſcientiæ*, incur the guilt, and at the ſame time evade the temporal penalties of perjury. The perjury muſt alſo be corrupt (that is, committed *malo animo)*, wilful, poſitive, and abſolute; not upon ſurpriſe, or the like: it alſo muſt be in ſome point material to the queſtion in diſpute; for if it only be in ſome trifling collateral circumſtance, to which no regard is paid, it it no more penal than in the voluntary extrajudicial oaths before mentioned. Subornation of perjury is the offence of procuring another to take ſuch a falſe oath, as conſtitutes perjury in the principal. The puniſhment of perjury and ſubornation, at common law, has been various. It was anciently death; afterwards baniſhment, or cutting out the tongue; then forfeiture of goods; and now it is fine and impriſonment, and never more to be capable of bearing teſtimony. But the ſtatute 5 Eliſ. c. 9. (if the offender be proſecuted thereon) inflicts the penalty of perpetual infamy, and a fine of 40 l. on the ſuborner; and in default of payment, impriſonment for ſix months, and to ſtand with both ears nailed to the pillory. Perjury itſelf is thereby puniſhed with ſix months impriſonment, perpetual infamy, and a fine of 20 l. or to have both ears nailed to the pillory. But the proſecution is uſually carried on for the offence at common law; eſpecially as, to the penalties before inflicted, the ſtatute 2 Geo. II. c. 25. ſuperadds a power for the court to order the offender to be ſent to the houſe of correction for a term not exceeding ſeven years, or to be tranſported for the ſame period; and makes it felony, without benefit of clergy, to return or eſcape within the time. It has ſometimes been wiſhed, that perjury, at leaſt upon capital accuſations whereby another's life has been or might have been deſtroyed, was alſo rendered capital, upon a principle of retaliation; as it was univerſally by the laws of France. And certainly the odiouſneſs of the crime pleads ſtrongly in behalf of the French law. But it is to be conſidered, that there they admitted witneſſes to be heard only on the ſide of the proſecution, and uſed the rack to extort a confeſſion from the accuſed. In ſuch a conſtitution, therefore, it was neceſſary to throw the dread of capital puniſhment into the other ſcale, in order to keep in awe the witneſſes for the crown; on whom alone the priſoner's fate depended: ſo naturally does one cruel law beget another. But corporal and pecuniary puniſhments, exile, and perpetual infamy, are more ſuited to the genius of the Engliſh law; where the fact is openly diſcuſſed between witneſſes on both ſides, and the evidence for the crown may be contradicted and diſproved by thoſe of the priſoner. Where indeed the death of an innocent perſon has actually been the conſequence of ſuch wilful perjury, it falls within the guilt of deliberate murder, and deſerves an equal puniſhment; which our ancient law in fact inflicted. But the mere attempt to deſtroy life by other means not being capital, there is no reaſon that an attempt by perjury ſhould; much leſs that this crime ſhould, in all judicial caſes, be puniſhed with death. For to multiply capital puniſhments leſſens their effect, when applied to crimes of the deepeſt dye; and, deteſtable as perjury is, it is not by any means to be compared with ſome other offences, for which only death can be inflicted; and therefore it ſeems already (except perhaps in the inſtance of deliberate murder by perjury) very properly puniſhed by our preſent law; which has adopted the opinion of Cicero, derived from the law of the twelve tables, *Perjurii pœna divina, exitium; humana, dedecus.* See Oath.

PERIWIG. See Perruke.

PERIZONIUS (James), a very learned and laborious writer, was born at Dam in 1651. He became profeſſor of hiſtory and eloquence at the univerſity of Franeker, when, by his merit and learning, he made that univerſity flouriſh. However, in 1693, he went to Leyden, where he was made profeſſor of hiſtory, eloquence, and the Greek tongue; in which employment he continued till his death, which happened in 1715. He wrote many Diſſertations, and other learned and curious works, particularly *Origines Babylonicæ et Egyptiacæ*.

Ægyptiacæ, 2 vols 8vo, &c. But the part of his labours which is the moſt generally known, and perhaps the moſt uſeful, is the notes which he wrote upon *Sanctii Minerva*. That work, as publiſhed by Perizonius, certainly ſuggeſted the idea of Haris's Hermes; and we heſitate not to ſay, that our countryman has made hardly any improvement on the ſyſtem of his maſter.

PERIZZITES, the ancient inhabitants of Paleſtine, mingled with the Canaanites. There is alſo great probability that they themſelves were Canaanites; but having no fixed habitations, ſometimes diſperſed in one country and ſometimes in another, they were for that reaſon called *Perizzites*, which ſignifies *ſcattered* or *diſperſed*. *Pherazoth* ſtands for *hamlets* or *villager*. The Perizzites did not inhabit any certain portion of the land of Canaan; there were ſome of them on both ſides the river Jordan, in the mountains, and in the plains. In ſeveral places of ſcripture the Canaanites and Perizzites are mentioned as the two chief people of the country. It is ſaid, for example, that in the time of Abraham and Lot the Canaanite and Perizzite were in the land (Gen. xiii. 7.). The Iſraelites of the tribe of Ephraim complained to Joſhua that they were too much pent up in their peſſeſſion (Joſh. xvii. 15.): he bid them go, if they pleaſed, into the mountains of the Perizzites, and Rephaims or giants, and there clearing the land, to cultivate and inhabit it. Solomon ſubdued the remains of the Canaanites and Perizzites which the children of Iſrael had not rooted out, and made them tributary to him (1 Kings ix. 20, 21. and 2 Chr. viii. 7.) There is ſtill mention made of the Perizzites in the time of Ezra (ix. 1.), after the return from the captivity of Babylon; and ſeveral Iſraelites had married wives from that nation.

PERKIN. See CYDERKIN, and HUSBANDRY, n° 238.

PERMEABLE, a term applied to bodies of ſo looſe a texture as to let ſomething paſs through them.

PERMSKI, or PERMIA, a town of the Ruſſian empire, and capital of a province of the ſame name, ſeated on the river Kama between the Dwina and the Oby; E. Long. 55. 50. N. Lat. 70. 26. The province is bounded on the north by the Samoides, on the weſt by Zirania and Ulatka, and on the eaſt by Siberia.

PERMUTATION, in commerce, the ſame with bartering. In the canon-law, permutation denotes the actual exchange of one benefice for another.

PERNAMBUCO, a province of Brazil, in South America, bounded on the north by Tamera, on the eaſt by the ocean, on the ſouth by Seregippa, and on the weſt by Tapuyers. It is about 200 miles in length and 150 in breadth. The Dutch became maſters of it in 1630, but the Portugueſe ſoon retook it from them. It produces a great quantity of ſugar, and the beſt Brazil wood.

PERNIO, a kibe or chilblain, is a little ulcer, occaſioned by cold in the hands, feet, heels, noſe, and lips. It will come on when warm parts are too ſuddenly expoſed to cold, or when parts from being too cold are ſuddenly expoſed to a conſiderable warmth; and has always a tendency to gangrene, in which it frequently terminates. It moſt commonly attacks children of a ſanguine habit and delicate conſtitution; and may be prevented or removed by ſuch remedies as invigorate the ſyſtem, and are capable of removing any tendency to gangrene in the conſtitution.

PERONÆUS, in anatomy, is an epithet applied to ſome of the muſcles of the perone or fibula. See ANATOMY, *Table of the Muſcles*.

PERONES, a ſort of high ſhoes which were worn not only by country people, but by men of ordinary rank at Rome. In the early times of the commonwealth they were worn even by ſenators: but at laſt they were diſuſed by perſons or figure, and confined to ploughmen and labourers. They were very rudely formed, conſiſting only of hides undreſſed, and reaching to the middle of the leg. Virgil mentions the perones as worn by a company of ruſtic ſoldiers on one foot only.

PERONNE, a ſtrong town of France, in Picardy, capital of Santerre. It is ſaid never to have been taken, though often beſieged. It is ſeated on the river Somme, in E. Long. 3. 1. N. Lat. 44. 50.

PERORATION, in rhetoric, the epilogue or laſt part of an oration, wherein what the orator had inſiſted on through his whole diſcourſe is urged afreſh with greater vehemence and paſſion. The peroration conſiſts of two parts. 1. Recapitulation; wherein the ſubſtance of what was diffuſed throughout the whole ſpeech is collected briefly and curſorily, and ſummed up with new force and weight. 2. The moving the paſſions; which is ſo peculiar to the peroration, that the maſters of the art call this part *ſedes affectuum*. The paſſions to be raiſed are various, according to the various kinds of oration. In a panegyric, love, admiration, emulation, joy, &c. In an invective, hatred, contempt, &c. In a deliberation, hope, confidence, or fear. The qualities required in the peroration are, that it be very vehement and paſſionate, and that it be ſhort; becauſe, as Cicero obſerves, tears ſoon dry up. Theſe qualities were well obſerved by Cicero, who never had an equal in the management of this part of an orator's province; for peroration was his maſterpiece.

Lectures on Belles Letters.

"Concerning peroration (ſays Dr Blair), it is needleſs to ſay much, becauſe it muſt vary ſo conſiderably, according to the ſtrain of the preceding diſcourſe. Sometimes the whole pathetic part comes in moſt properly at the peroration. Sometimes, when the diſcourſe has been entirely argumentative, it is fit to conclude with ſumming up the arguments, placing them in one view, and leaving the impreſſion of them full and ſtrong on the mind of the audience. For the great rule of a concluſion, and what nature obviouſly ſuggeſts, is, to place that laſt on which we chooſe that the ſtrength of our cauſe ſhould reſt.

"In all diſcourſes, it is a matter of importance to hit the preciſe time of concluding, ſo as to bring our diſcourſe juſt to a point; neither ending abruptly and unexpectedly, nor diſappointing the expectation of the hearers when they look for the cloſe, and continuing to hover round and round the concluſion till they become heartily tired of us. We ſhould endeavour to go off with a good grace; not to end with a languiſhing and drawling ſentence, but to cloſe with dignity and ſpirit, that we may leave the minds of the hearers warm;

warm, and diſmiſs them with a ſavourable impreſſion of the ſubject and of the ſpeaker."

PEROTIS, in botany: a genus of the digynia order, belonging to the triandria claſs of plants; and in the natural method ranking under the 4th order, *Gramina*. There is no calyx: the corolla conſiſts of a bivalvular gluma; the valves are oblong, acute, ſomewhat unequal, and terminating in a ſharp beard: it has three capillary ſtamina; the antheræ incumbent; the ſtyli capillary, and ſhorter than the corolla; the ſtigma feathery and divaricated. The corolla ſerves as a perianthium, including a ſingle ſeed of an oblong linear ſhape.—Of this there is only one ſpecies; viz. plumoſus, a native of America, and lately introduced into Kew Garden.

PERPENDICULAR, in geometry, a line falling directly on another line, ſo as to make equal angles on each ſide. See Geometry.

PERPETUAL, ſomething that endures always, or laſts for ever.

Perpetual Motion. See Movement.

PERPIGNAN, a conſiderable town of Rouſillon, in France, with a ſtrong citadel, an univerſity and a biſhop's ſee. It is ſeated on the river Tet; over which there is an handſome bridge, partly in a plain, and partly on a hill. E. Long. 0 43. N. Lat. 45. 18.

PERQUISITE, in a general ſenſe, ſomething gained by a place over and above the ſettled wages.

Perquisite, in law, is any thing gotten by a man's own induſtry, or purchaſed with his money; in contradiſtinction to what deſcends to him from his father or other anceſtor.

PERRAULT (Claude), the ſon of an advocate in parliament, was born at Paris in 1613; and was bred a phyſician, though he never practiſed but among his relations, friends, and the poor. He diſcovered early a particular taſte for the ſciences and fine arts; of which he acquired a conſummate knowledge without the aſſiſtance of a maſter: he excelled in architecture, painting, ſculpture, mathematics, phyſics, and all thoſe arts that relate to deſigning and mechanics. The entrance into the Louvre, which was deſigned by him, is, according to the judgment of Voltaire, one of the moſt auguſt monuments of architecture in the world. M. Colbert put him upon tranſlating Vitruvius into French; which he performed, and publiſhed it in 1673, folio, with figures from his own drawings; which are ſaid to have been more exactly finiſhed than the plates themſelves. When the academy of ſciences was eſtabliſhed, he was one of its firſt members, and was chiefly depended on for mechanics and natural philoſophy. His works are, *Memoires pour ſervir à l'Hiſtoire naturelle des Animaux*, folio, 1676, with figures; *Eſſais de Phyſique*, 4 vols. 12mo, 1688; *Recueil des pluſieurs machines de nouvelle invention*, 4to, 1700, &c. He died in 1688.

Perrault (Charles), the brother of Claude, was born at Paris in 1626, with as great a genius for arts, and a greater for letters, than his brother. Colbert choſe him firſt clerk of the buildings, of which he was ſuperintendant, and afterward made him comptroller-general of the finances under him. He was one of the firſt members of the academy of the belles lettres and inſcriptions, and was received into the French academy in 1671. His poem, *La Peinture*, printed in 1688, was univerſally admired: that intitled *La ſiecle de Louis le Grand*, in which he exalted the modern authors above the ancient, was a prelude to a war with all the learned. After he had diſengaged himſelf from this conteſt, he applied himſelf to draw up eulogies of ſeveral great men of the 17th century, with their portraits, of which he has collected 102. There are other eſteemed works of Perrault.—Beſides theſe there were two other brothers, *Peter* and *Nicholas*, who made themſelves known in the literary world.

PERRON (James Davy Du,) a cardinal diſtinguiſhed by his abilities and learning, was born in the canton of Bern in 1556. He was educated by Julian Davy, his father, a very learned Calviniſt, who taught him Latin and the mathematics; after which, he by himſelf became acquainted with the Greek and Hebrew, philoſophy, and the poets. Philip Deſportes, abbot of Tyron, made him known to Henry III. king of France, who conceived a great eſteem for him. Some time after, Du Perron abjured Calviniſm, and afterwards embraced the eccleſiaſtical function; and having given great proofs of his wit and learning, he was choſen to pronounce the funeral oration of Mary queen of Scots. After the murder of Henry III. he retired to the houſe of Cardinal de Bourbon, and took great pains in bringing back the Proteſtants to the church of Rome. Among others, he gained over Henry Spondanus, afterwards biſhop of Pamiers. He alſo chiefly contributed to engage Henry IV. to change his religion; and that prince ſent him to negociate his reconciliation to the holy ſee, in which he ſucceeded. Du Perron was conſecrated biſhop of Evereaux while he reſided at Rome. On his return to France, he wrote, preached, and diſputed againſt the reformed; particularly againſt Du Pleſſis Mornay, with whom he had a public conference in the preſence of the king at Fontainbleau. He was made cardinal in 1604 by pope Clement VIII. at the ſolicitation of Henry IV. who afterwards nominated him to the archbiſhopric of Sens. The king at length ſent him to Rome with Cardinal Joyeuſe in order to terminate the diſputes which had ariſen between Paul V. and the Venetians. It is ſaid that this pope had ſuch an high opinion of the addreſs of the cardinal Du Perron, that he uſed to ſay, "Let us pray to God to inſpire the cardinal Du Perron, for he will perſuade us to do whatever he pleaſes." After the death of Henry IV. he retired into the country, where he put the laſt hand to his works; and, ſetting up a printing-houſe, corrected every ſheet himſelf. He died at Paris in 1611. His works were collected after his death, and publiſhed at Paris in 3 vols. folio.

PERROT (Nicholas), Sieur d'Ablancourt, one of the firſt geniuſes of his age, was born at Chalons in 1606. After ſtudying philoſophy about three years, he was ſent to Paris to follow the law. At eighteen years of age he was admitted advocate of parliament, and frequented the bar: but he ſoon conceived a diſtaſte for it, and therefore diſcontinued his practice. This diſpleaſed an uncle, but whoſe favour he recovered by quitting the proteſtant religion. He could not, however, be prevailed upon to take orders in the Romiſh church; and ſome years after, he had a deſire to return to the religion he had abjured. But, that he might not do any thing raſhly, he reſolved to ſtudy philoſophy and divinity. For that purpoſe he choſe for his maſter Mr Stuart a Scotſman and Lutheran, a man of great learning. Almoſt three years he ſpent in the moſt aſſiduous ſtudy; and then ſet out from Paris to Champagne, where he abjured the Roman Catholic, and once more embraced the Proteſtant religion. In 1637 he was admitted a member of the French Academy; a little after which he undertook a tranſlation of Tacitus. Whilſt he was engaged in that laborious taſk, he retired to his ſmall eſtate of Ablancourt, and lived there till his death in 1664. He was a man of fine underſtanding, of great piety and integrity, and of univerſal learning. Moreri has given a catalogue of his works, the greateſt part of which conſiſt of tranſlations, which ſeemed rather originals.

PERRUKE, Peruke, or *Periwig*, was anciently a name for a long head of natural hair; ſuch, particularly, as there was care taken in the adjuſting and trimming of. Menage derives the word rather fancifully from the Latin *pilus* "hair." It is derived, according to this critic, thus, *pilus*, *pelus*, *pelutus*, *pelutic*us, *pelutica*, *perutica*, *peruca*, *perruque*. The Latins call it *coma*; whence part of Gaul took the denomination of *Gallia Comata*, from the long hair which the inhabitants wore as a ſign of freedom. An ancient author ſays, that Abſalom's peruke weighed 200 ſhekels.

The word is now uſed for a ſet of falſe hair, curled, buckled, and ſewed together on a frame or cawl; anciently called *capillamentum* or "falſe peruke." It is doubted whether or not the uſe of perrukes of this kind was known among the ancients. It is true, they uſed falſe hair: Martial and Juvenal make merry with the women of their time, for making themſelves look young with their borrowed hair; with the men who changed their colours according to the ſeaſons; and with the dotards, who hoped to deceive the Deſtinies by their white hair. But theſe ſeem to have ſcarce had any thing in common with our perrukes; and were at beſt only compoſed of hair painted, and glued together. Nothing can be more ridiculous than the deſcription Lampridius gives of the emperor Commodus's perruke: it was powdered with ſcrapings of gold, and oiled (if we may uſe the expreſſion) with glutinous perfumes for the powder to hang by. In effect, the uſe of perrukes, at leaſt in their preſent mode, is not much more than 160 years old; the year 1629 is reckoned the epocha of long perrukes, at which time they began to appear in Paris; from whence they ſpread by degrees through the reſt of Europe. At firſt it was reputed a ſcandal for young people to wear them, becauſe the loſs of their hair at that age was attributed to a diſeaſe the very name whereof is a reproach; but at length the mode prevailed over the ſcruple, and perſons of all ages and conditions have worn them, foregoing without any neceſſity the conveniences of their natural hair. It was, however, ſome time before the eccleſiaſtics came into the faſhon; the firſt who aſſumed the perruke were ſome of the French clergy, in the year 1660; nor is the practice yet well authoriſed. Cardinal Grimaldi in 1684, and the biſhop of Lavaur in 1688, prohibited the uſe of the perruke to all prieſts without a diſpenſation or neceſſity. M. Thiers has an expreſs treatiſe, to prove the perruke indecent in an eccleſiaſtic, and directly contrary to the decrees and canons of councils. A prieſt's head, embelliſhed with artificial hair curiouſly adjuſted, he eſteems a monſter in the church, nor can he conceive any thing ſo ſcandalous as an abbot with a florid countenance, heightened with a well-curled perruke.

PERRY (Captain John), was a famous engineer, who reſided long in Ruſſia, having been recommended to the czar Peter while in England, as a perſon capable of ſerving him on a variety of occaſions relating to his new deſign of eſtabliſhing a fleet, making his rivers navigable, &c. His ſalary in this ſervice was 300l. per annum, beſides travelling expences and ſubſiſtence money on whatever ſervice he ſhould be employed, together with a further reward to his ſatisfaction at the concluſion of any work he ſhould finiſh. After ſome converſation with the czar himſelf, particularly reſpecting a communication between the river Volga and Don, he was employed on that work for three ſummers ſucceſſively; but not being well ſupplied with men, partly on account of the ill ſucceſs of the czar's arms againſt the Swedes at the battle of Narva, and partly by the diſcouragement of the governor of Aſtracan, he was ordered at the end of 1707 to ſtop, and next year was employed in refitting the ſhips at Veroniſe, and 1709 in making the river of that name navigable; but after repeated diſappointments, and a variety of fruitleſs applications for his ſalary, he at laſt quitted the kingdom, under the protection of Mr Whitworth, the Engliſh ambaſſador, in 1712: (See his narrative in the Preface to *The State of Ruſſia*). In 1721 he was employed in ſtopping with ſucceſs the breach at Dagenham, in which ſeveral other undertakers had failed; and the ſame year about the harbour at Dublin, to the objections againſt which he then publiſhed an anſwer. He was author of The State of Ruſſia, 1716, 8vo, and an account of the ſtopping of Dagenham Breach, 1721, 8vo; and died Feb. 11, 1733.

Perry, the name of a very pleaſant and wholeſome liquor extracted from pears, in the ſame manner as cyder is from apples. See the article Cyder and Husbandry, n° 227—238.

The beſt pears for perry, or at leaſt the ſorts which have been hitherto deemed the fitteſt for making this liquor, are ſo exceſſively tart and harſh, that no mortal can think of eating them as fruit; for even hungry ſwine will not eat them, nay hardly ſo much as ſmell them. Of theſe the Boſbury pear, the Bareland pear, and the horſe pear, are the moſt eſteemed for perry in Worceſterſhire, and the ſquaſh pear, as it is called, in Glouceſterſhire, England; in both which counties, as well as in ſome of the adjacent parts, they are planted in the hedge-rows and moſt common fields. There is this advantage attending pear-trees, that they will thrive on land where apples will not ſo much as live, and that ſome of them grow to ſuch a ſize, that a ſingle pear tree, particularly of the Boſbury and the ſquaſh kind, has frequently been known to yield, in one ſeaſon, from one to four hogſheads of perry. The Boſbury pear is thought to yield the moſt laſting and moſt vinous liquor. The John pear, the Harpary pear, the Drake pear, the Mary pear, the Lullum pear, and ſeveral others of the harſheſt kinds, are eſteemed the beſt for perry, but the redder or more tawney they are, the more they are preferred. Pears as well as apples, ſhould be full ripe before they are ground.

Perry ‖ Perſees.

Dr Beale, in his general advertiſements concerning cyder, ſubjoined to Mr Evelyn's Pomona, diſapproves of Palladius's ſaying, that perry will keep during the winter, but that it turns ſour as ſoon as the weather begins to be warm; and gives, as his reaſon for being of a contrary opinion, that he had himſelf taſted at the end of ſummer, a very briſk, lively and vinous liquor, made of horſe pears: that he had often tried the juice of the Boſbury pear, and found it both pleaſanter and richer the ſecond year, and ſtill more ſo the third, though kept only in common hogſheads, and in but indifferent cellars, without being bottled; and that a very honeſt, worthy, and ingenious gentleman in his neighbourhood, aſſured him, as of his own experience, that it will keep a great while, and grow much the ſtronger for keeping, if put into a good cellar and managed with due care. He imputes Palladius's error to his poſſibly ſpeaking of common eatable pears, and to the perry's having been made in a very hot country; but he would have aſcribed it to a more real cauſe, perhaps, had he pointed out the want of a thorough regular fermentation, to which it appears plainly that the ancients were entire ſtrangers; for all their vinous liquors were medicated by boiling before they were laid up in order to be kept.

PERSECUTION, is any pain or affliction which a perſon deſignedly inflicts upon another: and in a more reſtrained ſenſe, the ſufferings of Chriſtians on account of their religion.

Hiſtorians uſually reckon ten general perſecutions, the firſt of which was under the emperor Nero, 31 years after our Lord's aſcenſion; when that emperor having ſet fire to the City of Rome, threw the odium of that execrable action on the Chriſtians, who under that pretence were wrapped up in the ſkins of wild beaſts, and worried and devoured by dogs; others were crucified, and others burnt alive. The ſecond was under Domitian, in the year 95. In this perſecution St John the apoſtle was ſent to the iſle of Patmos, in order to be employed in digging in the mines. The third began in the third year of Trajan, in the year 100, and was carried on with great violence for ſeveral years. The fourth was under Antoninus the philoſopher, when the Chriſtians were baniſhed from their houſes, forbidden to ſhow their heads, reproached, beaten, hurried from place to place, plundered, impriſoned, and ſtoned. The fifth began in the year 197, under the emperor Severus. The ſixth began with the reign of the emperor Maximinus in 235. The ſeventh, which was the moſt dreadful perſecution that had ever been known in the church, began in the year 250, in the reign of the emperor Decius, when the Chriſtians were in all places driven from their habitations, ſtripped of their eſtates, tormented with racks, &c. The eighth began in the year 257, in the fourth year of the reign of the emperor Valerian. The ninth was under the emperor Aurelian, A. D. 274; but this was very inconſiderable: and the tenth began in the 19th year of Diocleſian, A. D. 303. In this dreadful perſecution, which laſted ten years, houſes filled with Chriſtians were ſet on fire, and whole droves were tied together with ropes and thrown into the ſea. See Toleration.

PERSEES, the deſcendants of a colony of ancient Perſians, who took refuge at Bombay, Surat, and in the vicinity of thoſe cities, when their own country was conquered 1100 years ago by the Mahometan Arabs. They are a gentle, quiet, and induſtrious people, loved by the Hindoos, and living in great harmony among themſeves. The conſequence is, that they multiply exceedingly, whilſt their coutrymen in the province of Kerman are viſibly diminiſhing under the yoke of the Mahometan Perſians. Of the manners and cuſtoms of this amiable race, we have the following account in Heron's elegant tranſlation of Niebuhr's Travels.

Perſee.

"The Perſees (ſays he) make common contributions for the aid of their poor, and ſuffer none of their number to aſk alms from people of a different religion. They are equally ready to employ their money and credit to ſcreen a brother of their fraternity from the abuſes of juſtice. When a Perſee behaves ill, he is expelled from their communion. They apply to trade, and exerciſe all ſorts of profeſſions.

"The Perſees have as little knowledge of circumciſion as the Hindoos. Among them a man marries only one wife, nor ever takes a ſecond, unleſs when the firſt happens to be barren. They give their children in marriage at ſix years of age; but the young couple continue to live ſeparate, in the houſes of their parents, till they attain the age of puberty. Their dreſs is the ſame as that of the Hindoos, except that they wear under each ear a tuft of hair, like the modern Perſians. They are much addicted to aſtrology, altho' very little ſkilled in aſtronomy.

"They retain the ſingular cuſtom of expoſing their dead to be eaten by birds of prey, inſtead of interring or burning them. I ſaw (continues our author) on a hill at Bombay a round tower, covered with planks of wood, on which the Perſees lay out their dead bodies. When the fleſh is devoured, they remove the bones into two chambers at the bottom of the tower.

"The Perſees, followers of the religion of Zerduſt or Zoroaſter, adore one God only, eternal and almighty. They pay, however, a certain worſhip to the ſun, the moon, the ſtars, and to fire, as viſible images of the inviſible divinity. Their veneration for the element of fire induces them to keep a ſacred fire conſtantly burning, which they feed with odoriferous wood, both in the temples and in the houſes of private perſons, who are in eaſy circumſtances. In one of their temples at Bombay, I ſaw a fire which had burnt unextinguiſhed for two centuries. They never blow out a light, leſt their breath ſhould ſoil the purity of the fire, See Polytheism.

"The religion of the Perſees enjoins purifications as ſtrictly as that of the Hindoos. The diſciples of Zerduſt are not, however obliged to abſtain from animal food. They have accuſtomed themſelves to refrain from the fleſh of the ox, becauſe their anceſtors promiſed the Indian prince who received them into his dominions never to kill horned cattle. This promiſe they continue to obſerve under the dominion of Chriſtians and Mahometans. The horſe is by them conſidered as the moſt impure of all animals, and regarded with extreme averſion.

"Their feſtivals, denominated *Ghumbars*, which return frequently, and laſt upon each occaſion five days, are all commemorations of ſome part the work of creation. They celebrate them not with ſplendour, or

Perſees, Perſepolis

with any particular ceremonies, but only dreſs better during thoſe five days, perform ſome act of devotion in their houſes, and viſit their friends."

The Perſees were till lately but very little known; the ancients ſpeak of them but ſeldom, and what they ſay ſeems to be dictated by prejudice. On this account Dr Hyde, who thought the ſubject both curious and intereſting, about the end of laſt century attempted a deeper inveſtigation of a ſubject which till then had been but very little attended to. He appplied to the works of Arabian and Perſian authors, from whom, and from the relations of travellers, together with variety of letters from perſons in India, he compiled his celebrated work on the religion of the Perſees. Other accounts have been given by different men, as accident put information in their way. But the moſt diſtinguiſhed is by M. Anquetil du Perron, who undertook a voyage to diſcover and tranſlate the works attributed to Zoroaſter. Of this voyage he drew up an account himſelf and read it before the Royal Academy of Sciences at Paris in May 1761. A tranſlation of it was made and publiſhed in the Gentleman's Magazine for 1762, to which we refer our readers. The account begins at p. 373, and is concluded at p. 614. Remarks were afterwards made on Du Perron's account by a Mr Yates. See the ſame Magazine for 1766, p. 529.

Plate cccxxxix.

PERSEPOLIS, formerly the capital of Perſia, ſituated in N. Lat. 30. 30. E. long. 84. now in ruins, but remarkable for the moſt magnificent remains of a palace or temple that are to be found throughout the world.—This city ſtood in one of the fineſt plains in Perſia, being 18 or 19 leagues in length, and ſome places two, in ſome four, and in others ſix leagues in breadth. It is watered by the great river Araxes, now Bendemir, and by a multitude of rivulets beſides. Within the compaſs of this plain, there are between 1000 and 1500 villages, without reckoning thoſe in the mountains, all adorned with pleaſant gardens, and planted with ſhady trees. The entrance of this plain on the weſt ſide has received as much grandeur from nature, as the city it covers could do from induſtry or art. It conſiſts of a range of mountains ſteep and high, four leagues in length, and about two miles broad, forming two flat banks, with a riſing terrace in the middle, the ſummit of which is perfectly plain and even, all of native rock. In this there are ſuch openings, and the terraces are ſo fine and ſo even, that one would be tempted to think the whole the work of art, if the great extent, and prodigious elevation thereof, did not convince one that it is a wonder too great for aught but nature to produce. Undoubtedly theſe banks were the very place where the advanced guards from Perſepolis took poſt, and from which Alexander found it ſo difficult to diſlodge them. One cannot from hence deſcry the ruins of the city, becauſe the banks are too high to be overlooked; but one can perceive on every ſide the ruins of walls and of edifices, which heretofore adorned the range of mountains of which we are ſpeaking. On the weſt and on the north this city is defended in the like manner: ſo that, conſidering the height and evenneſs of theſe banks, one may ſafely ſay, that there is not in the world a place ſo fortified by nature.

Perſepolis.

The mountain Rehumut, in the form of an amphitheatre, encircles the palace, which is one of the nobleſt and moſt beautiful pieces of architecture remaining of all antiquity. Authors and travellers have been exceedingly minute in their deſcriptions of their ruins; and yet ſome of them have expreſſed themſelves ſo differently from the others, that had not they agreed, with reſpect to the latitude and longitude of the place, one would be tempted to ſuſpect that they had viſited different ruins. Theſe ruins have been deſcribed by Garcias de Silva Figueroa, Pietro de la Valle, Chardin, Le Brun, and Mr Francklin. We ſhall adopt the lateſt deſcription, as being exceedingly diſtinct, and given by a traveller intelligent and unaſſuming. The aſcent to the columns is by a grand ſtaircaſe of blue ſtone containing 104 ſteps.

"The firſt object that ſtrikes the beholder on his entrance, are two portals of ſtone, about 50 feet in height each; the ſides are embelliſhed with two ſphinxes of an immenſe ſize, dreſſed out with a profuſion of head-work, and, contrary to the uſual method, they are repreſented ſtanding. On the ſides above are inſcriptions in an ancient character, the meaning of which no one hitherto has been able to decypher.

"At a ſmall diſtance from theſe portals you aſcend another flight of ſteps, which lead to the ground hall of columns. The ſides of this ſtaircaſe are ornamented with a variety of figures in baſſo relievo; moſt of them have veſſels in their hands; here and there a camel appears, and at other times a kind of triumphal car, made after the Roman faſhion; beſides there are ſeveral led horſes, oxen and rams, that at times intervene and diverſify the proceſſion. At the head of the ſtaircaſe is another baſſo relievo, repreſenting a lion ſeizing a bull; and cloſe to this are other inſcriptions in ancient characters. On getting to the top of this ſtaircaſe, you enter what was formerly a moſt magnificent hall; the natives have given this the name of *chehul minàr*, or forty pillars; and though this name is often uſed to expreſs the whole of the building, it is more particularly appropriated to this part of it. Although a vaſt number of ages have elapſed ſince the foundation, 15 of the columns yet remain entire; they are from 70 to 80 feet in height, and are maſterly pieces of maſonry: their pedeſtals are curiouſly worked, and appear little injured by the hand of time. The ſhafts are enfluted up to the top, and the capitals are adorned with a profuſion of fret work.

From this hall you proceed along eaſtward, until you arrive at the remains of a large ſquare building, to which you enter through a door of granite. Moſt of the doors and windows of this apartment are ſtill ſtanding they are of a black marble, and poliſhed like a mirror: on the ſides of the doors, at the entrance, are baſs reliefs of two figures at full length; they repreſent a man in the attitude of ſtabbing a goat: with one hand he ſeizes hold of the animal by the horn, and thruſts a dagger into his belly with the other; one of the goat's feet reſts upon the breaſt of the man, and the other upon his right arm. This device is common throughout the palace. Over another door of the ſame apartment is a repreſentation of two men at full length; behind them ſtands a domeſtic holding a ſpread umbrella: they are ſupported by large round ſtaffs, appear

Perſepolis
‖
Perſia.

pear to be in years, have long beards and a profuſion of hair upon their heads.

“ At the ſouth weſt-entrance of this apartment are two large pillars of ſtone, upon which are carved four figures; they are dreſſed in long garments, and hold in their hands ſpears 10 feet in length. At this entrance alſo the remains of a ſtaircaſe of blue ſtone are ſtill viſible. Vaſt numbers of broken pieces of pillars, ſhafts, and capitals are ſcattered over a conſiderable extent of ground, ſome of them of ſuch enormous ſize, that it is wonderful to think how they could have been brought whole, and ſet up together. Indeed, all the remains of theſe noble ruins indicate their former grandeur and magnificence, truly worthy of being the reſidence of a great and powerful monarch.”

Theſe noble ruins are now the ſhelter of beaſts and birds of prey. Beſides the inſcription above-mentioned, there are others in Arabic, Perſian and Greek. Dr Hyde obſerves, that the inſcriptions are very rude and unartful; and that ſome, if not all of them, are in praiſe of Alexander the Great; and therefore are later than that conqueror. See the article RUINS.

PERSEVERANCE, in theology, a continuance in a ſtate of grace to a ſtate of glory.

About this ſubject there has been much controverſy in the Chriſtian church. All divines, except Unitarians, admit, that no man can ever be in a ſtate of grace without the co-operation of the ſpirit of God; but the Calvaniſts and Arminians differ widely as to the nature of this co-operation. The former, at leaſt ſuch as call themſelves the *true diſciples of Calvin*, believe, that thoſe who are once under the influence of divine grace can never fall totally from it, or die in mortal ſin. The Arminians, on the other hand, contend, that the whole of this life is a ſtate of probation; that without the grace of God we can do nothing that is good, that the Holy Spirit aſſiſts, but does not overpower, our natural faculties; and that a man, at any period of his life, may reſiſt, grieve, and even quench, the ſpirit. See THEOLOGY.

PERSEUS was the moſt ancient of all the Greek heroes. He founded the city of Mycenæ, of which he became afterwards king, and where he and his poſterity reigned for 100 years. He flouriſhed, according to moſt chronologiſts, 1348 B. C. but, according to Sir Iſaac Newton, only 1028.

PERSEUS, in aſtronomy, See there, nº 406.

1 Extent of Perſia.

PERSIA, a moſt ancient and celebrated empire of Aſia, extending in length from the mouth of the river Araxes to that of the river Indus, about 1840 of miles, and in breadth from the river Oxus, to the Perſian gulph, about 1089 of the ſame miles. It is bounded on the north by the Caſpain Sea, the river Oxus, and mount Caucaſus: on the eaſt, by the river Indus and the dominions of the Great Mogul; on the ſouth by the Perſian gulph and the Indian ocean, and on the weſt, by the dominions of the Grand Signior.

2 Perſia properly the name of only one province of this vaſt empire.

We learn from Sir William Jones, the illuſtrious preſident of the Aſiatic Society, that Perſia is the name of only one province of this extenſive empire, which by the preſent natives, and all the learned *Muſſulmans* who reſide in the Britiſh territories in India, is called *Iràn*. It has been a practice not uncommon in all ages to denominate the whole of a country from that part of it, with which we are beſt acquainted; and hence have the Europeans agreed to call Iràn by the name of that province of which Shirauz is the capital; See SHIRAUZ. The ſame learned writer is confident that Iràn, or Perſia in its largeſt extent, comprehended within its outline the lower Aſia, which, ſays he, was unqueſtionably a part of the *Perſian*, if not of the old Aſſyrian empire. “ Thus may we look on Iràn as the nobleſt peninſula on this inhabitable globe; and if M. Bailly had fixed on it as the *Atlantis* of PLATO, he might have ſupported his opinion with far ſtronger arguments than any that he has adduced in favour of *Nova Zembla*. If, indeed the account of the Atlantis be not purely an Egyptian fable. I ſhould be more inclined, ſays Sir William, to place them in Iràn than in any region with which I am acquainted.”

3 Various names of the country.

The moſt ancient name, however, of this country was that of *Elam*, or, as ſome write it, *Ælam*, from Elam the ſon of Shem, from whom its firſt inhabitants are deſcended. Herodotus calls its inhabitants *Cephenes*; and in very ancient times the people are ſaid to have called themſelves *Artæi*, and the country where they dwelt *Artæa*. In the books of Daniel, Eſdras, and from the time of Cyrus who learned riding in Media, and introduced it, it is called by the name of *Peres Pharas*, which ſignifies a horſeman or rider, *eques*; whence the modern name of *Perſia*.

4 Opinions reſpecting its firſt population.

That Perſia was originally peopled by Elam the ſon of Shem, has been very generally admitted; but the truth is, that of the ancient hiſtory of this diſtinguiſhed empire very little is perfectly known. For this ignorance, which at firſt ſeems ſtrange, ſatiſfactory reaſons may eaſily be aſſigned: of which the principal are the ſuperficial knowledge of the *Greeks* and *Jews*, and the loſs of Perſian archives or hiſtorical compoſitions. “ That the Grecian writers before XENOPHON had *no* acquaintance with *Perſia*, and that their accounts of it are wholly fabulous, is a paradox too extravagant to be ſeriouſly mentioned; but (ſays Sir William Jones) their connection with it in war or peace had been generally confined to bordering kingdoms under feudatory princes: and the firſt *Perſian* emperor, whoſe life and character they ſeem to have known with tolerable accuracy, was the great CYRUS.” Our learned author, however, is ſo far from conſidering Cyrus as the firſt perſian monarch, that he thinks it evident a powerful monarchy had ſubſiſted in Iràn for ages before the acceſſion of that hero; that this monarch was called the *Mahebédian* dynaſty; and that it was in fact the oldeſt monarchy in the world. The evidence upon which the preſident reſts this opinion, is the work of a Mahometan traveller, compiled from the books of ſuch Perſians as fled from their country upon the innovation in religion made by Zoroaſter: and if theſe books, of which a few ſtill remain, be genuine, and the Mahometan a faithful compiler, facts of which Sir William has not the ſmalleſt doubt, the evidence is certainly ſufficient to bear the ſuperſtructure which he has raiſed upon it.

5 Perhaps the original ſeat of the human race.

If the Perſian monarchy was thus ancient, it is natural to ſuppoſe that Perſia or Iràn was the original ſeat of the human race, whence colonies were ſent out, or emigrated of themſelves to people the reſt of the habitable globe. This ſuppoſition is actually made by our ingenious author, who ſtrongly confirms it by remarks

marks on the moſt ancient language of Perſia, which he ſhows to have been the parent of the *Sanſcrit*, as well as of the Greek, Latin, and Gothic (ſee PHILOLOGY). He therefore holds, as a propoſition firmly eſtabliſhed, "that *Iran* or Perſia, in its largeſt ſenſe, was the true centre of population, of knowledge, of languages, and of arts; which inſtead of travelling weſtward only, as it has been fancifully ſuppoſed, or eaſtward, as might with equal reaſon have been aſſerted, were expanded in all directions to all the regions of the world." He thinks it is from good authority that the Saxon Chronicle brings the firſt inhabitants of Britain from Armenia; that the Goths have been concluded to come from Perſia; and that both the Iriſh and old Britons have been ſuppoſed to have proceeded from the borders of the Caſpian: for all theſe places were comprehended within the ancient Iran.

6
Accounts of the birth, &c. of Cyrus.

Of this firſt Perſian monarchy we have no hiſtorical accounts; and muſt therefore, after having thus mentioned it, deſcend at once to the era of Cyrus. This prince is celebrated both by ſacred and profane hiſtorians; but the latter are at no ſmall variance concerning his birth and acceſſion to the throne. According to Herodotus, Aſtyages, the laſt king of the Medes being warned in a dream, that the ſon who was to be born of his daughter Mandane, ſhould one day be lord of Aſia, reſolved to marry her, not to a Mede, but to a Perſian. Accordingly he choſe for her huſband one Cambyſes, a man of a peaceable diſpoſition, and of no very high ſtation. However, about a year after they were married, Aſtyages was frightened by another dream, which made him reſolve to diſpatch the infant as ſoon as it ſhould be born. Hereupon the king ſent for his daughter and put her under confinement, where ſhe was ſoon after delivered of a ſon. The infant was committed to the care of one Harpagus, with ſtrict orders to deſtroy it in what manner he thought proper. But he, having acquainted his wife with the command he had received, by her advice gave it to a ſhepherd, deſiring him to let it periſh by expoſing it. But the ſhepherd, out of compaſſion, expoſed a ſtill-born child which his wife happened to be then delivered of, and brought up the ſon of Mandane as his own, giving him the name of CYRUS.

When the young prince had attained the age of ten years, as he was one day at play with other children of the ſame age, he was choſen king by his companions; and having, in virtue of that dignity, divided them into ſeveral orders and claſſes, the ſon of Artembares, a lord of eminent dignity among the Medes, refuſed to obey his orders; whereupon Cyrus cauſed him to be ſeized, and whipped very ſeverely. The boy ran crying to his father; and he immediately haſtened to the king's palace, loudly complaining of the affront his ſon had received from the ſon of a ſlave, and intreating Aſtyages to revenge, by ſome exemplary puniſhment, the indignity offered to him and his family. Aſtyages, commanding both the herdſman and his ſon to be brought before him, aſked the latter, how he, who was the ſon of ſo mean a man, had dared to abuſe the ſon of one of the chief lords of the kingdom? Cyrus replied, that he had done no more than he had a right to do; for the boys of the neighbourhood having choſen him king, becauſe they thought him moſt worthy of that dignity, and performed what he, veſted with that character, had commanded, the ſon of Artembares alone had ſlighted his orders, and for his diſobedience had ſuffered the puniſhment he deſerved. In the courſe of this converſation Aſtyages happening to recollect, that his grandſon, whom he had ordered to be deſtroyed, would have been about the ſame age with Cyrus, began to queſtion the ſhepherd concerning his ſuppoſed ſon, and at laſt obtained from him a confeſſion of the whole truth.

Aſtyages having now diſcovered Cyrus to be his grandſon, ſent for Harpagus, who alſo confeſſed that he had not ſeen Mandane's ſon deſtroyed but had given him to the ſhepherd; at which Aſtyages was ſo much incenſed, that, having invited Harpagus to an entertainment he cauſed him to be ſerved with the fleſh of his own ſon. When he had done, the king aſked him whether he liked his victuals; and Harpagus anſwering, that he had never taſted any thing more delicious, the officers appointed for that purpoſe brought in a baſket, containing the head, hands, and feet of his ſon, deſiring him to uncover the baſket, and take what he liked beſt. He did as they deſired, and beheld the mangled remains of his only child without betraying the leaſt concern; ſo great was the command which he had over his paſſions. The king then aſked him, whether he knew with what kind of meat he had been entertained. Harpagus replied, that he knew very well, and was always pleaſed with what his ſovereign thought fit to ordain; and having thus replied, with a ſurpriſing temper he collected the mangled parts of his innocent ſon, and went home.

Aſtyages having thus vented his rage on Harpagus, began next to conſult what he ſhould do with Cyrus. The magi, however, eaſed him of his fears with regard to him, by aſſuring him, that as the boy had been once choſen king by his companions, the dream had been already verified and that Cyrus, never would reign in any other ſenſe. The king, being well pleaſed with this anſwer, called Cyrus, and, owning how much he had been wanting in the affection which he ought to have had towards him, deſired him to prepare for a journey into Perſia, where he would find his father and mother in circumſtances very different from thoſe of the poor ſhepherd and his wife with whom he had hitherto lived. Cyrus, on his arrival at his father's houſe, was received with the greateſt joy. When he grew up, he ſoon became popular on account of his extraordinary parts; till at laſt his friendſhip was courted by Harpagus, who had never forgot the cruel treatment he received from Aſtyages. By his means a conſpiracy was formed againſt Aſtyages; who being overthrown in two ſucceſſive engagements, was taken priſoner and confined for life.

The account given by Xenophon of the riſe of Cyrus is much more conſonant to Scripture: for he tells us, that Babylon was conquered by the united forces of the Medes and Perſians. According to him, Cyrus was the ſon of Cambyſes king of the Perſians, and Mandane the daughter of Aſtyages king of the Medes. He was born a year after his uncle Cyaxares, the brother of Mandane. He lived till the age of twelve with his parents in Perſia, being educated after the manner of the country, and inured to fatigues and military exerciſes. At this age he was taken to the court of Aſtyages, where he reſided four years; when the revolt of the Medes and Perſians from the Babylonians happened, and which ended in the deſtruction of the Babyloniſh empire, as related under the article BABYLON.

7 His war with the Lydians.

While Cyrus was employed in the Babyloniſh war, before he attacked the metropolis itſelf, he reduced all the nations of Aſia Minor. The moſt formidable of theſe were the Lydians, whoſe king Crœſus aſſembled a very numerous army, compoſed of all the other nations in that part of Aſia, as well as of Egyptians, Greeks and Thracians. Cyrus being informed of theſe vaſt preparations, augmented his forces to 196,000 men, and with them advanced againſt the enemy, who were aſſembled near the river Pactolus. After long marches, he came up with them at Thymbra, not far from Sardis, the capital of Lydia. Beſides the horſe and foot, which amounted to 196,000 as already obſerved, Cyrus had 300 chariots armed with ſcythes, each chariot drawn by four horſes abreaſt, covered with trappings that were proof againſt all ſorts of miſſive weapons; he had likewiſe a great number of chariots of a larger ſize, upon each of which was placed a tower about 18 or 20 feet high, and in each tower were lodged 20 archers. Theſe towers were drawn by 16 oxen yoked abreaſt. There was moreover a conſiderable number of camels each mounted by two Arabian archers, the one looking towards the head, and the other towards the hinder pars of the camel. The armies of Crœſus conſiſted of 420,000 men. The Egyptians, who alone were 120,000 in number, being the main ſtrength of the army were placed in the centre. Both armies were drawn up in an immenſe plain, which gave room for the extending of the wings on either ſide; and the deſign of Crœſus, upon which alone he founded his hopes of victory, was to ſurround and hem in the enemy's army.

8 The battle of Thymbra.

When the two armies were in ſight of each other, Crœſus, obſerving how much his front exceeded that of Cyrus, made the centre halt, but commanded the two wings to advance, with a deſign to incloſe the Perſian army, and begin the attack on both ſides at once. When the two detached bodies of the Lydian forces were ſufficiently extended, Crœſus gave the ſignal to the main body, which marched up to the front of the Perſian army, while the two wings attacked them in flank; ſo that Cyrus's army was hemmed in on all ſides, and, as Xenophon expreſſes it, was incloſed like a ſmall ſquare drawn within a great one. This motion, however, did not at all alarm the Perſian commander; but, giving his troops the ſignal to face about, he attacked in flank thoſe forces that were going to fall upon his rear ſo vigorouſly, that he put them to great diſorder. At the ſame time a ſquadron of camels was made to advance againſt the enemy's other wing, which conſiſted moſtly of cavalry. The horſes were ſo frightened at the approach of theſe animals, that moſt of them threw their riders and trod them under foot; which occaſioned great confuſion. Then Artageſes, an officer of great valour and experience, at the head of a ſmall body of horſe, charged them ſo briſkly, that they could never afterwards rally; and at the ſame time the chariots, armed with ſcythes, being driven in among them, they were entirely routed. Both the enemy's wings being thus put to flight, Cyrus commanded his chief favourite Abradates to fall upon the centre with the large chariots abovementioned. The firſt ranks, conſiſting moſtly of Lydians, not being able to ſtand ſo violent a charge, immediately gave way: but the Egyptians, being covered with their bucklers, and marching ſo cloſe that the chariots had not room to penetrate their ranks, a great ſlaughter of the Perſians enſued. Abradates himſelf was killed, his chariot overturned, and the greateſt part of his men were cut in pieces. Upon his death, the Egyptians advancing boldly, obliged the Perſian infantry to give way, and drove them back quite to their engines. There they met with a new ſhower of darts and javelins from their machines; and at the ſame time the Perſian rear advancing ſword in hand, obliged their ſpearmen and archers to return to the charge. In the mean time Cyrus, having put to flight both the horſe and foot on the left of the Egyptians, puſhed on to the centre, where he had the misfortune to find his Perſians again giving ground: and judging that the only way to ſtop the Egyptians, who were purſuing them, would be to attack them in the rear, he did ſo; and at the ſame time the Perſian cavalry coming up to his aſſiſtance, the fight was renewed with great ſlaughter on both ſides. Cyrus himſelf was in great danger; for his horſe being killed under him, he fell among the midſt of his enemies: but the Perſians, alarmed at the danger of their general, threw themſelves headlong on their opponents, reſcued him and made a terrible ſlaughter; till at laſt Cyrus, admiring the valour of the Egyptians, offered them honourable conditions: letting them know at the ſame time that all their allies had abandoned them. They accepted the terms offered them: and having agreed with Cyrus that they ſhould not be obliged to carry arms againſt Crœſus, they engaged in the ſervice of the conqueror, and continued faithful to him ever after.

9 Sardis taken, and the Lydian empire overthrown.

The next morning Cyrus advanced towards Sardis, and Crœſus marched out to oppoſe him at the head of the Lydians only; for his allies had all abandoned him. Their ſtrength conſiſted moſtly in cavalry; which Cyrus being well appriſed of, he ordered his camels to advance; by whom the horſes were ſo frightened, that they became quite ungovernable. However the Lydians diſmounted, and for ſome time made a vigorous reſiſtance on foot; but were at laſt driven into the city, which was taken two days after; and thus the Lydian empire was totally deſtroyed.

10 Reduces Babylon.

After the conqueſt of Sardis, Cyrus turned his arms againſt Babylon itſelf, which he reduced in the manner related under that article. Having ſettled the civil government of the conquered kingdoms, Cyrus took a review of all his forces, which he found to conſiſt of 600,000 foot, 120,000 horſe, and 2000 chariots armed with ſcythes. With theſe he extended his dominion all over the nations to the confines of Ethiopia, and to the Red Sea: after which he continued to reign peaceably over his vaſt empire till his death, which happened about 529 before Chriſt.

11 His death.

According to Xenophon, he died a natural death; but others tell us, that having engaged in a war with the Scythians, he was by them overthrown and cut in pieces with his whole army, amounting to 200,000 men. But this is very improbable, ſeeing all authors agree that the tomb of Cyrus was extant at Paſargada in Perſia in the time of Alexander the Great; which it could not have been if his body had remained in the poſſeſſion of the Scythians, as theſe authors aſſert.

In the time of Cyrus, the Perſian empire extended from the river Indus to the Ægean Sea. On the north it was bounded by the Euxine and Caſpian Seas, and on the South by Ethiopia and Arabia. That monarch kept his reſidence for the ſeven cold months at Babylon, by reaſon of the warmth of that climate: three months in the ſpring he ſpent at Suſa, and two at Ecbatan during the heat of ſummer. On his death bed he appointed his ſon Cambyſes to ſucceed him in the empire; and to his other ſon, Smerdis, he gave ſeveral conſiderable governments. The new monarch immediately ſet about the Conqueſt of Egypt; which he accompliſhed in the manner related in the hiſtory of that country.

12
Cambyſes conquers Egypt.

Having reduced Egypt, Cambyſes next reſolved to turn his arms againſt the Carthaginians, Hammonians, and Ethiopians. But he was obliged to drop the firſt of theſe enterpriſes, becauſe the Phœnicians refuſed to ſupply him with ſhips againſt the Carthaginians, who were a Phœnician colony. However, he ſent ambaſſadors to Ethiopia with a deſign to get intelligence of the ſtate and ſtrength of the country. But the Ethiopian monarch, being well appriſed of the errand on which they came, treated them with great contempt. In return for the preſents ſent him by Cambyſes, he ſent his own bow; and adviſed the Perſians to make war upon the Ethiopians when they could bend ſuch a ſtrong bow as eaſily as he did, and to thank the gods that the Ethiopians had no ambition to extend their dominions beyond their own country.

13
His unſucceſsful expedition againſt Ethiopia and the Hammonians.

Cambyſes was no ſooner informed of this anſwer by his ambaſſadors than he flew into a violent paſſion; and ordered his army immediately to begin their march, without conſidering that they were neither furniſhed with proviſions nor any other neceſſary. When he arrived at Thebes in Upper Egypt, he detached 50,000 men, with orders to deſtroy the temple of Jupiter Ammon: but all theſe periſhed in the deſert; not a ſingle perſon arriving either at the oracle, or returning to Thebes. The reſt of the army, led by Cambyſes himſelf, experienced incredible hardſhips; for not being provided with any neceſſaries, they had not marched a fifth part of the way when they were obliged to kill and eat their beaſts of burthen. When theſe failed, the ſoldiers fed on graſs and roots, as long as any could be found; and at laſt were reduced to the dreadful neceſſity of eating one another; every tenth man, on whom the lot fell, being condemned to ſerve as food for his companions. The king, however, obſtinately perſiſted in his deſign; till, being apprehenſive of the danger he himſelf was in, he retreated to Thebes, after having loſt the greateſt part of his army.

14
He murders his brother.

Cambyſes was a man of a very cruel and ſuſpicious temper, of which he gave many inſtances; and the following proved indirectly the cauſe of his death.—We have already obſerved that the king of Ethiopia ſent his bow in return for the preſents brought to him by the ambaſſadors of Cambyſes. The only man in the Perſian army who could bend this bow was Smerdis the king's brother; and this inſtance of his perſonal ſtrength ſo alarmed the tyrant, that, without any crime alleged, he cauſed him to be murdered. This gave occaſion to one Smerdis, a magian, who greatly reſembled the other Smerdis in looks, to aſſume the name of the deceaſed prince, and to raiſe a rebellion againſt Cambyſes, who was generally hated for his cruelty; and this he could the more eaſily do, as the chief management of affairs had been committed to this Smerdis during the king's abſence. Cambyſes, on receiving the news of this revolt, immediately ordered his army to march, in order to ſuppreſs it; but as he was mounting his horſe, his ſword, ſlipping out of its ſcabbard, wounded him in the thigh. On this accident, he aſked the name of the city where he was; and being told that it was Ecbatan, he ſaid in the preſence of his attendants, "Fate has decreed that Cambyſes the ſon of Cyrus ſhall die in this place." For, having conſulted the oracle of Butus, which was very famous in that country, he was told that he ſhould die at Ecbatan. This he had always underſtood of Ecbatan in Media, and had therefore reſolved to avoid it. Being now, however, convinced that his end approached, he aſſembled the chief Perſian lords who ſerved in the army, and having told them that his brother was certainly dead, he exhorted them never to ſubmit to the impoſtor, or ſuffer the ſovereignty again to paſs from the Perſians to the Medes, to which nation Smerdis belonged, but to uſe their utmoſt endeavours to place one of their own blood on the throne.

15
His death.

16
Reign of Smerdis the magian.

17
His impoſture diſcovered.

As the king's wound mortified, he lived but a few days after this; but the aſſembly ſuppoſing that he had ſpoken only out of hatred to his brother, quietly ſubmitted to the impoſtor, who was thus for a time eſtabliſhed on the throne. Indeed from his conduct during the ſhort time which he enjoyed the kingdom, he appears to have been not at all undeſerving of a crown. He began with granting to all his ſubjects an exemption from taxes and military ſervice for three years, and treated all of them in the moſt beneficent manner. To ſecure himſelf on the throne the more effectually, he married Atoſſa the daughter of Cyrus; thinking, that in a caſe of diſcovery he might hold the empire by her title. She had before been married to her brother Cambyſes, on a deciſion of the magi that a king of Perſia might do as he pleaſed; and by virtue of this deciſion Smerdis alſo married her as her brother. The extreme caution of Smerdis, however, promoted the diſcovery of his impoſture. He had married all his predeceſſor's wives, among whom was one Phedyma, the daughter of Otanes, a Perſian nobleman of the firſt rank. Otanes, who ſuſpected that the king was not Smerdis the ſon of Cyrus, ſent a truſty meſſenger to his daughter, deſiring to know whether he was ſo or not; but Phedyma, having never ſeen this Smerdis, could not give any anſwer. Her father then deſired her to enquire at Atoſſa, who could not but know her own brother. However, he was again diſappointed; for Phedyma acquainted him that all the king's wives were lodged in diſtinct and ſeparate apartments, without being allowed to ſee each other. This greatly increaſed the ſuſpicions of Otanes; upon which he ſent his daughter a third meſſage, deſiring her, the next time ſhe ſhould be admitted to the king's bed, to take an opportunity of feeling whether he had ears or not; for Cyrus had formerly cauſed the ears of Smerdis the magian to be cut off for ſome crime of which he had been guilty; ſo that, if the king had ears, ſhe might then be aſſured that he was Smerdis the ſon of Cyrus. The event ſhowed that the ſuſpicions of Otanes were juſt; and Phedyma, having acquainted her father that the king had no ears, a conſpiracy was immediately formed againſt him. While the conſpirators were debating about the proper means of carrying their deſigns into execution, Darius the ſon of Hyſtaſpes happening to arrive at Suſa where his father was governor, they all agreed to make him privy to their deſign. He told them, at their firſt meeting, that he thought nobody in the empire but himſelf had known that Smerdis the ſon of Cyrus was dead, and the throne uſurped by one of the magi; that he had come with the deſign to kill the uſurper without imparting his deſign to any one, that the glory of ſuch an action might be entirely his own. But ſince others were appriſed of the impoſture, he inſiſted that the uſurper ſhould be diſpatched without delay. Otanes, on the other hand, was for putting off the enterpriſe till ſome better opportunity offered; but Darius proteſted, that if they did not make the attempt that very day, he would prevent any one from accuſing him, by diſcloſing the whole matter to the impoſtor himſelf.

18
A conſpiracy formed againſt him.

In the mean time Smerdis and his brother had by great promiſes prevailed on Prenaſpes (the executioner of the true Smerdis) to bind himſelf by an oath not to diſcover the fraud they had put on the Perſians, and even to make a public ſpeech, declaring that the preſent king of Perſia was really the ſon of Cyrus. At the time appointed, he began his diſcourſe with the genealogy of Cyrus, putting his hearers in mind of the great favours the nation had received from that prince. After having extolled Cyrus and his family, to the great aſtoniſhment of all preſent, he confeſſed the whole tranſaction with regard to the death of Smerdis: telling the people, that the apprehenſions of the danger he muſt inevitably run by publiſhing the impoſture had conſtrained him to conceal it ſo long; but now, not being able any longer to act ſuch a diſhonourable part, he acknowledged that he had been compelled by Cambyſes to put his brother to death with his own hand, and that the perſon who poſſeſſed the throne was Smerdis the magian. He then begged pardon of the gods and men for the crime he had committed; and fulminating many imprecations aganſt the Perſians if they failed to recover the ſovereignty, he threw himſelf headlong, from the top of the tower on which he ſtood, and died on the ſpot.

19
e is kill-

In the mean time the conſpirators, who were advancing towards the palace, were informed of what had happened: and Otanes was again for deferring the execution of their enterpriſe; but Darius inſiſting upon the danger of delay, they proceeded boldly to the palace; and being admitted by the guards, who did not ſuſpect them, they killed both the uſurper and his brother; after which they expoſed their heads to the people, and declared the whole impoſture. The Perſians at this were ſo enraged, that they fell on the whole ſect, and killed every one of the magi they could meet with; and had not the ſlaughter been ſtopped by night, not one of the order would have been left alive. The day on which this ſlaughter happened was afterwards celebrated by the Perſians with the greateſt ſolemnity, and called by the name of *Magophonia*, or *the ſlaughter of the Magi*. On that feſtival the magi durſt not appear abroad, but were obliged to ſhut themſelves up in their houſes. Smerdis the magian reigned only eight months.

When the tumult was a little ſubſided, the conſpirators, who were ſeven in number met together in order to elect a new king, or to determine what form of government they ſhould next introduce. Otanes was for a republic: but being over-ruled by the reſt, he declared, that as he was determined not to be a king, neither would he be ruled by one: and therefore inſiſted that he and his family ſhould ever afterwards remain free from ſubjection to the royal power. This was not only granted, but it was further agreed by the other ſix, that whoever was choſen ſhould every year preſent Otanes with a Median veſt, a mark of great diſtinction among the Perſians, becauſe he had been the chief author of the enterpriſe. They farther agreed to meet at a certain place next morning at ſunriſe on horſeback, and that he whoſe horſe firſt neighed ſhould be king. This being overheard by Oebores, who had the care of Darius's horſes, he led a mare over-night to the place, and brought his maſter's horſe to her. The next morning the horſe remembering the place, immediately neighed for the mare; and the five lords diſmounting, ſaluted Darius as their king.

20
Darius Hyſtaſpes choſen king.

Darius Hyſtaſpes was elected king of Perſia in the year 522 B. C. Immediately after his acceſſion, he promoted the other conſpirators to the firſt employments in the kingdom, married the two daughters of Cyrus, Atoſſa and Artyſtona, Parmys the daughter of the true Smerdis, and Phedyma the daughter of Otanes, who had detected the impoſture of the magian. He then divided the whole empire into 20 ſatrapies or governments, and appointed a governor over each diviſion, ordering them to pay him an annual tribute. The inhabitants of Colchis, with ſome others, were enjoined only to make annual preſents, and the Arabians to furniſh every year ſuch a quantity of frankincenſe as equalled the weight of 1000 talents. Thus Darius received the yearly tribute of 14,560 Eubœic talents, upwards of 260,000 pounds ſterling.

Under Darius, the building of the temple of Jeruſalem, which had been obſtructed by Cambyſes and Smerdis, went on ſucceſsfully, and the Jewiſh ſtate was entirely reſtored. The moſt remarkable of Darius's other tranſactions were his expeditions againſt Babylon; againſt Scythia, India, and Greece. The expedition againſt Babylon took place in the year 517 B. C. when the people unable to bear the oppreſſion of the Perſians, and likewiſe diſcontented becauſe the ſeat of government was removed from their city to Suſa in Perſia, took the opportunity of the troubles which happened in the reigns of Cambyſes and Smerdis, to ſtore their city with all kinds of proviſions ſufficient to ſerve them for many years; after which they broke out into an open rebellion, and this quickly brought upon them Darius with all his forces. The Babylonians perceiving themſelves ſhut up by ſo numerous an army, turned all their thoughts towards the ſupporting of a long ſiege, which they imagined would tire out the king's troops. To prevent the conſumption of their proviſions, they took the moſt barbarous and cruel reſolution that ever was put in execution by any nation. They agreed among themſelves to get rid of all unne-

21
Revolt of the Babylonians.

ceſſary months; and therefore gathering together all the old men, women, and children, they ſtrangled them without diſtinction; every one being allowed only to keep the wife he liked beſt, and a maid ſervant to do the work of the houſe. The ſiege continued for a year and eight months; nor was there any likelihood of its being ended, when Zopyrus, one of Darius's chief commanders, put him in poſſeſſion of it by the following ſtratagem. He cut off his noſe and ears, and having mangled his body with ſtripes in a moſt cruel manner, he fled to the Babylonians thus diſfigured, pretending that he had been ſo treated by Darius for adviſing him to raiſe the ſiege. Being intruſted with the command of ſome forces, he cut off ſeveral parties of the Perſian army, whom Darius thus ſacrificed in order to raiſe the character of Zopyrus the higher among the Babylonians. In this manner he ſo much eſtabliſhed his credit, that at laſt he was made commander in chief of all the Babyloniſh forces, and the guard of the city committed entirely to his care; and no ſooner was this done than he delivered it up to Darius, who, to prevent their rebelling a ſecond time beat down the walls of that metropolis to the height of 50 cubits. Three thouſand of the moſt active in the rebellion were impaled; the reſt pardoned. As they had deſtroyed moſt of their women, the neighbouring nations were commanded to furniſh them with wives, and 50,000 women were ſent to that city, by which means it was prevented from being depopulated. Zopyrus was rewarded with the higheſt honours, and had the whole revenues of Babylon beſtowed on him for life.

22 His unſucceſsful expedition againſt the Scythians

After the reduction of Babylon Darius undertook a Scythian expedition, directed againſt thoſe nations which lie between the Danube and the Tanais. His pretext for this war was, to revenge the calamities which theſe nations had brought upon Aſia about 120 years before, when they invaded and ſubdued Media; keeping it in ſubjection for the ſpace of 28 years, as we have related under the article. In this expedition he was attended with an army of 700,000 men. With theſe he marched to the Thracian Boſphorus: which having paſſed on a bridge of boats, he reduced all Thrace. From Thrace he advanced to the Danube, where he had appointed his fleet to meet him. This river he paſſed on another bridge of boats, and entered Scythia. His enemies, however, were too wiſe to oppoſe ſuch a formidable power in the open field; and therefore retired before him, waſting the country as they went along, till at laſt the king, ſenſible of the danger he was in, reſolved to give over the enterpriſe and return home. In order to do ſo with ſafety, he lighted a great number of fires in the night-time, and decamped; leaving behind him the old men and the ſick, who fell into the hands of their enemies. The Scythians perceiving that Darius was gone, detached a conſiderable body to the bridge over the Danube; and as they were well acquainted with the roads, they got thither before the Perſians. The Scythians had ſent expreſſes before-hand to perſuade the Ionians, whom Darius had left to guard the bridge, to break it down and retire to their own country; and this they preſſed the more earneſtly, that as the time preſcribed by Darius was now expired, they were at liberty to return home, without breaking their word or being wanting in their duty. Miltiades, prince of the Cherſoneſus of Thrace, was for embracing ſo favourable an opportunity of cutting of Darius's retreat, and ſhaking off the Perſian yoke at once; all the other commanders agreed with him, except Hyſtiæus prince of Miletus; who repreſented to the Ionian chiefs, that their power was connected with that of Darius, ſince it was under his protection that each of them was lord in his own city; and that the cities of Ionia would not fail to depoſe them and recover their liberty, if the Perſian power ſhould ſink or decline. This ſpeech made a deep impreſſion on the reſt, and it was at laſt determined that they ſhould wait for Darius; and in order to deceive the Scythians, they began to break down the bridge, but adviſed them to return back and defeat Darius. They did ſo, but miſſed him; and he having thus ſafely eſcaped ſo great a danger, immediately repaſſed the Boſphorus, and took up his winter-quarters at Sardis, leaving Megabyzus, one of his chief generals, to complete the conqueſt of Thrace.

23 He conquers India.

The king having ſufficiently refreſhed his troops, who had ſuffered extremely in the Scythian expedition, began to think of extending his dominions eaſtward; and, in order to facilitate his deſign, reſolved in the firſt place to diſcover theſe countries. With this view, he cauſed a fleet to be built and equipped at Caſpatyras, a city on the river Indus. The command of this fleet he gave to one Scylax, a Grecian of Caryandia a city of Caria, who was well verſed in maritime affairs. Him he ordered to ſail down the current, and make the beſt diſcoveries he could of the country lying on either ſide of the river, till he arrived at the ſouthern ocean; from whence he was to ſteer his courſe weſtward, and that way return to Perſia. Scylax, having exactly obſerved his inſtructions, and ſailed down the river Indus, entered the Red Sea by the ſtraits of Babelmandel, and on the 30th month from his firſt ſetting out, landed at the ſame place from whence Nechu king of Egypt formerly ſent out the Phœnicians who circumnavigated Africa. From hence Scylax returned to Suſa, where he gave a full account of his diſcoveries; upon which Darius, marching into India at the head of a powerful army, reduced that large country, and made it a province of the Perſian empire drawing from thence an annual tribute of 360 talents of gold.

24 Revolt of the Ionians &c.

Soon after the expedition of Darius againſt India, happened the revolt of the Ionians, which gave occaſion to his expedition into Greece; an account of which is given under the articles Attica, Greece, Sparta, &c. The ill ſucceſs which attended him here, however, was ſo far from making him drop the enterpriſe, that it only made him the more intent on reducing the Grecians; and he reſolved to head his army in perſon, having attributed his former bad ſucceſs to the inexperience of his generals. But while he was employed in making the neceſſary preparations for this purpoſe, he received intelligence that the Egyptians had revolted, ſo that he was obliged to make preparations for reducing them alſo; and before this could be done, the king died, after having reigned 36 years, leaving the throne to his ſon Xerxes.

25 Expeditions of Xerxes gainst E gypt an Greece

This prince aſcended the throne of Perſia in the year 485 B. C.; and his firſt enterpriſe was to reduce the Egyptians; which he effectually did, bringing them into a worſe ſtate of ſlavery than they ever had experienced before. After this he reſolved on an expedition into Greece; the unfortunate event of which is related under the article ATTICA. By his misfortunes in the Grecian expedition, he became at laſt ſo diſpirited, that he thenceforth abandoned all thoughts of war and conqueſts: but growing tyrannical, and oppreſſing his ſubjects, he was murdered in his bed, in the year 464 B C. and 21ſt of his reign and was ſucceeded by his third ſon Artaxerxes, Surnamed *Longimanus* on account of the great length of his arms.

26 Xerxes ſucceeded by Artaxerxes Longimanus.

This prince is named *Ahaſuerus*, in Scripture, and is the ſame who married Eſther and during the whole of his reign ſhowed the greateſt kindneſs to the Jewiſh nation. In the beginning of his reign he was oppoſed by Hyſtaſpes the ſecond ſon of Xerxes, whom, however, he overcame, though not without conſiderable difficulty. After this he applied himſelf to the ſettlement of the affairs of government, and reforming many abuſes which had crept in; and then, being fully eſtabliſhed on the throne, he appointed feaſts and rejoicings to be made for 180 days in the city of Suſa: at one of which he reſolved to divorce his queen for diſobedience; and afterwards married Eſther, as we find it recorded in the ſacred writings.

In the fifth year of the reign of Artaxerxes the Egyptians revolted anew, and, being aſſiſted by the Athenians, held out for ſix years; but were again obliged to ſubmit, and continued in ſubjection during the whole of his reign. Nothing elſe remarkable happened during the life of Artaxerxes Longimanus, who died in the 41ſt year of his reign; and was ſucceeded by Xerxes II. the only ſon he had by his queen, though by his concubines he had 17. Xerxes having drunk immoderately at an entertainment immediately after his acceſſion, retired to a chamber in order to refreſh himſelf with ſleep; but here he was murdered by Sogdianus, the ſon of Artaxerxes by one of his concubines, after he had reigned 45 days.

27 Xerxes II.

28 Sogdianus.

Sogdianus was ſcarce ſeated on the throne when he put to death Bagorazus, the moſt faithful of all his father's eunuchs; by which, and the murder of his ſovereign, he became generally odious. Upon this, ſenſible of the dangerous ſituation in which he was, he ſent for one of his brothers named *Ochus*, whom he ſuſpected, with a deſign to murder him the moment he arrived. Ochus, however, underſtanding his deſign, put off, by ſeveral pretences, his coming, till he had drawn together a powerful army, with which he advanced to the confines of Perſia. Here he openly declared, that his deſign was to revenge his brother's death; which brought over to him many of the nobility and governors of provinces, by whom he was immediately proclaimed king. Sogdianus, ſeeing himſelf thus deſerted, contrary to the advice of all his friends, came to an accomodation with Ochus; who no ſooner had him in his power than he cauſed him to be ſuffocated among aſhes; a puniſhment invented on purpoſe for him.

29 Ochus.

Ochus being firmly ſettled on the throne by the death of Sogdianus, changed his name to Darius; and is by hiſtorians commonly called *Darius Nothus*, or, *The Baſtard*. But Arſites, another of the brothers ſeeing in what manner Sogdianus had got the better of Xerxes, and been afterwards driven out by Ochus, began to entertain thoughts of treating him in the ſame manner. He was not however, ſo ſucceſsful; for, being defeated in an engagement, he ſurrendered himſelf in hopes of mercy, but was immediately put to death by ſuffocation in aſhes. Several other perſons were executed; but theſe ſeverities did not procure him the repoſe which he expected; for his whole reign was diſturbed with violent commotions in various parts of the empire. One of the moſt dangerous was raiſed by Piſuthna, governor of Lydia; but he being deſerted by his Greek mercenaries, was at laſt overcome, and put to death: however, his ſon Amorgas continued to infeſt the maritime provinces of Aſia Minor for two years; till he alſo was taken priſoner by Tiſſaphernes, the new governor of Lydia, who put him to death. Other inſurrections quickly followed this; but the greateſt misfortune which befel Darius during the whole courſe of his reign was the revolt of the Egyptians, who could not be reduced. Before his death he inveſted Cyrus his youngeſt ſon with the ſupreme government of all the provinces of Aſia Minor. This was done through the perſuaſions of his mother Paryſatis, who had an abſolute ſway over her huſband; and ſhe procured this command for him, that he might thereby be enabled to contend for the kingdom after his father's death. She even inſiſted that the king ſhould declare him heir to the crown before he died; but this he could not by any means be induced to do. He died in the year 405 B. C. and was ſucceeded by his ſon Artaxerxes, by the Greeks ſurnamed *Mnemon* on account of his extraordinary memory.

30 Artaxerxes Mnemon.

31 Revolt of Cyrus the Younger.

The moſt remarkable tranſaction which happened during the reign of this prince was the revolt of his brother Cyrus. This young prince had been raiſed to ſo great power through the intereſt of his mother, on purpoſe that he might revolt, as we have already ſeen. He began with gaining over the cities under the government of Tiſſaphernes; which quickly produced a war with that governor. Cyrus then began to aſſemble troops, which he pretended were deſigned only againſt Tiſſaphernes. As he had given great aſſiſtance to the Lacedemonians in their wars againſt the Athenians, he now in return demanded aſſiſtance from them; which requeſt they very readily complied with, ordering their fleet immediately to join him, and to obey in every thing the commands of Tamos his admiral. At laſt Cyrus, having collected an army of 13,000 Greek mercenaries and 100,000 regular troops of other nations, ſet out from Sardis, directing his march towards Upper Aſia; the army being entirely ignorant of the expedition on which they were going. When they arrived at Tarſus, the Greeks, ſuſpecting that they were marching againſt the king, refuſed to proceed any further; but Cyrus having gained them over with preſents and promiſes, they ſoon went on with ſatisfaction. Having arrived at Cunaxa in the province of Babylon, Cyrus found his brother with 900,000 men ready to engage him, Whereupon leaping out of his chariot he commanded his troops to ſtand to their arms and fall into their ranks; which was done with great expedition, no time being allowed the ſoldiers to refreſh themſelves. Clearchus, the commander of the Peleponeſian troops, adviſed Cyrus not to charge in perſon, but to remain in

32 Battle of Cunaxa.

the rear of the Greek battalions; but this advice he rejected with indignation, ſaying, that he ſhould thus render himſelf unworthy of the crown for which he was fighting. As the king's army drew near, the Greeks fell upon them with ſuch fury, that they routed the wing oppoſite to them almoſt at the firſt onſet; upon which Cyrus was with loud ſhouts proclaimed king by thoſe who ſtood next to him. But he in the mean time, perceiving that Artaxerxes was wheeling about to attack him in flank, advanced againſt him with 600 choſen horſe, killed Artageſes captain of the king's guard with his own hand, and put the whole body to flight. In this encounter, diſcovering his brother, he ſpurred on his horſe, and coming up to him, engaged him with great fury; which in ſome degree turned the battle into a ſingle combat. Cyrus killed his brother's horſe, and wounded him on the ground; but he immediately mounted another horſe, when Cyrus attacked him again, gave him a ſecond wound, and had already lifted up his hand to give him a third, when the guards, perceiving the danger in which their king was, diſcharged their arrows at once againſt his antagoniſt, who at the ſame time throwing himſelf headlong upon his brother, was pierced through by his javelin. He fell dead upon the ſpot; and all the chief lords of his court, reſolving not to ſurvive him, were ſlain in the ſame place.

33 Retreat of ten thouſand Greeks.

In the mean time, the Geeeks having defeated the enemy's left wing commanded by Tiſſaphernes, and the king's right wing having put to flight Cyrus's left, both parties, being ignorant of what had paſſed elſewhere, imagined that they had gained the victory. But Tiſſaphernes acquainting the king, that his men had been put to flight by the Greeks, he immediately rallied his troops, in order to attack them. The Greeks, under the command of Clearchus, eaſily repulſed them, and purſued them to the foot of the neighbouring hills. As night was drawing near, they halted at the foot of the hill, much ſurpriſed that neither Cyrus himſelf, nor any meſſenger from him, had appeared; for as yet they knew nothing of his death, and the defeat of the reſt of the army. They determined, therefore, to return to their camp, which they did accordingly; but found there that the greateſt part of their baggage had been plundered, and all their proviſions taken, which obliged them to paſs the night in the camp without any ſort of refreſhment. The next morning, as they were ſtill expecting to hear from Cyrus, they received the news of his death, and the defeat of that part of the army. Whereupon they ſent deputies to Ariæus, who was commander in chief of all the other forces of Cyrus, offering him, as conquerors, the crown of Perſia. Ariæus rejected the offer, and acquainting them that he intended to ſet out early in the morning on his return to Ionia, adviſed them to join him in the night. They followed his directions, and, under the conduct of Clearchus, began their march, arriving at his camp about midnight, whence they ſet out on their return to Greece. They were at a vaſt diſtance from their own country, in the very heart of the Perſian empire, ſurrounded by a victorious and numerous army, and had no way to return again but by forcing their way through an immenſe track of the enemy's country. But their valour and reſolution maſtered all theſe difficulties; and in ſpite of a powerful army, which purſued and haraſſed them all the way, they made good their retreat for 2325 miles through the provinces belonging to the enemy, and got ſafe to the Greek cities on the Euxine ſea. This retreat (the longeſt that was ever made through an enemy's country) was conducted at firſt by Clearchus; but he being cut off through the treachery of Tiſſaphernes, Xenophon was choſen in his room, who at laſt brought his men ſafe into Greece; but for a full account of that famous retreat, ſee the article XENOPHON.

34 War with the Lacedemonians.

The war with Cyrus was ſcarce ended, when another broke out with the Lacedemonians, on the following account. Tiſſaphernes being appointed to ſucceed Cyrus in all his power, to which was added all which he himſelf poſſeſſed formerly, began to oppreſs the Greek cities in Aſia in a moſt cruel manner. On this they ſent ambaſſadors to Sparta deſiring the aſſiſtance of that powerful republic. The Spartans having ended their long war with the Athenians, willingly laid hold of the preſent opportunity of breaking again with the Perſians, and therefore ſent againſt them an army under the command of Thimbro, who, being ſtrengthened by the forces which returned under Xenophon, took the field againſt Tiſſaphernes. But Thimbro being ſoon recalled upon ſome complaints, Dercyllidas, a brave officer and experienced engineer, was appointed to ſucceed him; and he carried on the war to much more advantage than his predeceſſor. On his arrival in Aſia, finding that Tiſſaphernes was at variance with another governor named *Pharnabazus*, he concluded a truce with the former, and marching againſt Pharnabazus, drove him quite out of Æolis, and took ſeveral cities in other parts. The latter, however, immediately repaired to the Perſian court, where he made loud complaints againſt Tiſſapharenes, but gave the king a moſt ſalutary advice, which was to equip a powerful fleet, and give the command of it to Conon the Athenian, the beſt ſea officer of his time, by which means he would obſtruct the paſſage of further recruits from Greece; and thus ſoon put an end to the power of the Lacedemonians in Aſia. This advice being approved of, the king ordered 500 talents for the equipment of a fleet, with directions to give Conon the command of it.

In the mean time, Dercyllidas, with all his valour and ſkill, ſuffered himſelf to be drawn into ſuch a diſadvantageous ſituation, that he muſt inevitably have been deſtroyed with his whole army, had it not been through the cowardice of Tiſſaphernes, who, having experienced the Grecian valour at the battle of Cunaxa, could not by any means be induced to attack them. The Lacedemonians, however having heard that the Perſian monarch was fitting out a great fleet againſt them, reſolved to puſh on the war as vigorouſly as poſſible; and for this purpoſe, ſent over Ageſilaus one of their kings, and a moſt experienced commander, into Aſia. This expedition was carried on with ſuch ſecrecy, that Ageſilaus arrived at Epheſus before the Perſians had the leaſt notice of his deſigns. Here he took the field with 10,000 foot and 4000 horſe, and falling upon the enemy while they were totally unprepared, carried every thing before him. Tiſſaphernes deceived him into a truce till he had leiſure to aſſemble his forces, but gained little by his treachery;

ery; for Ageſilaus deceived him in his turn, and while Tiſſaphernes marched his troops into Caria, the Greeks invaded and plundered Phrygia.

Early in the ſpring, Ageſilaus gave out that his deſign was to invade Lydia; but Tiſſaphernes, who remembered the laſt year's ſtratagem, now taking it for granted that Ageſilaus would really invade Caria, made his troops again march to the defence of that province. But Ageſilaus now led his amy into Lydia as he had given out, and approached Sardis; upon which Tiſſaphernes recalled his forces from their former rout, with a deſign to relieve the place. But Caria being a very mountainous country, and unfit for horſe, he had marched thither only with the foot, and left the horſe behind on the borders of that province. Whence, on their marching back to the relief of Sardis, the horſe being ſome days march before the foot, Ageſilaus, took the advantage of ſo favourable an opportunity, and fell upon them before the foot could come to their aſſiſtance. The Perſians were routed at the very firſt onſet; after which Ageſilaus over-ran the whole country, enriching both himſelf and his army with the ſpoils of the conquered Perſians.

By this continued ill fortune Artaxerxes was ſo much provoked againſt Tiſſaphernes, that he ſoon after cauſed him to be put to death.

On the death of Tiſſaphernes, Tithrauſtes, who was appointed to ſucceed him, ſent large preſents to Ageſilaus, in hopes of perſuading him to abandon his conqueſts; but finding that commander was not by any means to be induced to relinquiſh the war, he ſent Timocrates of Rhodes into Greece, with large ſums of money to corrupt the leading men in the cities; and rekindle a war againſt the Lacedemonians. This ſtratagem produced the intended effect; for the cities of Thebes, Argos, Corinth, and others, entering into a confederacy, obliged them to recall Ageſilaus, to the defence of his own country.

35 Ageſilaus obliged to leave Aſia.

36 Lacedemonians defeated.

After the departure of Ageſilaus, which happened in the year 354 B. C. the Lacedemonian power received a ſevere blow at Cnidos, where their fleet was entirely defeated by that of Artaxerxes under Conon, 50 of their ſhips being taken in the engagement; after which, Conon and Pharnabazus being maſters of the ſea, ſailed round the iſlands and coaſts of Aſia, taking the cities there which had been reduced by the Lacedemonians. Seſtos and Abydos only held out, and reſiſted the utmoſt efforts of the enemy, though they had been beſieged both by ſea and land.

Next year Conon having aſſembled a powerful fleet, again took Pharnabazus on board, and reduced the iſland of Melos, from whence he made a deſcent on the coaſts of Lyconia, pillaging all the maritime provinces, and loading his fleet with an immenſe booty. After this, Conon obtained leave of him to repair to Athens with 80 ſhips and 50 talents, in order to rebuild the walls of that city; having firſt convinced Pharnabazus, that nothing could more effectually contribute to the weakening of the power of Sparta than putting Athens again in a condition to rival its power. He no ſooner arrived at Piræus the port of Athens, but he began to work; which as he had a great number of hands, and was ſeconded by the zeal of all thoſe that were well inclined to the Athenians was ſoon completed, and the city not only reſtored to its former ſplendor, but rendered more formidable than ever. The Lacedemonians were now reduced to the neceſſity of accepting ſuch terms of peace as they could procure. The terms were, that all the Greek cities in Aſia ſhould be ſubject to the king of Perſia, as alſo the iſlands of Cyprus and Clazomena; that the iſlands of Sycros, Lemnos, and Imbros, ſhould be reſtored to the Athenians, and all the cities of Greece, whether ſmall or great, ſhould be declared free; and by the ſame treaty, Artaxerxes engaged to join thoſe who accepted the terms he propoſed, and to aſſiſt them to the utmoſt of his power againſt ſuch as ſhould reject them.

37 Are obliged to make peace with the Perſians.

38 Cyprus reduced.

Artaxerxes, being now diſengaged from the Grecian war, turned his arms againſt Evagoras king of Cyprus. This man was deſcended from the ancient kings of Salamine, the capital city of the iſland of Cyprus. His anceſtors had held that city for many ages in quality of ſovereigns; but were at laſt driven out by the Perſians, who, making themſelves maſters of the whole iſland, reduced it to a Perſian province. Evagoras, however, being a man of an enterpriſing genius, ſoon became weary of living in ſubjection to a foreign power, drove out the Perſian governor, and recovered his paternal kingdom. Artaxerxes attempted to drive him out of it; but being diverted by the Greek war, was obliged to put off the enterprize. However, Conon, by means of Cteſias, chief phyſician to Artaxerxes, got all differences accommodated, and Artaxerxes, promiſed not to moleſt him in the poſſeſſion of his ſmall kingdom. But Evagoras ſoon becoming diſcontented with ſuch a narrow poſſeſſion, gradually reduced under his ſubjection almoſt the whole of the iſland. Some, however, there were, who held out againſt him, and theſe immediately applied to Artaxerxes for aſſiſtance; and he, as ſoon as the war with Greece was at an end, bent all his force againſt Evagoras, intending to drive him quite out of the iſland. The Athenians, however, notwithſtanding the favours lately conferred upon them by the king of Perſia, could not forbear aſſiſting their old ally in ſuch a dreadful emergency. Accordingly, they ſent him ten men of war under the command of Philocrates; but the Lacedemonian fleet, commanded by Talentias brother of Ageſilaus, falling in with them near the iſle of Rhodes, ſurrounded them ſo that not one ſhip could eſcape. The Athenians, determined to aſſiſt Evagoras at all events, ſent Chabrias with another fleet and a conſiderable body of land forces; and with the aſſiſtance of theſe he quickly reduced the whole iſland. But in a ſhort time, the Athenians being obliged, in conſequence of the treaty concluded with the Perſians, to recal Chabrias, Artaxerxes attacked the iſland with an army of 300,000 men, and a fleet of 300 ſhips. Evagoras applied to the Egyptians, Lybians, Arabians, Tyrians, and other nations, from whom he received ſupplies both of men and money; and fitted out a fleet, with which he ventured an engagement with that of Artaxerxes. But being defeated, and obliged to ſhut himſelf up in Salamine, he was cloſely beſieged by ſea and land. Here at laſt he was obliged to capitulate, and abandon to the Perſians the whole of the iſland except Salamine, which he held as a king tributary to Artaxerxes.

The Cyprian war being ended, Artaxerxes turned his

39
Unſucceſsful expeditions againſt the Caduſians and Egyptians.

his arms againſt the Caduſians, whoſe country lay between the Euxine and Caſpian ſeas. But theſe nations were too well accuſtomed to war to be overcome by the Perſians; and therefore the king was obliged to abandon the project, after having loſt a great number of his troops and all the horſes which he took out with him. In his Egyptian expedition, which happened immediately after the Caduſian war, he was attended with little better ſucceſs; which, however, was owing to the bad conduct of his general Pharnabazus. This commander being entruſted with the management of the Egyptian war, ſent an ambaſſador to Athens, complaining that Chabrias had engaged in the ſervice of an enemy of the king of Perſia, with whom the ſtate of Athens was in alliance, and threatening the republic with his maſter's reſentment if proper ſatisfaction was not given: at the ſame time he demanded Iphicrates, another Athenian, and the beſt general of his time, to command the Greek mercenaries in the Perſian ſervice. This the Athenians complied with; and Iphicrates having muſtered his troops, ſo exerciſed them in all the arts of war, that they became afterwards very famous among the Greeks under the name of *Iphicrateſian ſoldiers*. Indeed he had ſufficient time to inſtruct them; for the Perſians were ſo ſlow in their preparations, that two whole years elapſed before they were ready to take the field. At the ſame time Artaxerxes, that he might draw the more mercenaries out of Greece, ſent ambaſſadors to the different ſtates in it, declaring it to be his will and pleaſure that they ſhould live at peace with each other, on the terms of the treaty lately concluded: which declaration was received with pleaſure by all the ſtates except Thebes, who aſpired at the ſovereignty of Greece; and accordingly refuſed to conform to it. All things, however, at laſt being ready for the expedition, the troops were muſtered at the city then called *Ace*, and ſince *Ptolemais*; where they were found to conſiſt of 200,000 Perſians under the command of Pharnabazus, and 20,000 Greeks led by Iphicrates. The fleet conſiſted of 300 galleys, beſides a vaſt number of other veſſels which followed with proviſions. The fleet and army began to move at the ſame time; and that they might act in concert they ſeparated as little as poſſible. It was propoſed, that the war ſhould begin with the ſiege of Peluſium; but Nectanebus, the revolted king of Egypt, had provided ſo well for the defence of the place, that it was thought expedient to drop the enterprize, and make a deſcent at one of the mouths of the Nile. In this they ſucceeded; for the Egyptians not expecting them at that place, had not taken ſuch care to fortify it as at Peluſium. The fortreſs of conſequence was eaſily taken, and all the Egyptians in it put to the ſword. After this, Iphicrates was for embarking the troops without loſs of time, and attacking Memphis the capital of Egypt. Had this opinion been followed before the Egyptians recovered from the conſternation into which they were thrown, it is highly probable that the whole country might have been reduced at once; but Pharnabazus would undertake nothing before the reſt of the forces were come up. Iphicrates then, in the utmoſt vexation at loſing ſo favourable an opportunity, preſſed Pharnabazus to allow him to attack the place with the Greek mercenaries only; but he refuſed this alſo, from a mean jealouſy of the honour which Iphicrates might acquire; and in the mean time the Egyptians recovered ſufficient courage to put themſelves in ſuch a poſture of defence, that they could not be attacked with any probability of ſucceſs; and at the ſame time the Nile overflowing as uſual, obliged them to return to Phœnice. The expedition was again undertaken 12 years after, but without ſucceſs.

40
Ochus ſucceeds Artaxerxes.

The laſt years of the reign of Artaxerxes were greatly diſturbed by diſſenſions in his family; which at laſt broke his heart, and he died in the 94th year of his age, and 46th of his reign. He was ſucceeded by one of his ſons named *Ochus*, who behaved with ſuch cruelty, that almoſt one half of his dominions revolted as ſoon as he came to the throne. But by reaſon of the diſſenſions of the rebels among themſelves, all of them were reduced, one after another; and among the reſt, the Sidonians, finding themſelves betrayed, burnt themſelves to the number of 40,000, together with their wives and children.

41
Reduces Egypt.

Ochus, having quelled all the inſurgents, immediately ſet himſelf about reducing Egypt, and for this purpoſe procured a reinforcement of other 10,000 mercenaries from Greece. On his march, he loſt a great number of his men drowned in the lake Serbonis, which lies between Phœnice and Egypt, extending about 30 miles in length. When the ſouth wind blows, the whole ſurface of the lake is covered with ſand, in ſuch a manner that no one can diſtinguiſh it from the firm land. Several parties of Ochus's army were loſt in it for want of proper guides; and it is ſaid that whole armies have ſometimes periſhed in the ſame place. When he arrived in Egypt, he detached three bodies to invade the country in different parts: each being commanded by a Perſian and a Greek general. The firſt was led by Lachares the Theban, and Roſaces governor of Lydia and Ionia: the ſecond by Nicoſtratus the Theban and Ariſtazanes; the third by Mentor the Rhodian and Bagoas an eunuch. The main body of the army he kept with himſelf, and encamped near Peluſium, with a deſign to watch the events of the war there. The event was ſucceſsful, as we have related under the article EGYPT; and Ochus having reduced the whole country, diſmantled their ſtrong holds, plundered the temples, and returned to Babylon loaded with booty.

The king, having ended this war with ſuch ſucceſs, conferred very high rewards on his mercenaries and others who had diſtinguiſhed themſelves. To Mentor the Rhodian he gave 100 talents, and other preſents to a great value; appointing him alſo governor of all the coaſts of Aſia, and committing to his care the whole management of the war which he was ſtill carrying on againſt ſome provinces that had revolted in the beginning of his reign; and all theſe either by ſtratagems, or by force, he at laſt reduced; reſtoring the king's authority in all theſe places.—Ochus then, finding himſelf free from all troubles, gave his attention to nothing but his pleaſures, leaving the adminiſtration of affairs entirely to Bagoas the eunuch, and to Mentor. Theſe two agreed to ſhare the power between them; in conſequence of which the former had the provinces of Upper Aſia, and the latter all the reſt. Bagoas being by birth an Egyptian, had a great zeal for the religion of his country, and endeavoured, on the conqueſt of Egypt, to influence the king in favour of the Egyptian ceremonies; but in ſpite of all his endeavours, Ochus not only refuſed to comply, but killed the ſacred bull, the emblem of the Egyptian god Apis, plundered the temples, and carried away their ſacred records. This Bagoas ſuppoſed to be the higheſt guilt which a human creature could commit; and

42 Ochus murdered by Bagoas.

therefore poiſoned his maſter and benefactor in the 21ſt year of his reign. Nor did his revenge ſtop here; for he kept the king's body, cauſing another to be buried in its ſtead; and becauſe the king had cauſed his attendants eat the fleſh of Apis, Bagoas cut his body in pieces, and gave it ſo mangled to be devoured by cats, making handles for ſwords of his bones. He then placed Arſes the youngeſt of the deceaſed king's ſons on the throne, that he might the more eaſily preſerve the whole power to himſelf.

Arſes did not long enjoy even the ſhadow of power which Bagoas allowed him, being murdered in the

43 Darius Codomanus.

ſecond year of his reign by that treacherous eunuch, who now conferred the crown on Darius Codomannus, a diſtant relation of the royal family. Neither did he incline to let him enjoy the crown much longer than his predeceſſor; for finding that he would not ſuffer himſelf to be guided by him in all things, the treacherous Bagoas brought him a poiſonous potion; but Darius got rid of him by his own artifice, cauſing him to drink the poiſon which he brought. This eſtabliſhed Darius in the throne as far as ſecurity from internal enemies could do ſo; but in a very little time his do-

44 Perſia conquered by Alexander the Great.

minions were invaded, and, we may ſay, the ſame moment conquered, by Alexander the Great. The particulars of that heroe's conqueſt are related under the article MACEDON; we ſhall therefore here only take notice of the fate of Darius himſelf, with which the Perſian empire concluded for many ages. After the battle of Arbela, which was deciſive in favour of Alexander, the latter took and plundered Perſepolis, from whence he marched into Media, in order to purſue Darius, who had fled to Ecbatan the capital of that province. This unhappy prince had ſtill an army of 30,000 foot, among whom were 4000 Greeks, who continued faithful to the laſt. Beſides theſe, he had 4000 ſlingers and 3000 horſe, moſt of them Bactrians, and commanded by Beſſus governor of Bactria. When Darius heard that Alexander was marched to Ecbatan, he retired into Bactria, with a deſign to raiſe another army; but ſoon after, changing his mind, he determined to venture a battle with the forces he ſtill had left. On this Beſſus governor of Bactria, and Nabarzanes a Perſian lord of great diſtinction, formed a conſpiracy againſt him, propoſing to ſeize his perſon, and if Alexander purſued them, to gain his friendſhip and protection by betraying their maſter into his hands; but if they eſcaped, their deſign was to murder him, and uſurp the crown. The troops were eaſily gained over, by repreſenting to them the deſperate ſituation of Darius's affairs; but Darius himſelf, though informed of their proceedings, and ſolicited to truſt his perſon among the Greeks,

45 Darius ſeized by his own ſubjects.

refuſed to give credit to the report, or follow ſuch a ſalutary counſel. The conſequence of this was, that he was in a few days ſeized by the traitors; who, out of reſpect to the royal dignity, bound him with golden chains, and ſhutting him up in a covered cart, fled with him towards Bactria. The cart was covered with ſkins, and ſtrangers appointed to drive it without knowing who the priſoner was. Beſſus was proclaimed commander in chief in the room of Darius by the Bactrian horſe; but Artabazus and his ſons with the forces they commanded, and the Greeks under the command of one *Patron*, retired from the body of the army under Beſſus, and marched over the mountains towards Parthiene. In the mean time Alexander arriving at Ecbatan, was informed that Darius had left the place five days before. He then diſpatched orders to Clitus, who had fallen ſick at Suſa, to repair, as ſoon as he recovered, to Ecbatan, and from thence to follow him into Parthia with the cavalry and 6000 Macedonians, who were left in Ecbatan. Alexander himſelf with the reſt of the army purſued Darius; and the 11th day arrived at *Rhages*, having marched in that ſpace of time 3300 furlongs. Moſt of thoſe who accompanied him died through the fatigue of ſo long a march; inſomuch that, on his arrival at Rhages, he could ſcarce muſter 60 horſemen. Finding that he could not come up with Darius, who had already paſſed the Caſpain ſtraits, he ſtaid five days at Rhages, in order to refreſh his army and ſettle the affairs of Media. From thence he marched into Parthia, and encamped at a ſmall diſtance from the Caſpian ſtraits, which he paſſed the next day without oppoſition. He had ſcarce entered Parthia, when he was informed that Beſſus and Nabarzanes had conſpired againſt Darius, and deſigned to ſeize him. Hereupon leaving the main body of the army behind with Craterus, he advanced with a ſmall troop of horſe lightly armed; and having marched day and night without ever halting, except for a few hours, he came on the third day to a village where Beſſus with his Bactrians had encamped the day before. Here he underſtood that Darius had been ſeized by the traitors; that Beſſus had cauſed him to be ſhut up in a cloſe cart, which he had ſent before that he might be the more ſure of his perſon; and that the whole army except Artabazus and the Greeks, who had taken another rout, obeyed Beſſus. Alexander therefore taking with him a ſmall body of light armed horſe, for the others could not poſſibly proceed further, at laſt came in ſight of the barbarians, who were marching in great confuſion. His unexpected appearance ſtruck them though far ſuperior in number, with ſuch terror, that they immediately betook themſelves to flight; and becauſe Darius refuſed to follow them, Beſſus and thoſe who were about him

46 And murdered.

diſcharged their darts at the unfortunate prince, leaving him wallowing in his blood. After this they all fled different ways and were purſued with great ſlaughter by the Macedonians. In the mean time the horſes that drew the cart in which Darius was, ſtopped of their own accord, for the drivers had been killed by Beſſus, near a village about four furlongs from the highway. Thither Polyſtratus a Macedonian, being preſſed with thirſt in the purſuit of the enemy, was directed by the inhabitants to a fountain to refreſh himſelf, not far from the place where they ſtopped. As he was filling his helmet with water, he heard the groans of a dying man; and looking round him, diſcovered a cart with a team of horſes, unable to move by reaſon of the many wounds they had received. When he drew near, he perceived Darius lying in the cart and very near his end, having ſeveral darts ſticking in his body. However, he had ſtrength enough left to call for ſome water, which Polyſtratus readily brought him. Darius, after drinking, turned to the Macedonian, and with a faint voice told him, that, in the deplorable ſtate to which he was reduced, it was no ſmall comfort to him that his laſt words would not be loſt; he then charged him to return his hearty thanks to Alexander for the kindneſs he had ſhown to his wife and family, and to acquaint him, that, with his laſt breath, he beſought the gods to proſper him in all his undertakings, and make him ſole monarch of the univerſe. He added that it did not ſo much concern him as Alexander to purſue and bring to condign puniſhment thoſe traitors who had treated their lawful ſovereign with ſuch cruelty, that being the common cauſe of all crowned heads. Then, taking Polyſtratus by the hand, "Give Alexander your hand, ſays he, as I give you mine, and carry him, in my name, the only pledge I am able to give, in this condition, of my gratitude and affection." Having uttered theſe words, he expired in the arms of Polyſtratus. Alexander coming up a few minutes after, bewailed his death, and cauſed his body to be interred with the higheſt honours.

47 His murderers purſued.

The traitor Beſſus being at laſt reduced to extreme difficulties, was delivered up by his own men naked and bound into the hands of the Macedonians; on which Alexander gave him up to Oxathres the brother of Darius, to ſuffer what puniſhment he ſhould think proper. Plutarch tells us, that he was executed in the following manner: Several trees being by main force bent down to the ground, and one of the traitor's limbs tied to each of them, the trees, as they were ſuffered to return to their natural poſition, flew back with ſuch violence, that each carried with it the limb that was tied to it.

48 Revolt of the Parthians.

Thus ended the empire of Perſia, 209 years after it had been founded by Cyrus. On the death of Alexander the Perſian dominions became ſubject to Seleucus Nicator, and continued ſubject to him for 62 years, when the Parthians revolted, and conquered the greateſt part of them. To the Parthians they continued ſubject for 475 years; when the ſovereignty was again reſtored to the Perſians, as related under the article PARTHIA.

49 Perſian empire again reſtored by Artaxerxes

The reſtorer of the Perſian monarchy was Artaxerxes, or Artaxares, who was not only a private perſon, but of ſpurious birth. However, he poſſeſſed great abilities, by which means he executed his ambitious projects. He was no ſooner ſeated on the throne than he took the pompous title of *king of kings*, and formed a deſign of reſtoring the empire to its ancient glory. He therefore gave notice to the Roman governors of the provinces bordering on his dominions, that he had a juſt right, as the ſucceſſor of Cyrus, to all the Leſſer Aſia; which he there commanded them immediately to quit, as well as the provinces on the frontiers of the ancient Parthian kingdom, which were already his. The conſequence of this was a war with Alexander Severus the Roman emperor. Concerning the event of this war there are very different accounts. It is certain, however, that, on account of his exploits againſt Artaxeres, Alexander took the titles of *Parthicus* and *Perſicus*; though, it would ſeem, with no great reaſon, as the Perſian monarch loſt none of his dominions, and his ſucceſſors were equally ready with himſelf to invade the Roman territories.

50 Succeeded by Sapor, who takes Valerian the Roman emperor priſoner;

Artaxares dying after a reign of 12 or 15 years, was ſucceeded by his ſon Sapor; a prince of great abilities both of body and mind, but fierce, haughty, untractable, and cruel. He was no ſooner ſeated on the throne than he began a new war with the Romans. In the beginning he was unſucceſsful; being obliged, by the young emperor Gordian, to withdraw from the Roman dominions, and was even invaded in his turn; but, in a ſhort time, Gordian being murdered by Philip, the new emperor made peace with him upon terms very advantageous to the Perſians. He was no ſooner gone than Sapor renewed his incurſions, and made ſuch alarming progreſs, that the emperor Valerian, at the age of 70, marched againſt him in perſon with a numerous army. An engagement enſued, in which the Romans were defeated, and Valerian taken priſoner. Sapor purſued his advantages with ſuch inſolence of cruelty than the people of the provinces took arms, firſt under Caliſtus a Roman general, and then under Odenatus prince of Palmyrene. Thus they not only protected themſelves from the inſults of the Perſians, but even gained many great victories over them, and drove Sapor with diſgrace into his own dominions. In his march he is ſaid to have made uſe of the bodies of his unfortunate priſoners to fill up the hollow road, and to facilitate the paſſage of his carriages over ſuch rivers as lay in his way. On his return to Perſia, he was ſolicited by the kings of the Caduſians, Armenians, Bactrians, and other nations, to ſet Valerian at liberty; but to no purpoſe.

51 And treats him cruelly.

On the contrary he uſed him the worſe; treated him daily with indignities, ſet his foot upon his neck when he mounted his horſe, and, as is affirmed by ſome, flayed him alive after ſome years confinement; and cauſed his ſkin to be tanned, which he kept as a monument of his victory over the Romans. This extreme inſolence and cruelty was followed by an uninterrupted courſe of misfortune. Odenatus defeated him in every engagement, and even ſeemed ready to overthrow his empire; and after him Aurelian took ample vengeance for the captivity of Valerian. Sapor died in the year of Chriſt 273, after having reigned 31 years; and was ſucceeded by his ſon Hormiſdas, and he by Varanes I. Concerning both theſe princes we know nothing more than that the former reigned a year and ten days, and the latter three years; after which he left the crown to Varanes II. who ſeems to have been ſo much awed by the power of the Romans, that he durſt undertake nothing. The reſt of the Perſian hiſtory, to the overthrow of the empire by the Saracens, affords nothing but an account of their continued invaſions of the Roman empire, which more properly belongs to the hiſtory of ROME: and to which therefore we refer.

5 The Perſian empire overthrown by the Saracens.

The laſt of the Perſian monarchs, of the line of Artaxerxes, was Iſdigertes or Jezdegerd, as he is called by the Arabian and Perſian hiſtorians, who was cotemporary with Omar the ſecond caliph after Mahomet. He was ſcarce ſeated on the throne, when he found himſelf attacked by a powerful army of Saracens under the command of one Sad, who invaded the country through Chaldea. The Perſian general took all imaginable pains to haraſs the Arabs on their march; and having an army ſuperior to them in numbers, employed them continually in ſkirmiſhes; which were ſometimes favourable to him and ſometimes otherwiſe. But Sad, perceiving that this lingering war would deſtroy his army, determined to haſten forward, and force the enemy to a general engagement. The Perſians declined this for a long time; but at length, finding a convenient plain where all their forces might act, they drew up in order of battle and reſolved to wait for the Arabs. Sad having diſpoſed his men in the beſt order he could, attacked the Perſians with the utmoſt fury. The battle laſted three days and three nights; the Perſians retiring continually from one poſt to another, till at laſt they were entirely defeated; and thus the capital city, and the greateſt part of the dominions of Perſia, fell into the hands of the Arabs. The conquerors ſeized the treaſures of the king; which were ſo vaſt, that, according to a Mahometan tradition, their prophet gave the Saracen army a miraculous view of thoſe treaſures before the engagement, in order to encourage them to fight.

After the loſs of this battle, Jezdegerd retired into Choraſſan, where he maintained himſelf as king, having under his ſubjection two other provinces, named *Kerman* and *Segeſtan*. But after he had reigned in this limited manner for 19 years, one of the governors of the few towns he had left, betrayed it, and called in the Turks. This place was called *Merou*, ſeated on the river Gihon or Odus. Jezdegerd immediately marched againſt the rebels and their allies. The Perſians were defeated; and the unfortunate monarch, having with much difficulty reached the river, found there a little boat, and a fiſherman to whom it belonged. The king offered him a bracelet of precious ſtones; but the fellow, equally brutal and ſtupid, told him that his fare was five farthings, and that he would neither take more nor leſs. While they diſputed, a party of the rebel horſe came up, and knowing Jezdegerd, killed him in the year 652.

Jezdegerd left behind him a ſon named *Firouz*, and a daughter named *Dara*. The latter eſpouſed Boſtenay, whom the rabbinical writers have dignified with the title of the *head of the captivity;* and who, in fact, was the prince of the Jews ſettled in Chaldea. As for Firouz, he ſtill preſerved a little principality; and when he died, left a daughter named *Mah Afrid*, who married Walid the ſon of the caliph Abdalmalek, by whom ſhe had a ſon named *Yezid*, who became caliph, and conſequently ſovereign of Perſia; and ſo far was this prince from thinking himſelf above claiming the title derived from his mother, that he conſtantly ſtyled himſelf *the ſon of Khoſrou king of Perſia, the deſcendant of the caliph Maroan, and among whoſe anceſtors on the ſide of the mother were the Roman emperor and the khacan.*

53 State of Perſia under the Mogul princes.

Perſia continued to be ſubject to the Arabs till the decline of the Saracen empire, when it was ſeized by various uſurpers, till the time of Jenghiz Khan, who conquered it, as well as almoſt all the reſt of Aſia. After his death, which happened in the year 1227, Perſia, together with the neighbouring countries, were governed by officers appointed by his ſucceſſors, who reigned at Kærakorom, in the eaſtern parts of Tartary, till the year 1253, when it became once more the ſeat of a mighty empire under Hulaku the Mogul, who in 1256 aboliſhed the khalifat, by taking the city of **Bagdad**, as related under that article. After the death of Hulaku, his ſon Abaka ſucceeded to his extenſive dominions; and his firſt care was to ſhut up all the avenues of his empire againſt the other princes of the race of Jenghiz Khan, who reigned in different parts of Tartary. His precautions, however, were of little avail; for in the very beginning of his reign he was invaded by Barkan Khan, of the race of Jagatay the ſon of Jenghiz Khan, from Great Bukharia, with an army of 300.000 men. Abaka was but indifferently prepared to oppoſe ſuch a formidable power; but, happily for him, his antagoniſt died before the armies came to an engagement, upon which the invaders diſperſed and returned to Tartary. In the year 1264, Armenia and Anatolia were ravaged by the Mamlucks from Egypt, but they were obliged to fly from Abaka; who thus ſeemed to be eſtabliſhed in the poſſeſſion of an empire almoſt as extenſive as that of the ancient Perſian kings. His tranquillity, however, was of ſhort duration; for in 1268 his dominions were invaded by Borak Khan, a prince likewiſe of the race of Jagatay, with an army of 100,000 men. He quickly reduced the province of Choraſſan, where he met with little oppoſition, and in 1269 advanced as far as Aderbijan, where Abaka had the bulk of his forces. A bloody battle enſued; in which Abaka was victorious, and Borak obliged to fly into Tartary, with the loſs of all his baggage and great part of his army. Abaka died in 1282, after a reign of 17 years, not without ſuſpicion of being poiſoned; and was ſucceeded by his brother Ahmed Khan. He was the firſt of the family of Jenghiz Khan who embraced Mahometaniſm; but neither he nor his ſucceſſors appear to have been in the leaſt verſed in the arts of government; for the Perſian hiſtory, from this period, becomes only an account of inſurrections, murders, rebellions, and poiſonings, till the year 1335, when it ſplit all to pieces, and was poſſeſſed by a great number of petty princes; all of whom were at perpetual war with each other till the time of Timur Beg, or Tamerlane, who once more reduced them all under one juriſdiction.

54 Under Tamerlane and his ſucceſſors.

After the death of Tamerlane, Perſia continued to be governed by his ſon Shah Rukh, a wiſe and valiant prince: but immediately after his death fell into the ſame confuſion as before; being held by a great number of petty tyrants, till the beginning of the 16th century, when it was conquered by Shah Iſmael Safi, or Sefi; of whoſe family we have the following account. His father was Sheykh Hayder or Haydr, the ſon of Sultan Juneyd, the ſon of Sheykh Ibrahim, the ſon of Sheykh Ali, the ſon of Sheykh Muſa, the ſon of Sheykh Sefi; who was the 13th in a direct line from Ali the ſon-in-law of the prophet Mahomet. When Tamerlane returned from the defeat of Bajazet the Turkiſh ſultan, he carried with him a great number of captives out of Karamania and Anatolia, all of whom he intended to put to death on ſome remarkable occaſion; and with this reſolution he entered Ardebil, or Ardevil, a city of Aderbijan, about 25 miles to the eaſt of Taurus, where he continued for ſome days. At this time lived in that city the Sheykh Safi or Sefi abovementioned, reputed by the inhabitants to be a ſaint; and, as ſuch, much reverenced by them. The fame of Safi's ſanctity ſo much moved Tamerlane, that he paid him frequent viſits; and, when he was about to depart, promiſed to grant whatever favour he ſhould aſk. Sheykh Safi, who had been informed of Tamer-

55 Conquered by Iſmael Safi.

lane's deſign to put the captives to death, requeſted of the conqueror that he would ſpare the lives of thoſe unfortunate men. Tamerlane, deſirous of obliging him, not only granted this requeſt, but delivered them up to him to be diſpoſed of as he thought fit; upon which the Sheykh furniſhed them with clothes and other neceſſaries as well as he could, and ſent them home to their reſpective countries. This generous action proved very beneficial to the family; for the people were ſo much affected with ſuch an extraordinary inſtance of virtue, that they repaired in great numbers to Safi, bringing with them conſiderable preſents; and this ſo frequently, that few days paſſed in which he was not viſited by many. Thus the deſcendants of the Sheykh made a conſpicuous figure till the year 1486, when they were all deſtroyed by the Turkmans except Iſmael, who fled to Ghilan, where he lived under the protection of the king of that country; after which he became conſpicuous on the following occaſion.

There was at that time, among the Mahometans, a vaſt number of people diſperſed over Aſia; and among theſe a particular party who followed that of Haydr the father of Iſmael, which Sheykh Safi, one of his anceſtors, had brought into great reputation. Iſmael, who had aſſumed the ſurname of *Sofi*, or *Sage*, finding that Perſia was all in confuſion, and hearing that there was a great number of the Hayderian ſect in Karamania, removed thither. There he collected 7000 of his party, all devoted to the intereſt of his family; and while he was yet only 14 years of age, conquered Shirwan. After this he purſued his conqueſts; and as his antagoniſts never united to oppoſe him, had conquered the greateſt part of Perſia, and reduced the city of Bagdad by the year 1510. However, his conqueſts on the weſt ſide were ſoon ſtopped by the Turks; for, in 1511, he received a great a defeat from Selim I. who took Tauris; and would probably have cruſhed the empire of Iſmael in its infancy, had he not thought the conqueſt of Egypt more important than that of Perſia. After his defeat by Selim, Iſmael never undertook any thing of conſequence. He died in 1523, leaving the crown to his eldeſt ſon Thamaſp I.

The new ſhah was a man of very limited abilities, and was therefore invaded by the Turks almoſt inſtantly on his acceſſion to the throne. However, they were obliged to retreat by an inundation, which overflowed their camp, and which frightened them with its red colour, probably ariſing from the nature of the ſoil over which it paſſed. Thamaſp, however, reduced Georgia to a province of the Perſian empire; that country being in his time divided among a number of petty princes, who by reaſon of their diviſions, were able to make little oppoſition.

56
Reign of Shah Abbas the Great.

The reigns of the ſucceeding princes afford nothing remarkable till the time of Shah Abbas I. ſurnamed the *Great*. He aſcended the throne in the year 1584; and his firſt care was to recover from the Turks and Tartars the large provinces they had ſeized which formerly belonged to the Perſian empire. He began with declaring war againſt the latter, who had ſeized the fineſt part of Choraſſan. Accordingly, having raiſed a powerful army, he entered that province, where he was met by Abdallah Khan the chief of the Uſbeck Tartars. The two armies lay in ſight of each other for ſix months; but at length Abbas attacked and defeated his enemies, forcing them, for that time, to abandon Choraſſan. Here he continued for three years; and on his leaving that place, fixed the ſeat of government at Iſpahan, where it has continued ever ſince. His next expedition was againſt the Turks. Underſtanding that the garriſon of Tauris was in no expectation of an enemy, he formed a deſign of ſurpriſing the place; and having privately aſſembled a few forces, he marched with ſuch celerity, that he reached a paſs called *Shibli*, very near Tauris, in ſix days, though it is uſually 18 or 20 days journey for the caravans. Here the Turks had poſted a few ſoldiers, rather for the purpoſe of collecting the cuſtoms on ſuch commodities as were brought that way, than of defending the paſs againſt an enemy. Before they came in ſight of this paſs, Abbas and ſome of his officers left the reſt of the army, and rode briſkly up to the turnpike. Here the ſecretary of the cuſtomhouſe, taking them for merchants, demanded the uſual duties. Abbas replied, that the perſon who had the purſe was behind, but at the ſame time ordered ſome money to be given him. But while the ſecretary was counting it, he was ſuddenly ſtabbed by the Shah's order; and the officers who were with him ſuddenly falling upon the few ſoldiers who were there, obliged them to ſubmit; after which he entered the paſs with his army. The governor of Tauris marched out with all the troops he could collect on ſo ſhort a warning; but being inferior to the Perſians, he was utterly defeated, and himſelf taken priſoner; after which the city was obliged to ſubmit, as alſo a number of places in the neighbourhood. One city only, called *Orumi*, being very ſtrongly ſituated, reſiſted all the efforts of Abbas; but was at laſt taken by the aſſiſtance of the Curds, whom he gained over by promiſing to ſhare the plunder of the place with them. But inſtead of this, he formed a deſign to cut them all off at once; fearing that they might at another time do the Turks a ſervice of the ſame nature that they had done to him juſt now. For this reaſon he invited their chiefs to dine with him; and having brought them to a tent, the entrance to which had ſeveral turnings, he ſtationed on the inſide two executioners, who cut of the head of the gueſts as ſoon as they entered.

After this Shah Abbas conſiderably enlarged his dominions, and repelled two dangerous invaſions of the Turks. He attempted alſo to promote commerce, and civilize his ſubjects; but ſtained all his great actions by his abominable cruelties, which he practiſed on every one who gave him the leaſt cauſe of offence; nay, frequently without any cauſe at all. He took the Iſle of Ormus from the Portugueſe, who had kept it ſince 1507, by the aſſiſtance of ſome Engliſh ſhips in 1622; and died ſix years after, aged 70.

57
Hiſtory of Khouli Khan.

The princes who ſucceeded Shah Abbas the Great, were remarkable only for their cruelties and debaucheries, which occaſioned a revolution in 1716, when the Shah Huſſein was dethroned by the Afghans, a people inhabiting the country between Perſia and India; who being oppreſſed by the miniſters, revolted under the conduct of one Mereweis. The princes of the Afghan race continued to enjoy the ſovereignty for no more than 16 years, when Aſhraff the reigning ſhah was dethroned by one of his officers*. On this

* See Patans.

Thamaſp, otherwiſe called *Prince Thamas*, the only ſurvivor of the family of Abbas, aſſembling an army, invited into his ſervice Nadir Khan, who had obtained great reputation for his valour and conduct. He was the ſon of a Perſian nobleman, on the frontiers of Uſbeck Tartary; and his uncle who was his guardian, keeping him out of poſſeſſion of the caſtle and eſtate, which was his inheritance, he took to robbing the caravans; and, having increaſed his followers to upwards of 5000 men, became the terror of that part of the country, and eſpecially of his uncle, who had ſeized his eſtate. His uncle therefore reſolved to make his peace with him, and with that view invited him to the caſtle, where he entertained him in a ſplendid manner; but Nadir Khan ordered his throat to be cut next night, and all his people to be turned out of the caſtle. No ſooner had Nadir Khan got the command of the Perſian army, than he attacked and defeated the uſurper Eſriff, put him to death, and recovered all the places the Turks and Ruſſians had made themſelves maſters of during the rebellion; and then prince Thamas ſeemed to be eſtabliſhed on the throne; but Nadir Khan, to whom Thamas had given the name of *Thamas Kouli Khan*, that is, *the Slave of Thamas*, thinking his ſervices not ſufficiently rewarded, and pretending that the king had a deſign againſt his life, or at leaſt to ſet him aſide, conſpired againſt his ſovereign, and put him to death, as is ſuppoſed: after which, he uſurped the throne, ſtyling himſelf *Shah Nadir*, or *King Nadir*.

He afterwards laid ſiege to Candahor, of which a ſon of Mereweis had poſſeſſed himſelf. While he lay at this ſiege, the court of the Great Mogul being diſtracted with factions, one of the parties invited Shah Nadir to come to their aſſiſtance, and betrayed the Mogul into his hands. He thereupon marched to Delhi, the capital of India, and ſummoned all the viceroys and governors of provinces to attend him, and bring with them all the treaſures they could raiſe; and thoſe that did not bring as much as he expected, he tortured and put to death. Having thus amaſſed the greateſt treaſure that ever prince was maſter of, he returned to Perſia, giving the Mogul his liberty, on condition of his reſigning the provinces on the weſt ſide of the Indus to the crown of Perſia. He afterwards made a conqueſt of Uſbeck Tartary, and plundered Bochara the capital city. Then he marched agaiſt the Dagiſtan Tartars; but loſt great part of his army in their mountains, without fighting. He defeated the Turks in ſeveral engagements; but lying ſiege to Bagdad, was twice compelled to raiſe the ſiege. He proceeded to change the religion of Perſia to that of Omar, hanged up the chief prieſts, put his own ſon to death, and was guilty of ſuch cruelty, that he was at length aſſaſſinated by his own relations, anno 1747. A conteſt upon this enſued between theſe relations for the crown, which has rendered Perſia a ſcene of the moſt horrible confuſion for upwards of 40 years.

58 Different pretenders to the throne of Perſia.

The reader will form ſome notion of the troubles of this unhappy Country from the following ſeries of pretenders to the throne between the death of Nadir and the acceſſion of Kerim Khan. We give it from Francklin's Obſervations. "1ſt, Adll Shah.—2d, Ibraheem Shah.—3d, Shah Rokh Shah.—4th, Suleeman Shah.—5th, Iſmaeel Shah.—6th, Azad Khan Afghan.—7th, Huſſun Khan Kejar.—8th, Ali Merdan Khan Bukhteari.—9th, Kerim Khan Zund.

"Their reigns, or more properly the length of time they reſpectively governed with their party, were as follows: Adil Shah, nine months. Ibraheem Shah, ſix months. Shah Rokh Shah, after a variety of revolutions, at length regained the city of Meſchid: he is now alive (1787), and above 80 years of age, reigning in Khoraſan, under the direction of his ſon Nuſſir Ullah Meerza. Suleeman Shah and Iſmaeel Shah in about forty days were both cut off, almoſt as ſoon as they were elevated. Azad Khan Afghan, one of Kerim Khan's moſt formidable rivals and competitors, was ſubdued by him, brought priſoner to Shirauz, and died there a natural death. Huſſun Khan Kejar, another of Kerim Khan's competitors, was beſieging Shirauz, when his army ſuddenly mutinied and deſerted him. Their mutiny was attributed to their want of pay. A party ſent by Kerim Khan took him priſoner. His head was inſtantly cut off, and preſented to Kerim Khan. His family were brought captives to Shirauz. They were well treated, and had their liberty given them ſoon after, under an obligation not to quit the city. Ali Merden Khan was killed by a muſket-ſhot as he was walking on the ramparts of Maſchid encouraging his men Kerim Khan Zund, by birth a Curdiſtan, was a moſt favourite officer of Nadir Shah, and at the time of his death was in the ſouthern provinces. Shirauz and other places had declared for him. He found means at laſt, after various encounters with doubtful ſucceſs, completely to ſubdue all his rivals, and finally to eſtabliſh himſelf as ruler of all Perſia. He was in power about 30 years; the latter part of which he governed Perſia under the appellation of *vakeel* or *regent*, for he never would receive the title of Shah. He made Shirauz the chief city of his reſidence, in gratitude for the aſſiſtance he had received from its inhabitants and thoſe of the ſouthern provinces. He died in the year 1779, regretted by all his ſubjects, who eſteemed and honoured him as the glory of Perſia.

59 Kerim Khan enjoyed a reign of near 30 years.

60 Twenty-two officers take poſſeſſion of the citadel.

"When the death of Kerim Khan was announced in the city, much confuſion aroſe; two and twenty of the principal officers of the army, men of high rank and family, took poſſeſſion of the ark, or citadel, with a reſolution to acknowledge Abul Futtah Khan (the eldeſt ſon of the late Vakeel) as their ſovereign, and to defend him againſt all other pretenders; whereupon Zikea Khan, a relation of the late Vakeel by the mother's ſide, who was poſſeſſed of immenſe wealth, enliſted a great part of the army into his pay, by giving them very conſiderable bounties. Zikea Khan was of the tribe of Zund (or the Lackeries); a man remarkably proud, cruel, and unrelenting. Having aſſembled a large body of troops, he immediately marched them to the citadel, and laid cloſe ſiege to it for the ſpace of three days; at the expiration of which, finding he could not take it by force, he had recourſe to treachery. To each of the principal khans he ſent a written paper, by which he ſwore upon the Koran, that if they would come out and ſubmit to him, not a hair of their heads ſhould be touched, and that they ſhould have their effects ſecured to them. Upon this a conſultation was held by them; and it appearing that they could not ſubſiſt many days longer, they agreed to

61 Zikea Khan

62 Beſieges the citadel.

63 Employs treacherous means to entice the officers out, and was ſucceſsful.

ſurrender themſelves, firmly relying on the promiſes that had been made them. Zikea Khan, in the mean time, gave private orders for the khans to be ſeized, and brought ſeparately before him as they came out of the citadel. His orders were ſtrictly obeyed, and theſe deluded men were all maſſacred in his preſence: he was ſeated the whole time, feaſting his eyes on the cruel ſpectacle.

64 Murdered.

"Zikea Khan's tyranny became ſoon intolerable, and he was cut off by his own body-guard, when Abul Futtah Khan, who was at the time in the camp, was proclaimed king by the unanimous voice of the troops, whom he immediately led back to Shirauz. On his arrival he was acknowledged as ſovereign by all ranks of people, and took quiet poſſeſſion of the government.

65 Mahomed Sadick Khan attempts to ſeize the government,

" Mahomed Sadick Khan, only brother of the late Kerim Khan, who had during that prince's life filled the high office of beglerbeg of Fars, and had been appointed guardian of his ſon Abul Futtah Khan, was at this period governor of the city of Buſſora, which had been taken by the Perſians, previous to the vakeel's death. Upon hearing the news of his brother's deceaſe he became ambitious of reigning alone, and from that inſtant formed ſchemes for the deſtruction of his nephew; but as it was neceſſary for him to be on the ſpot for the advancement of his views, he determined to withdraw the Perſian garriſon from Buſſora, who were all devoted to his intereſt: accordingly he evacuated that place, and marched immediately for Shirauz.

" The news of Sadick Khan's approach threw the inhabitants of Shirauz into the greateſt conſternation; their minds were variouſly agitated on the occaſion; ſome, from his known public character, expected he would honeſtly fulfil the commands of his deceaſed brother; others, who had been witneſſes to the confuſion of former times, on ſimilar occaſions, rightly imagined that he would ſet up for himſelf; and indeed this proved to be the caſe: for having entered Shirauz a very few days after, he cauſed Abul Futtah Khan to be ſeized and deprived of ſight, and put into cloſe confinement.

66 Which he effects.

" After this event, Sadick Khan openly aſſumed the government. As ſoon as the intelligence reached Ali Murad Khan, who was at Iſpahan, that lord inſtantly rebelled: deeming himſelf to have an equal right to the government with Sadick Khan, as in fact he had, he could ill brook the thought of being obedient to him, and openly declared himſelf a competitor for the empire. Perſia was by this means again involved in all the horrors of a civil war. Ali Murad Khan indeed took poſſeſſion of Shirauz, aſſumed the government, and gave to the empire the flattering proſpect of being ſettled under the government of one man; but this proſpect was ſoon obſcured by the power and credit acquired by Akau Mahomed Khan."

67 Akau Mahomed Khan collects troops, and is proclaimed at Mazanderan and Ghilan,

On the night following Kerim Khan's death, this man found means to make his eſcape from Schirauz, and fled to the northward, where collecting ſome troops, he ſoon made himſelf maſter of Mazanderan and Ghilan, and was proclaimed nearly about the time that Ali Murad Khan had taken Shirauz. " It is remarkable (ſays our author), that from his firſt entering into competition for the government, he has been ſucceſsful in every battle which he has fought. He is an eunuch, having been made ſo whilſt an infant, by the command of Nadir Shah, but poſſeſſes great perſonal bravery."

Ali Murad Khan, hearing of the ſucceſs of Akau Mahomed Khan, determined to go againſt him; but as he was previouſly proceeding to Iſpahan to ſuppreſs a rebellion, he fell ſuddenly from his horſe and expired on the ſpot.

68 Jaafar Khan aſſerts his pretenſions to the government.

" At this period Jaafar Khan, the eldeſt and only ſurviving ſon of Sadick Khan, was governor of Khums: he deemed this a favourable opportunity to aſſert his pretenſions to the government, and immediately marched with what few troops he had to Iſpahan: ſoon after his arrival he was joined by the greater part of the malcontents, who were then in arms. In this ſituation he remained ſome time; but Akau Mahomed Khan coming down upon him with his army, he was obliged to riſk his fate in a battle, and being defeated, fled with the ſmall remains of his troops, taking the road to Shirauz. Soon after finding himſelf ſtrengthened by an increaſe of his army, he determined to venture a ſecond engagement with his opponent Akau Mahomed Khan; and for this purpoſe marched with
69 Is defeated by Akau Mahomed Khan.
his army towards Iſpahan: the two armies met near Yezdekhaſt, when a battle enſued, and Akau Mahomed Khan's ſuperior fortune again prevailing, Jaafar Khan was defeated, and retired to Shirauz, which he quitted on the 25th of June 1787, and ſhortly after marched his army to the northward, but returned in October without having effected any thing." Such was the ſtate of Perſia in 1788. Mr Francklin, from whoſe excellent *Obſervations on a Tour made in the years 1786-7*, theſe particulars are moſtly extracted, ſays that Jaafar Khan is the moſt " likely, in caſe of ſucceſs againſt his opponent, to reſtore the country to a happy and reputable ſtate; but it will require a long ſpace of time to recover it from the calamities into which the different revolutions have brought it:—a country, if an oriental metaphor may be allowed, once blooming as the garden of Eden, fair and flouriſhing to the eye;—now, ſad reverſe! deſpoiled and leafleſs by the cruel ravages of war, and deſolating contention."

70 Air and climate of Perſia.

As to the air and climate of this country, conſidering the great extent thereof, it cannot but be very different, according to the ſituation of its ſeveral parts; ſome being frozen with cold, whilſt others are burnt with heat at the ſame time of the year. The air, wherever it is cold, is dry; but where it is extremely hot, it is ſometimes moiſt. All along the coaſt of the Perſian Gulph, from weſt to eaſt, to the very mouth of the river Indus, the heat of four months is ſo exceſſive, that even thoſe who are born in the country, unable to bear it, are forced to quit their houſes, and retire to the mountains; ſo that ſuch as travel in theſe parts, at that ſeaſon, find none in the villages but wretched poor creatures, left there to watch the effects of the rich, at the expence of their own health. The extreme heat of the air, as it is inſupportable, ſo it makes it prodigiouſly unwholeſome; ſtrangers frequently falling ſick there, and ſeldom eſcaping. The eaſtern provinces of Perſia, from the river Indus to the borders of Tartary, are ſubject to great heats, though not quite ſo unwholeſome as on the coaſts of the Indian Ocean and the Perſian Gulph; but in the northern provinces, on the coaſt of the Caſpian Sea, the heat is full as great, and, though attended with moiſture, as unwholeſome as on the coaſt before mentioned. From October to May, there is no country in the world more pleaſant than this; but the people carry indelible marks of the malign influence of their ſummers, looking all of them of a faint yellow, and having neither ſtrength nor ſpirits; though, about the end of April, they abandon their houſes, and retire to the mountains, which are 25 or 30 leagues from the ſea. But this moiſtneſs in the air is only in theſe parts; the reſt of Perſia enjoys a dry air, the ſky being perfectly ſerene, and hardly ſo much as a cloud ſeen to fly therein. Though it ſeldom rains, it does not follow that the heat admits of no mitigation: for in the night, notwithſtanding there is not a cloud to be ſeen, and the ſky is ſo clear, that the ſtars alone afforded a light ſufficient to travel by, a briſk wind ſprings up, which laſts until within an hour of the morning, and gives ſuch a coolneſs to the air, that a man can bear a tolerable warm garment. The ſeaſons in general, and particularly in the middle of this kingdom, happen thus: the winter, beginning in November, and laſting until March, is very ſharp and rude, attended with froſt and ſnow; which laſt deſcends in great flakes on the mountains, but never in the plains. 17 Climate of Shirauz. The climate of Shirauz, the capital of Perſia Proper, is repreſented by a traveller who lately viſited it, as one of the moſt agreeable in the world, the extremes of heat and cold being ſeldom felt. "During the ſpring of the year the face of the country appears uncommonly beautiful. The flowers, of which they have a great variety, and of the brighteſt hues, the fragrant herbs, ſhrubs, and plants, the roſe, the ſweet baſil, and the myrtle, all here contribute to refreſh and perfume the natural mildneſs of the air. The nightingale of the garden (called by the Perſians *boolbul hezar daſtaan*), the goldfinch, and the linnet, by their melodious warblings at this delightful ſeaſon of the year, ſerve to add to the ſatisfaction of the mind, and to inſpire it with the moſt pleaſing ideas. The beauties of nature are here depicted in their fulleſt extent; the natural hiſtorian and the botaniſt would here meet with ample ſcope for purſuing their favourite inveſtigations. With ſuch advantages, added to the ſalubrity of the air, how can it be wondered at that the inhabitants of Shirauz ſhould ſo confidently aſſert the pre eminence of their own city to any other in the world?—or that ſuch beauties ſhould fail of calling forth the poetical exertions of a Hafiz, a Sàdi, or a Jami? Their mornings and evenings are cool, but the middle of the day is very pleaſant. In ſummer the thermometer ſeldom riſes above 73 in the day-time, and at night it generally ſinks as low as 62. The autumn is the worſt ſeaſon of the year, that being the time when the rains begin to fall, and during the autumnal months it is conſidered by natives as the moſt unhealthy; colds, fluxes, and fevers being very general. In winter a vaſt deal of ſnow falls, and very thick, but ice is rearly to be found, except on the ſummits of the mountains, or towards Iſpahan, and the more northern parts of Perſia. One thing which is moſt to be eſteemed in this country, and renders it preferable to any other part of the world, is their nights, which are always clear and bright; and the dew, that in moſt places is of ſo pernicious and dangerous a nature, is not of the leaſt ill conſequence here: there is none at all in ſummer, and in the other ſeaſons it is of ſuch a nature, that if the brighteſt ſcimitar ſhould be expoſed to it all the night, it would not receive the leaſt ruſt; a circumſtance I have myſelf experienced. This dryneſs in the air cauſes their buildings to laſt a great while, and is undoubtedly one of the principal reaſons that the celebrated ruins of Perſepolis have endured for ſo many ages, and, comparatively ſpeaking, in ſo perfect a ſtate." The great dryneſs of the air exempts Perſia from thunder and earthquakes. In the ſpring, indeed, there ſometimes falls hail; and, as the harveſt is then pretty far advanced, it does a great deal of miſchief. The rainbow is ſeldom ſeen in this country, becauſe there riſe not vapours ſufficient to form it; but in the night there are ſeen rays of light ſhooting thro' the firmament, and followed as it were by a train of ſmoke. The winds, however briſk, ſeldom ſwell into ſtorms or tempeſts; but, on the other hand, they are ſometimes poiſonous and infectious on the ſhore of the Gulph, as all travellers agree. Mr Tavernier ſays, that at Gombroon people often find themſelves ſtruck by a ſouth wind, in ſuch a manner that they cry, "I burn!" and immediately fall down dead. M. le Brun tells us, that he was aſſured while he was there, that the weather was ſometimes ſo exceſſive ſultry as to melt the ſeals of letters. At this time the people go in their ſhirts, and are continually ſprinkled with cold water; and ſome even lie ſeveral hours naked in the water. Among the inconveniences conſequent from this malign diſpoſition of the air, one of the moſt terrible is the engendering, in the arms and legs, a kind of long ſmall worms, which cannot be extracted without great danger of breaking them; upon which a mortification enſues.

72 Soil.

The ſoil of Perſia is in general ſtony, ſandy, barren and every where ſo dry, that, if it be not watered, it produces nothing, not even graſs; but, where they can turn the water into their plains and valleys, it is not unfruitful. There is a great difference in point of fertility in the different provinces of the empire; and thoſe of Media, Iberia, Hyrcania, and Bactria, are now in a great meaſure what they were formerly, and ſurpaſs moſt of the others in their productions. All along the Perſian Gulph, the ſoil is ſtill more barren, cattle leſs plenty, and every thing in a worſe condition than any where elſe.

73 Produce, &c.

Though there is ſcarce a province in Perſia which does not produce wine, yet the wine of ſome provinces is much more eſteemed than that of others; but Schiras, or, as it is written by Mr Francklin, *Sſhirauz*, wine is univerſally allowed to be the very beſt in Perſia: inſomuch, that it is a common proverb there, That to live happy one muſt eat the bread of Yezd, and drink the wine of Schiras.

The grain moſt common in Perſia is wheat; which is wonderfuly fair and clean. As for barley, rice, and millet, they only make bread of them in ſome places, as in Courdeſtan, when their wheat-bread is exhauſted before the return of harveſt. They do not cultivate in this country either oats or rye; except where the Armenians are ſettled, who make great uſe of the latter in Lent. Rice is the univerſal aliment of all ſorts of people in perſia; for this reaſon they are extremely careful in its cultivation; for, after they have ſown it in the ſame manner as other grain, they in three months time tranſplant it, root by root, into fields, which are well watered, otherwiſe it would never attain that perfection in which we find it there; ſince it is ſofter, ſooner boiled, and more delicious, than the ſame grain in any other part of the world. Perhaps its taſte is, in ſome meaſure heightened by a practice they make uſe of to give it a gloſſy whiteneſs, *viz.* by cleanſing it, after it is beaten out of the huſks, with a mixture of flour and ſalt. Corn ripens exceedingly in this country; ſo that in ſome parts they have threefold crop in the year. The Perſian bread is generally very thin, white, and good; and commonly cheap enough.

Metals of all ſorts have been found in Perſia. Since the reign of Shah Abbas the Great, iron, copper, and lead, have been very common; but there are no gold or ſilver mines open at preſent; though, as Perſia is a very mountainous country, ſuch might very probably be found, if pains were taken to ſearch them out. There are ſilver mines in Kirman and Mazanderan, and one not far from Spauhawn; but they cannot be worked for want of wood. Minerals are alſo found in Perſia in abundance; eſpecially ſulphur, ſaltpetre, ſalt, and alum. Nothing is more common in this country than to meet with plains, ſometimes 10 leagues in length, covered entirely with ſalt, and others with ſulphur or alum. In ſome places ſalt is dug out of mines, and even uſed in building houſes. Marble, freeſtone, and ſlate, are found in great plenty about Hammadan. The marble is of four colours, *viz.* white, black, red and black, and white and black. Perſia yields two ſorts of petroleum, or napthe; namely, black and white. In the neighbourhood of Tauris they find azure; but it is not ſo good as that brought from Tartary. Among the moſt valuable productions of Perſia are the precious ſtones called *turquoiſes*, of which there are ſeveral rocks or mines.

The horſes of Perſia are the moſt beautiful of the Eaſt, though they are not ſo much eſteemed as thoſe of Arabia; ſo great, however, is the demand for them, that the fineſt ones will fetch from 90l. to 450l. ſterling. They are higher than the Engliſh ſaddle horſes; ſtraight before, with a ſmall head, legs wonderfully ſlender, and finely proportioned; they are mighty gentle, good travellers, very light and ſprightly, and do good ſervice till they are 18 or 20 years old. The great numbers of them ſold into Turkey and the Indies, though none can be carried out of the kingdom without ſpecial licence from the king, is what makes them ſo dear. Next to horſes we may reckon mules, which are much eſteemed here, and are very fine; and next to theſe we may juſtly place aſſes, of which they have in this country two ſorts; the firſt bred in Perſia, heavy and doltiſh, as aſſes in other countries are; the other originally of an Arabian breed, the moſt docile and uſeful creature of its kind in the world. They are uſed wholly for the ſaddle; being remarkable for their eaſy manner of going, and are very ſure-footed, carrying their heads lofty, and moving gracefully. Some of them are valued at 20 l. ſterling. The mules here are alſo very fine; they pace well, never fall, and are ſeldom tired. The higheſt price of a mule is about 45l. ſterling. Camels are alſo numerous in Perſia, and very ſerviceable: they call them *ketchy-krouch-konion*, i. e. "the ſhips of the land;" becauſe the inland trade is carried on by them as the foreign is by ſhips. Of theſe camels there are two ſorts, the northern and ſouthern: the latter, which is much the ſmaller, but ſwifter, will carry a load of about 700 weight, and trot as faſt as a horſe will gallop; the other will travel with a load of 1200 or 1300 weight; both are profitable to their maſters, as coſting little or nothing to keep. They travel without halter or reins; grazing on the road from time to time, notwithſtanding their load. They are managed entirely by the voice; thoſe who direct them making uſe of a kind of ſong, and the camel moving briſker, or at its ordinary pace, as they keep a quicker or ſlower time. The camels ſhed their hair ſo clean in the ſpring, that they look like ſcalded ſwine; but then they are pitched over, to keep the flies from ſtinging them. The camels hair is the moſt profitable fleece of all the tame beaſts: fine ſtuffs are made of it; and in Europe, hats, with a mixture of a little beaver.

As beef is little eaten in Perſia, their oxen are generally employed in ploughing, and other ſorts of labour. Hogs are nowhere bred in Perſia, if we except a province or two on the borders of the Caſpian Sea. Sheep and deer are very common throughout all Perſia.

Of wild beaſts, the number is not great in that country, becauſe there are few foreſts; but where there are any, as in Hyrcania, now called *Tibriſtan*, abundance of lions, bears, tigers, leopards, porcupines, wild boars, and wolves, are to be found; but the laſt are not ſo numerous as any of the other ſpecies.

There are but few inſects in this country; which may be aſcribed to the dryneſs of the climate. In ſome provinces, however, there is an infinite number of locuſts or graſhoppers, which fly about in ſuch clouds as to darken the air. In certain parts of the Perſian dominions they have large black ſcorpions, ſo venomous, that ſuch as are ſtung by them die in a few hours. In others they have lizards, frightfully ugly, which are an ell long, and as thick as a large toad, their ſkins being as hard and tough as that of the ſea-dog: they are ſaid to attack and kill men ſometimes; but that may be doubted. The ſouthern provinces are infeſted with gnats; ſome with long legs, like thoſe we call *midges*; and ſome white, and as ſmall as fleas, which make no buzzing, but ſting ſuddenly, and ſo ſmartly, that the ſting is like the prick of a needle. Among the reptiles is a long ſquare worm, called by the inhabitants *bazar-pey*, i. e. "thouſand feet," becauſe its whole body is covered with feet; it runs prodigiouſly faſt; and its bite is dangerous, and even mortal, if it gets into the ear.

There are in Perſia all the ſeveral ſorts of fowls which we have in Europe, but not in ſuch great plenty; excepting, however, wild and tame pigeons, of which vaſt numbers are kept all over the kingdom, chiefly on account of their dung; which is the beſt manure for melons. It is a great diverſion among the lower ſort of people in town and country to catch pigeons, though it be forbidden: for this purpoſe they have pigeons ſo taught, that, flying in one flock, they ſurround ſuch wild ones as they find in the field, and bring them back with them to their maſters. The partridges of this country are the largeſt and fineſt in the world, being generally of the ſize of our fowls. Geeſe, ducks, cranes, herons, and many other ſorts of water-fowl, are common here; as are likewiſe nightingales which are heard all the year, but chiefly in the ſpring; martlets, which learn whatever words are taught them; and a bird called *noura*, which chatters inceſſantly, and repeats whatever it hears. Of birds of a larger ſize, the moſt remarkable is the pelican, by the Perſians called *tacab*, *i. e.* "water-carrier;" and alſo *miſe*, *i. e.* "ſheep;" becauſe it is as large as one of theſe animals *. There are in Perſia various birds of prey. Some of their falcons are the largeſt and fineſt in the world: the people take great pains to teach them to fly at game; the Perſian lords being great lovers of falconry, and the king having generally 800 of this ſort of birds, each of which has a perſon to attend it.

74
Mountains, rivers, and ſeas.

There is perhaps no country in the world which, generally ſpeaking, is more mountainous than Perſia; but many of them yield neither ſprings nor metals, and but few of them are ſhaded with trees. It is true, ſome of the chief of them are ſituated on the frontiers, and ſerve as a kind of natural ramparts, or bulwarks, to this vaſt empire. Among the latter are the mountains of Caucaſus and Ararat, ſometimes called the *mountains of Dagheſtan*, which fill all the ſpace between the Euxine and Caſpian ſeas: thoſe called *Taurus*, and the ſeveral branches thereof, run through Perſia from Natolia to India, and fill all the middle of the country.

As to rivers, except the Araxes, which riſes in the mountains of Armenia, and falls into the Kur or Cyrus before it reaches the Caſpian Sea, there is not one navigable ſtream in this country. The Oxus divides Perſia on the north-eaſt from Uſbeck Tartary. The Indus alſo may now be reckoned among the rivers of Perſia, as the provinces lying to the weſt of that river are now in poſſeſſion of that crown; this river is ſaid to run a courſe of more than 1000 miles, and overflows all the low grounds in April, May, and June.

The ſeas on the ſouth of Perſia are, the Gulph of Perſia or Baſſora, the Gulph of Ormus, and the Indian Ocean. The only ſea on the north is the Caſpian, or Hyrcanian ſea; which is more properly a lake, having no communication with any other ſea. Theſe ſeas, together with the lakes and rivers, ſupply Perſia with plenty of fiſh. The Caſpian ſea contains very fine fiſh on one ſide; and the Perſian Gulph on the other is believed to have more fiſh than any other ſea in the world. On the coaſts of this gulph is taken a ſort of fiſh, for which they have no particular name; its fleſh is of a red colour, very delicious, and ſome of them weigh 200 or 300 pounds. The river-fiſh are chiefly barbels; but far from being good. Thoſe of the lakes are carps and ſhads. In the river at Spauhawn are a great number of crabs, which crawl up the trees, and live night and day under the leaves, whence they are taken; and are eſteemed very delicious food.

75
Iſlands, &c in the Perſian gulph.

In his voyage from Gombroon up the Perſian Gulph, Mr Ives makes mention of ſeveral iſlands, named Kiſme, Polloar, Kyes, Inderabie, Shittewar, and Buſheel. Some of theſe were quite barren; on others there were a few trees and buſhes, with little fiſhing towns, and a few ſmall veſſels lying along ſhore. The date trees were thinly ſcattered among the hills; but tho' a ſmall portion of green might here and there be diſcovered, yet ſuch was the barrenneſs of theſe iſlands in general, that it was for ſome time a matter of ſurpriſe how ſheep and goats could poſſibly ſubſiſt upon them. On cloſer examination, however, it was found, that the ſoil produced a kind of ſmall-leaved juicy mallows, on which theſe animals principally feed. The Perſian coaſt, as they ſailed along, afforded a moſt romantic proſpect, appearing at firſt to be one continued rock, rent and torn aſunder by earthquakes; but it was afterwards diſcovered, that ſome part of it was only ſand hardened by the rains and ſun.

Narban Point terminates in a long and low piece of land, which runs off into the gulph from the foot of the Perſian hills. Between this point and the main land is a channel, in which a ſhip of 900 tons burden might eaſily ride. The Portugueſe had formerly a ſettlement here, the remains of which are ſtill to be ſeen. A large river empties itſelf into the ſea at this place; and Mr Ives obſerves, that "Providence ſeems here to have allotted a ſpot of ground amidſt unhoſpitable rocks and deſarts, capable of affording the kind production of vegetables for man and beaſt." The adjacent country is ſubject to the Arabs.

Through all the Perſian Gulph Mr Ives remarks, that the ſpring-water on the iſlands is much better than that on the continent; and the water neareſt the ſea on the iſlands has greatly the advantage over that which is found in the middle parts. This holds good however, only in thoſe parts which are near the ſea; for about 12 miles up the country, both on the Perſian and Arabian ſide of the gulph, the water is very good. At the iſland called Bareen or Baharen, divers go down to the bottom of the ſea, at certain known depths, and come up again with their veſſels filled with freſh water. This freſh water is found in holes or little natural wells, ſome fathoms below the ſurface of the ſea. The Arabs have certain marks on the iſland to teach them where to dive for the freſh water. Mr Ives was aſſured by an Arabian merchants, that he himſelf had diſcovered a ſpring upon the ſhore, by which one of theſe wells was ſerved. He put into this ſpring a bit of a heavy ſtick; and in two or three days an Arabian diver brought it to him again from the bottom of one of theſe holes.

76
Trade.

The Engliſh and other nations, trade with the Perſians ſeveral ways, particularly by the gulph of Ormus at Gombroon, and by the way of Turkey. A trade alſo was not many years ſince opened by the Engliſh with Perſia through Ruſſia and the Caſpian Sea; but that is now diſcontinued, having been prohibited by the court of Ruſſia, who were apprehenſive that the Engliſh would teach the Perſians to build ſhips, and diſpute the navigation of the Caſpian Sea with them. The principal commodities and manufactures of Perſia are, raw and wrought ſilks, mohair camblets, carpets, leather; for which, and ſome others, the European merchants exchange chiefly woollen manufactures; but the trade is carried on altogether in European ſhipping, the Perſians having ſcarce any ſhips of their own, and the Ruſſians the ſole navigation of the Caſpian Sea. There is not a richer or more profitable trade in the world, than that which is carried on between Gombroon and Surat in the Eaſt Indies; and the Engliſh Eaſt India company frequently let out their ſhips to tranſport the merchandiſe of the Banians and Armenians from Perſia to India. The ſhah, or ſovereign of Perſia, is the chief merchant; and he uſually employs his Armenian ſubjects to traffic for him in every part of the world. The king's agents muſt have the refuſal of all merchandiſe, before his ſubjects are permitted to trade. It is computed that Perſia produces yearly upwards of 22,000 bales of ſilk, chiefly in the provinces of Ghilan and Mazanderan, each bale weighing 263 pounds. Vaſt quantities of Perſian ſilk uſed to be imported into Europe, eſpecially by the Dutch, Engliſh, and Ruſſians, before the civil wars began. The goods exported from Perſia to India are, tobacco, all ſorts of fruits, pickled and preſerved, eſpecially dates, marmalade, wines, diſtilled waters, horſes, Perſian feathers, and Turkey leather of all ſorts and colours, a great quantity whereof is alſo exported to Muſcovy and other European countries. The exports to Turkey are, tobacco, galls, thread, goats hair, ſtuffs, mats, box-work, and many other things. As there are no poſts in the eaſt, and trading by commiſſion, with the uſe of bills of exchange, is little known, traffic muſt proceed in a very aukward heavy manner, in compariſon of that of Europe.

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* See Pelicanus.

77 Money. The moſt current money of Perſia are the abaſſees, worth about 1s. 4d. ſterling; they are of the fineſt ſilver. An abaſſee is worth two mahmoudes; a mahmoude, two ſhahees; and a ſhahee, ten ſingle or five double caſbeghes: theſe laſt pieees are of braſs, the others of ſilver; for gold is not current in trade. The ſhahees are not very common; but mahmoudes and caſbeghes are current everywhere. Horſes, camels, houſes, &c. are generally ſold by the toman, which is an imaginary coin, worth 200 ſhahees, or 50 abaſſees; and they uſually reckon their eſtates that way. Such a one, they ſay, is worth ſo many tomans, as we ſay pounds in this country.

78 Government. Perſia is an abſolute monarchy, the lives and eſtates of the people being entirely at the diſpoſal of their prince. The king has no council eſtabliſhed, but is adviſed by ſuch miniſters as are moſt in favour; and the reſolutions taken amongſt the women of the haram frequently defeat the beſt laid deſigns. The crown is hereditary, excluding only the females. The ſons of a daughter are allowed to inherit The laws of Perſia exclude the blind from the throne; which is the reaſon that the reigning prince uſually orders the eyes of all the males of the royal family, of whom he has any jealouſy, to be put out. The king has generally a great many wives, which it would be death for any one, beſides the eunuchs, who have the ſuperintendance of them, to look at, or even ſee by accident; wherefore, when he travels, notice is given to all men to quit the road, nay their very houſes, and to retire to a great diſtance.

The prime miniſter is called *attemaet doulet*, which ſignifies the director of the empire, and alſo *vizir azem*, or the great ſupporter of the empire; as he alone almoſt ſuſtains the whole weight of the adminiſtration. This miniſter's chief ſtudy is to pleaſe his maſter, to ſecure to himſelf an aſcendant over his mind, and to avoid whatever may give him any uneaſineſs or umbrage. With this view, he never fails to flatter him, to extol him above all the princes upon earth, and to throw a thick veil over every thing that might help to open his eyes, or diſcover to him the weakneſs of the ſtate. He even takes particular care to keep the king in utter ignorance, to hide from him, or at leaſt to ſoften, all unwelcome news; and, above all, to exalt immoderately every the leaſt advantage he obtains over his enemies. As he takes theſe methods, which indeed are and muſt be taken, more or leſs, by the miniſters of every deſpotic prince, to ſecure the favour and confidence of his maſter; ſo the inferior officers and governors of provinces are obliged to employ all the means in their power to ſecure the prime miniſter's, they depending no leſs upon him then he does upon the king. There is a gradation of deſpotiſm and ſlavery, down from the prime miniſter to the loweſt retainer to the court, or dependent on the government. Children are ſometimes in Perſia required by the king to cut off the ears and noſe, and even to cut the throats of their parents; and theſe orders cannot be objected to, without endangering their own lives. Indeed their baſeneſs and mercenarineſs are ſuch, that they will perpetrate ſuch atrocious deeds without the leaſt ſcruple or difficulty, when they have a promiſe or expectation of poſſeſſing their poſts. The prime miniſters, notwithſtanding the precarious footing on which they ſtand, in effect of their abilities or good fortune, ſometimes continue in their employments during life, or, if removed, are only baniſhed to ſome city, where they are allowed to ſpend the remainder of their days in a private ſtation.

Next to the prime miniſter are the nadir, or grand-maſter of the houſhold; the mehter, or groom of the chambers, who is always a white eunuch; the mir-akbor-baſhe, or maſter of the horſe; the mir-ſhikar-baſhe, or great huntſman and falconer; the divan-beggi, or chief-juſtice, to whom there lies an appeal from the deroga, or the lieutenant of police, in every town; the vacka-nuviez, or recorder of events, or firſt ſecretary of ſtate; the muſtau-ſhe-elmenaleck, or maſter of the accounts and finances of the kingdom; the numes humbaſhes, or the king's chief phyſicians; the ſhickada-ſibaſhe, or inſpector of the palace, and regulator of rank at court; and the khans, or governors of provinces, under whom are other governors, called *ſultans*, appointed alſo by the king.

Civil matters are all determined by the cazi, and eccleſiaſtical ones (particularly divorces) by the ſheick-el-ſelleum, or head of the faith; an officer anſwering to the mufti among the Turks; under him are the ſheick-el-ſelum, and cadi, who decide in all matters of religion, and make all contracts, teſtaments, and other public deeds, being appointed by the king in all the principal towns; and next to theſe are the pich-namas, or directors of the prayers; and the moullahs, or doctors of the law.

Juſtice is carried in Perſia in a very ſummary manner; the ſentence, whatever it may be, being always put into execution on the ſpot. Theſt is generally puniſhed with the loſs of noſe and ears; robbing on the road, by ripping up the belly of the criminal, in which ſituation he is expoſed upon a gibbet in one of the moſt public parts of the city, and there left until he expires in torment.

There is no nobility in Perſia, or any reſpect ſhown to a man on account of his family, except to thoſe who are of the blood of their great prophet or patriarchs; but every man is eſteemed according to the poſt he poſſeſſes; and when he is diſmiſſed, he loſes his honour, and he is no longer diſtinguiſhed from the vulgar.

With reſpect to the forces of Perſia, their two bodies, called the *Kortſhies* and *Goulans*, that ſerve on horſeback, are well kept and paid, and may amount, the former to about 22,000, and the latter to about 18,000. The Kortſhies are deſcended from an ancient but foreign race; and the Goulans are either Georgian renegadoes or ſlaves, or the children of ſlaves of all nations. The infantry, called *Tangtchies*, are picked out from among the moſt robuſt and vigorous of the peaſants, and compoſe a body of 40,000 or 50,000. The Perſians have few fortified towns, and had no ſhips of war, till Kouli Khan built a royal navy, and among them had a man of war of 80 guns; but ſince the death of that uſurper, we hear no more of their fleet.

The arms of the king of Perſia are a lion couchant, looking at the ſun as he riſes over his back. His uſual title is *Shaw* or *Patſhaw*, the "diſpoſer of kingdoms." They add alſo to the king's titles thoſe of *ſultan*, and *chan* or *cham*, which is the title of the Tartar ſovereigns. To acts of ſtate the Perſian monarch does not ſubſcribe his name; but the grant runs in this manner, viz. *This act, or edict, is given by him whom the univerſe obeys.*

79 Manners, &c. The Perſians, before the conqueſt of Alexander, are known to have been exceedingly voluptuous and effeminate. After that event, the Greek diſcipline and martial ſpirit being in part communicated to them, they became much more formidable; and hence the Parthians were found to be a match not only for the Syro-Macedonian princes, but even for the Romans. Of their manners we know little or nothing, but that to their valour and military ſkill they joined in a ſurpriſing degree all the luxury and diſſipation of the ancient Perſians.

The modern Perſians, like the Turks, plundering all the adjacent nations for beauties to breed by, are men of a good ſtature, ſhape, and complexion; but the Gaures, or ancient Perſians, are homely, ill-ſhaped, and clumſy, with a rough ſkin, and olive complexions, In ſome provinces, not only the complexions but the conſtitutions of the inhabitants, ſuffer greatly by the extreme heat and unwholeſomeneſs of the air. The Perſian women, too, are generally handſome and well-ſhaped, but much inferior to thoſe of Georgia and Circaſſia. The men wear large turbans on their heads, ſome of them very rich, interwoven with gold and ſilver; a veſt, girt with a ſaſh; and over it a looſe garment, ſomething ſhorter; with ſandals, or ſlippers, on their feet. When they ride, which they do every day, if it be but to a houſe in the ſame town, they wear pliant boots of yellow leather; the furniture of their horſes is extremely rich, and the ſtirrups generally of ſilver: whether on horſeback or on foot they wear a broad ſword and a dagger in their ſaſh. The dreſs of the women does not differ much from that of the men; only their veſts are longer, and they wear ſtiffened caps on their heads, and their hair down.

With reſpect to outward behaviour, ſays an intelligent traveller, "The Perſians are certainly the Pariſians of the Eaſt. Whilſt a rude and inſolent demeanor peculiarly marks the character of the Turkiſh nation towards foreigners and Chriſtians, the behaviour of the Perſians would, on the contrary, do honour to the moſt civilized nations: they are kind, courteous, civil, and obliging, to all ſtrangers, without being guided by thoſe religious prejudices ſo very prevalent in every other Mahometan nation; they are fond of inquiring after the manners and cuſtoms of Europe, and in return very readily afford any information in reſpect to their own country. The practice of hoſpitality is with them ſo grand a point, that a man thinks himſelf highly honoured if you will enter his houſe and partake of what the family affords; whereas, going out of a houſe without ſmoking a calean, or taking any other refreſhment, is deemed in Perſia a high affront."

Their uſual drink is water and ſherbet, as in other Mahometan countries, wine being prohibited; but of all Mahometan nations, they pay the leaſt regard to this prohibition. Many of them drink wine publicly, and almoſt all of them in private (excepting thoſe who have performed the pilgrimage to Mecca, and men of religion): they alſo are very liable to be quarrelſome when inebriated, which is often attended with fatal conſequences. They eat opium, but in much leſs quantities than the Turks; and indeed in every thing they ſay or do, eat or drink, they make a point to be as different from this nation as poſſible, whom they deteſt to a man, beyond meaſure; eſteeming Jews and Chriſtians ſuperior to them, and much nearer to ſalvation.

80 Anecdotes of their religion. Every one knows, that the religion of the Perſians is Mahometan; and that they are of the ſect of Ali, for whom they entertain the moſt extravagant veneration. Mr Francklin heard one of his guides on the road reprove another for the expreſſion, *O God! O Ali!* "No, no (ſaid his zealous companion), *Ali firſt, God ſecond!*" This attachment is the ſource of their hatred to the Turks, and of many ſtrange cuſtoms among themſelves, which we have not room to enumerate; a few, however, muſt be mentioned.

"Their mode of living is as follows: They always riſe at daybreak, in order to perform their devotions. Their firſt prayer is denominated *numaz ſoobh*, or the morning prayer; it is ſaid before ſunriſe, after which they eat a ſlight meal called *naſhta* or breakfaſt; this conſiſts of grapes, or any other fruits of the ſeaſon, with a little bread, and cheeſe made of goat's milk; they afterwards drink a cup of very ſtrong coffee without milk or ſugar; then the calean or pipe is introduced. The Perſians, from the higheſt to the loweſt ranks, all ſmoke tobacco.

"Their ſecond hour of prayer is called *numaz zohur*, or mid day prayer, and is always repeated when the ſun declines from the meridian. Their dinner, or *chaſht*, which is ſoon after this prayer, conſiſts of curds, bread, and fruits of various kinds; animal food not being uſual at this meal.

"The third hour of prayer is called *numaz áſur*, or the afternoon prayer, ſaid about four o'clock.

"The fourth hour of prayer, is *numaz ſhàm*, or evening prayer, which is ſaid after ſun ſet; when this is finiſhed, the Perſians eat their principal meal, called *ſhàmi* or ſupper. This generally conſiſts of a pilau, dreſſed with rich meat-ſauces, and highly ſeaſoned with various ſpices: ſometimes they eat *kibaáb* or roaſt meat. When the meal is ready, a ſervant brings notice thereof, and at the ſame time preſents an ewer and water;

they then waſh their hands, which is an invariable cuſtom with the Perſians both before and after eating. They eat very quick, conveying their food to their mouths with their fingers; the uſe of knives and forks being unknown in Perſia. Sherbets of different ſorts are introduced, and the meal concludes with a deſert of delicious fruits. The ſupper being finiſhed, the family ſit in a circle, and entertain each other by relating pleaſant ſtories (of which they are exceſſively fond), and alſo by repeating paſſages from the works of their moſt favourite poets, and amuſing themſelves at various kinds of games. The fifth and laſt prayer is ſtyled *numaz akbir;* the laſt prayer, or ſometimes *numaz ſheb*, or the night prayer, repeated about an hour after ſupper."

81 Remarkable law reſpecting marriage.

The moſt remarkable law among the Perſians reſpects marriage. A man may divorce his wife when he chooſes, without aſſigning any other reaſon for the divorce than that it is his pleaſure. If he ſhould change his mind, he may again marry her, divorce her a ſecond time, and a third time marry her; but here this privilege ſtops. No man is allowed to marry the woman whom he has thrice divorced. A widow is obliged to mourn four months for her deceaſed huſband before ſhe can be married to another; but a concubine may form a new connection the inſtant that her keeper expires.

82 Ceremony of naming their children.

At the naming of children in Perſia, Mr Francklin informs us that the following ceremony is obſerved: "The third or fourth day after the child is born, the friends and relations of the woman who has lain-in aſſemble at her houſe, attended by muſic, and dancing girls hired for the occaſion; after playing and dancing ſome time, a mullah or prieſt is introduced, who, taking the child in his arms, demands of the mother what name ſhe chooſes the infant ſhould be called by; being told, he begins praying, and after a ſhort time applies his mouth cloſe to the child's ear, and tells him diſtinctly three times (calling him by name) to remember and be obedient to his father and mother, to venerate his Koran and his prophet, to abſtain from thoſe things which are unlawful, and to practice thoſe things which are good and virtuous. Having repeated the Mahometan profeſſion of faith, he then redelivers the child to his mother; after which the company are entertained with ſweet meats and other refreſhments, a part of which the females preſent always take care to carry away in their pockets, believing it to be the infallible means of their having offſpring themſelves."

83 Intellectual excellence.

The Perſians excel more in poetry than in any other ſort of literature; and aſtrologers are now in as great reputation in Perſia as the magi were formerly. Their books are all manuſcripts, the art of printing having not yet been introduced among them: they excel indeed in writing, and have eight different hands. They write from the right hand to the left, as the Arabs do. In their ſhort hand, they uſe the letters of the alphabet; and the ſame letters, differently pointed, will have 20 different ſignifications. In ſhort, the Perſians are born with as good natural parts as any people in the Eaſt, but make a bad uſe of them; being great diſſemblers, cheats, liars, and flatterers, and having a ſtrong propenſity to voluptuouſneſs, luxury, idleneſs, and indolence; vices in general to which the Aſiatics in general are much addicted.

PERSIAN WHEEL. See HYDROSTATICS.

PERSICA, the PEACH, is by Linnæus referred to the ſame claſs and genus with amygdalus; however, as they are ſo commonly reckoned to be different genera, we have thought proper to diſtinguiſh them. There are a great variety of peach-trees planted in the gardens, ſome of which are preſerved only for the beauty of their flowers, but moſt of them for the ſake of the fruit. Of thoſe remarkable for the beauty of their flowers, the principal are, 1. The vulgaris, or common peach-tree, with double flowers, which is a very great ornament in gardens, producing very large double flowers of a beautiful red or purple colour, and growing to a conſiderable ſize. 2. The humilis, or dwarf-almond. 3. The Africana, or double-flowering dwarf-almond. Theſe two reach not above the height of three or four feet, though their flowers are of equal beauty with the former.

Of the peach-trees cultivated for the ſake of their fruit there are a great number, to deſcribe which particularly would exceed the proper bounds of this article. They are raiſed from the ſtones of the fruit, which ſhould be planted in autumn on a bed of light dry earth, about three inches deep and four inches aſunder. In the winter the beds ſhould be covered with mulch to protect them from the froſt. In this bed they ſhould remain for a year; when they are to be taken up and planted in a nurſery, where they are to remain one or two years; after which they muſt be removed to the places where they are to continue.

PERSICANA, in botany. See POLYGONUM.

PERSICUS SINUS, in anc. geog. (Mela, Pliny); a part of the ſea which the Romans called *Mare Rubrum*, and the Greeks *Mare Erythræum;* waſhing Arabia Felix on the eaſt, between which and Carmania, entering into the land, it waſhes Perſis on the ſouth. Its large mouth conſiſts of ſtraight ſides, like a neck, and then the land retiring equally a vaſt way, and the ſea ſurrounding it in a large compaſs of ſhore, there is exhibited the figure of a human head (Mela). Theophraſtus calls this bay *Sinus Arabicus*, a name it equally claims with *Perſicus*, only for diſtinction ſake *Perſicus* is appropriated to it by others.

PERSIMON. See DIOSPYROS.—From the perſimon is made a very palatable liquor in the following manner: As ſoon as the fruit is ripe, a ſufficient quantity is gathered, which is very eaſy, as each tree is well ſtocked with them. Theſe perſimon apples are put into a dough of wheat or other flour, formed into cakes, and put into an oven, in which they continue till they are quite baked and ſufficiently dry, when they are taken out again: then, in order to brew the liquor, a pot full of water is put on the fire, and ſome of the cakes are put in: theſe become ſoft by degrees as the water grows warm, and crumble in pieces at laſt; the pot is then taken from the fire, and the water in it well ſtirred about, that the cakes may mix with it: this is then poured into another veſſel, and they continue to ſteep and break as many cakes as are neceſſary for a brewing: the malt is then infuſed, and they proceed as uſual with the brewing. Beer thus prepared is reckoned much preferable to other beer. They likewiſe

wiſe make brandy of this fruit in the following manner: having collected a ſufficient quantity of perſimons in autumn, they are altogether put into a veſſel, where they lie for a week till they are quite ſoft: then they pour water on them, and in that ſtate they are left to ferment of themſelves, without promoting the fermentation by any addition. The brandy is then made in the common way, and is ſaid to be very good, eſpecially if grapes (in particular of the ſweet ſort), which are wild in the woods, be mixed with the perſimon fruit. Some perſimons are ripe at the end of September, but moſt of them later, and ſome not before November and December, when the cold firſt overcomes their acrimony. The wood of this tree is very good for joiners inſtruments, ſuch as planes, handles to chiſels, &c. but if after being cut down it lies expoſed to ſunſhine and rain, it is the firſt wood which rots, and in a year's time there is nothing left but what is uſeleſs. When the perſimon trees get once into a field, they are not eaſily got out of it again, as they ſpread ſo much.

PERSIS, a Roman lady, whom St Paul ſalutes in his epiſtle to the Romans (xvi. 12.), and whom he calls his beloved ſiſter. He ſays ſhe has laboured much for the Lord, and ſtill labours. Nothing elſe of her life is come to our knowledge, nor do we know that ſhe is honoured by any church; which is ſomething ſingular.

PERSIUS (Flaccus Aulus), a Latin poet in the reign of Nero, celebrated for his ſatires. He was born, according to ſome, at Volterra in Tuſcany; and according to others, at Tigulia, in the gulph Della Specia, in the year 34. He was educated till 12 years old at Volterra; and afterwards continued his ſtudies at Rome under Palæmon the grammarian, Virginius the rhetorician, and Cornutus the Stoic philoſopher, who contracted a friendſhip for him. Perſius conſulted that illuſtrious friend in the compoſition of his verſes. Lucian alſo ſtudied with him under Cornutus; and appeared ſo charmed with his verſes, that he was inceſſantly breaking out into acclamations at the beautiful paſſages in his ſatires: an example rarely ſeen in poets of equal rank. He was a ſteady friend, a good ſon, an affectionate brother and parent. He was chaſte, meek, and modeſt: which ſhows how wrong it is to judge of a man's morals by his writings; for the ſatires of Perſius are not only licentious, but ſharp and full of bitterneſs. He wrote but ſeldom; and it was ſome time before he applied himſelf regularly to it.

Perſius was of a weak conſtitution, and troubled with a bad ſtomach, which was the cauſe of his death in the 30th year of his age. Six of his ſatires remain; in their judgments of which the critics have been much divided, excepting as to their obſcurity, Perſius being indeed the moſt obſcure of all the Latin poets. As a poet, he is certainly inferior to Horace and Juvenal; and all the labours of Iſaac Caſaubon, who has written a moſt learned and elaborate commentary upon him, cannot make him equal to either of them as a ſatiriſt, though in virtue and learning he exceeded them both. He was a profeſſed imitator of Horace; yet had little of Horace's wit, eaſe, and talent at ridicule. His ſtyle is grand, figurative, poetical, and ſuitable to the dignity of the Stoic philoſophy; and hence he ſhines moſt in recommending virtue and integrity: here it is that ſatire becomes him. He was too grave to court the muſes with ſucceſs: but he had a great ſoul, ſuſceptible of noble ſentiments, which gave a grace but to indifferent poetry. His cotemporaries thought highly of him. Quintilian allows, that Perſius, although he wrote but one book of ſatires, acquired a great deal of true glory, *Multum et veræ gloriæ quamvis uno libro Perſius meruit:* and Martial ſays much the ſame thing, *Sæpius in libro memoratur Perſius uno*, &c.

PERSON, an individual ſubſtance of a rational intelligent nature. Thus we ſay, an ambaſſador repreſents the perſon of his prince; and that, in law, the father and ſon are reputed the ſame perſon.

The word *perſon*, *perſona*, is thought to be borrowed *a perſonando*, from perſonating or counterfeiting; and is ſuppoſed to have firſt ſignified a maſk: becauſe, as Boethius informs us, *in larva concava ſonus volvatur:* and hence the actors who appeared maſked on the ſtage were ſometimes called *larvati* and ſometimes *perſonati*. He likewiſe ſays, that as the ſeveral actors repreſented each a ſingle individual perſon, *viz.* Œdipus, or Chremes, or Hecuba, or Medea; for this reaſon, other people, who were at the ſame time diſtinguiſhed by ſomething in their form, character, &c. whereby they might be known, came likewiſe to be called by the Latins *perſonæ*, and by the Greeks ϖροσωπα. Again, as actors rarely repreſented any but great and illuſtrious characters, the word came at length to import the mind, as being that whoſe diſpoſitions conſtitute the character. And thus men, angels, and even God himſelf, were called *perſons*. Things merely corporeal, as a ſtone, a plant, or a horſe, were called *hypoſtaſes*, or *ſuppoſita*, but never *perſons*. Hence the learned ſuppoſe, that the ſame name *perſon* came to be uſed to ſignify ſome dignity, whereby a *perſon* is diſtinguiſhed from another; as a father, huſband, judge, magiſtrate, &c. In this ſenſe we are to underſtand that of Cicero: "Cæſar never ſpeaks of Pompey but in terms of honour and reſpect; he does many hard and injurious things, however, againſt his perſon."

Perſon we have already defined to mean an individual ſubſtance of a reaſonable nature. Now a thing may be individual two ways: 1. Logically, becauſe it cannot be predicated of any other; as Cicero, Plato, &c. 2. Phyſically; in which ſenſe a drop of water, ſeparated from the ocean, may be called an individual. Perſon is an individual nature in each of theſe ſenſes: logically, according to Boethius, becauſe *perſon* is not ſpoken of univerſals, but only of ſingulars and individuals; we do not ſay the *perſon* of an animal or a man, but of Cicero and Plato; and phyſically, ſince Socrates's hand or foot are never conſidered as perſons. This laſt kind of individual is denominated two ways: poſitively, when the perſon is ſaid to be the whole principle of acting; for to whatever thing action is attributed, that the philoſophers call a *perſon:* and negatively, as when we ſay, with the Thomiſts, &c. that a perſon conſiſts in this, that it does not exiſt in another as a more perfect being. Thus a man, though he conſiſts of two different things, *viz.* body and ſpirit, is not two perſons; becauſe neither part of itſelf is a complete principle of action, but one perſon, ſince the manner of his conſiſting of body and ſpirit is ſuch as conſtitutes one whole principle of action; nor does he exiſt in any other as a more perfect being; as, for example, Socrates's foot does in Socrates, or a drop of water in the ocean.

PERSON, in grammar, a term applied to ſuch nouns or pronouns as, being either prefixed or underſtood, are the nominatives in all inflections of a verb; or it is the agent or patient in all finite or perſonal verbs. See GRAMMAR.

PERSONAL, any thing that concerns, or is reſtrained to, the perſon: thus it is a maxim in ethics, that all faults are perſonal.

PERSONAL *Action*, in law, is an action levied directly and ſolely againſt the perſon; in oppoſition to a real or mixed action. See ACTION.

PERSONAL *Goods*, or *Chattels*, in law, ſignifies any moveable thing belonging to a perſon, whether alive or dead. See CHATTELS.

PERSONAL *Identity*. See METAPHYSICS, Part III. Chap. iii.

PERSONAL *Verb*, in grammar, a verb conjugated in all the three perſons; thus called in oppoſition to an imperſonal verb, or that which has the third perſon only.

PERSONALITY, in the ſchools, is that which conſtitutes an individual a diſtinct perſon.

PERSONATÆ, is the name of the 40th order in Linnæus's Fragments of a Natural Method, conſiſting of a number of plants whoſe flowers are furniſhed with an irregular gaping or grinning petal, which in figure ſomewhat reſembles the ſnout of an animal. The bulk of the genera of this natural order arrange themſelves under the claſs and order didynamia angioſpermia of the Sexual Method.

The reſt, although they cannot enter into the artificial claſs juſt mentioned, for want of the claſſic character, the inequality of the ſtamina; yet, in a natural method, which admits of greater latitude, may be arranged with thoſe plants which they reſemble in their habit in general appearance, and particularly in the circumſtance expreſſed in that title.

PERSONIFYING, or PERSONALIZING, the giving an inanimate being the figure, ſentiments, and language of a perſon.

Dr Blair, in his Lectures on Rhetoric, gives this account of perſonification. "It is a figure, the uſe of which is very extenſive, and its foundation laid deep in human nature. At firſt view, and when conſidered abſtractly, it would appear to be a figure of the utmoſt boldneſs, and to border on the extravagant and ridiculous. For what can ſeem more remote from the track of reaſonable thought, than to ſpeak of ſtones and trees, and fields and rivers, as if they were living creatures, and to attribute to them thought and ſenſation, affections and actions? One might imagine this to be no more than childiſh conceit, which no perſon of taſte could reliſh. In fact, however, the caſe is very different. No ſuch ridiculous effect is produced by perſonification when properly employed; on the contrary, it is found to be natural and agreeable, nor is any very uncommon degree of paſſion required in order to make us reliſh it. All poetry, even in its moſt gentle and humble forms, abounds with it. From proſe it is far from being excluded; nay, in common converſation, very frequent approaches are made to it. When we ſay, the ground *thirſts* for rain, or the earth *ſmiles* with plenty; when we ſpeak of ambition's being *reſtleſs*, or a diſeaſe being *deceitful*; ſuch expreſſions ſhow the facility with which the mind can accommodate the properties of living creatures to things that are inanimate, or to abſtract conceptions of its own forming.

"Indeed, it is very remarkable, that there is a wonderful proneneſs in human nature to animate all objects. Whether this ariſes from a ſort of aſſimilating principle, from a propenſion to ſpread a reſemblance of ourſelves over all other things, or from whatever other cauſe it ariſes, ſo it is, that almoſt every emotion which in the leaſt agitates the mind beſtows upon its object a momentary idea of life. Let a man, by an unwary ſtep, ſprain his ankle, or hurt his foot upon a ſtone, and in the ruffled diſcompoſed moment he will ſometimes feel himſelf diſpoſed to break the ſtone in pieces, or to utter paſſionate expreſſions againſt it, as if it had done him an injury. If one has been long accuſtomed to a certain ſet of objects, which have made a ſtrong impreſſion on his imagination; as to a houſe, where he has paſſed many agreeable years; or to fields, and trees, and mountains, among which he has often walked with the greateſt delight; when he is obliged to part with them, eſpecially if he has no proſpect of ever ſeeing them again, he can ſcarce avoid having ſomewhat of the ſame feeling as when he is leaving old friends. They ſeem endowed with life. They become objects of his affection; and, in the moment of his parting, it ſcarce ſeems abſurd to him to give vent to his feeling in words, and to take a formal adieu.

"So ſtrong is that impreſſion of life which is made upon us, by the more magnificent and ſtriking objects of nature eſpecially, that I doubt not in the leaſt of this having been one cauſe of the multiplication of divinities in the heathen world. The belief of dryads and naiads, of the genius of the wood and the god of the river, among men of lively imaginations, in the early ages of the world, eaſily aroſe from this turn of mind. When their favourite rural objects had often been animated in their fancy, it was an eaſy tranſition to attribute to them ſome real divinity, ſome unſeen power or genius which inhabited them, or in ſome peculiar manner belonging to them. Imagination was highly gratified, by thus gaining ſomewhat to reſt upon with more ſtability; and when belief coincided ſo much with imagination, very ſlight cauſes would be ſufficient to eſtabliſh it.

"From this deduction may be eaſily ſeen how it comes to paſs that perſonification makes ſo great a figure in all compoſitions where imagination or paſſion have any concern. On innumerable occaſions it is the very language of imagination and paſſion; and therefore deſerves to be attended to, and examined with peculiar care. There are three different degrees of this figure, which it is neceſſary to remark and diſtinguiſh, in order to determine the propriety of its uſe. The firſt is, when ſome of the properties or qualities of living creatures are aſcribed to inanimate objects; the ſecond, when thoſe inanimate objects are introduced as acting like ſuch as have life; and the third, when they are repreſented either as ſpeaking to us, or as liſtening to what we ſay to them."

The ingenious profeſſor goes on to inveſtigate the nature of perſonification at conſiderable length. We ſhall give his caution for the uſe of it in proſe compoſitions, in which he informs us this figure requires to be uſed with great moderation and delicacy. "The ſame liberty is not allowed to the imagination there as in poetry. The ſame aſſiſtances cannot be obtained for raiſing paſſion to its proper height by the force of numbers and the glow of ſtyle. However, addreſſes to inanimate objects are not excluded from proſe; but have their place only in the higher ſpecies of oratory. A public ſpeaker may on ſome occaſions very properly addreſs religion or virtue; or his native country, or ſome city or province, which has ſuffered perhaps great calamities, or been the ſcene of ſome memorable action. But we muſt remember, that as ſuch addreſſes are among the higheſt efforts of eloquence, they ſhould never be attempted unleſs by perſons of more than ordinary genius: for if the orator fails in his deſign of moving our paſſions by them, he is ſure of being laughed at. Of all frigid things, the moſt frigid are the aukward and unſeaſonable attempts ſometimes made towards ſuch kinds of perſonification, eſpecially if they be long continued. We ſee the writer or ſpeaker toiling and labouring to expreſs the language of ſome paſſion which he neither feels himſelf nor can make us feel. We remain not only cold, but frozen; and are at full leiſure to criticiſe on the ridiculous figure which the perſonified object makes, when we ought to have been tranſported with a glow of enthuſiaſm. Some of the French writers, particularly Boſſuet and Flechier, in their ſermons and funeral orations, have attempted and executed this figure not without warmth and dignity. Their works are exceedingly worthy of being conſulted for inſtances of this and of ſeveral other ornaments of ſtyle. Indeed the vivacity and ardour of the French genius is more ſuited to this bold ſpecies of oratory, than the more correct but leſs animated genius of the Britiſh, who in their proſe works very rarely attempt any of the high figures of eloquence."

PERSPECTIVE.

PERSPECTIVE is the art of drawing on a plane ſurface true reſemblances or pictures of objects, as the objects themſelves appear to the eye from any diſtance and ſituation, real or imaginary.

It was in the 16th century that *Perſpective* was revived, or rather reinvented. It owes its birth to painting, and particularly to that branch which was employed in the decorations of the theatre, where landſcapes were properly introduced, and which would have looked unnatural and horrid if the ſize of the objects had not been pretty nearly proportioned to their diſtance from the eye. We learn from Vitruvius, that Agatharchus, inſtructed by Æſchylus, was the firſt who wrote upon this ſubject; and that afterwards the principles of this art were more diſtinctly taught by Democritus and Anaxagoras, the diſciples of Agatharchus. Of the theory of this art, as deſcribed by them, we know nothing; ſince none of their writings have eſcaped the general wreck that was made of ancient literature in the dark ages of Europe. However, the revival of painting in Italy was accompanied with a revival of this art.

The firſt perſon who attempted to lay down the rules of perſpective was Pietro del Borgo, an Italian. He ſuppoſed objects to be placed beyond a tranſparent tablet, and endeavoured to trace the images which rays of light, emitted from them, would make upon it. But we do not know what ſucceſs he had in this attempt, becauſe the book which he wrote upon this ſubject is not now extant. It is, however, very much commended by the famous Egnazio Dante; and, upon the principles of Borgo, Albert Durer conſtructed a machine, by which he could trace the perſpective appearance of objects.

Balthazar Peruſſi ſtudied the writings of Borgo, and endeavoured to make them more intelligible. To him we owe the diſcovery of points of diſtance, to which all lines that make an angle of 45 degrees with the ground-line are drawn. A little time after, Guido Ulbani, another Italian, found that all the lines that are parallel to one another, if they be inclined to the ground-line, converge to ſome point in the horizontal line; and that through this point alſo, a line drawn from the eye, parallel to them, will paſs. Theſe principles put together enabled him to make out a pretty complete theory of perſpective.

Great improvements were made in the rules of perſpective by ſubſequent geometricians; particularly by profeſſor Graveſande, and ſtill more by Dr Brook Taylor, whoſe principles are in a great meaſure new, and far more general than any before him.

In order to underſtand the principles of perſpective, it will be proper to conſider the plane on which the repreſentation is to be made as tranſparent, and interpoſed between the eye of the ſpectator and the object to be repreſented. Thus, ſuppoſe a perſon at a window looks through an upright pane of glaſs at any object beyond it, and, keeping his head ſteady, draws the figure of the object upon the glaſs with a black lead pencil, as if the point of the pencil touched the object itſelf; he would then have a true repreſentation of the object in perſpective as it appears to his eye.

In order to this two things are neceſſary: firſt, that the glaſs be laid over with ſtrong gum-water, which, when dry, will be fit for drawing upon, and will retain the traces of the pencil; and, ſecondly, that he looks through a ſmall hole in a thin plate of metal, fixed about a foot from the glaſs, between it and his eye, and that he keep his eye cloſe to the hole; otherwiſe he might ſhift the poſition of his head, and conſequently make a falſe delineation of the object.

Having traced out the figure of the object, he may go over it again with pen and ink; and when that is dry, put a ſheet of paper upon it, and trace it thereon with a pencil: then taking away the paper and laying it on a table, he may finiſh the picture by giving it the colours, lights, and ſhades, as he ſees them in the object itſelf; and then he will have a true reſemblance of the object.

To every perſon who has a general knowledge of the principles of optics, this muſt be ſelf-evident: For as viſion is occaſioned by pencils of rays coming in ſtraight lines to the eye from every point of the viſible object, it is plain that, by joining the points in the tranſparent plane, through which all thoſe pencils reſpectively paſs, an exact repreſentation muſt be formed of the object, as it appears to the eye in that particular poſition, and at that determined diſtance: and were pictures of things to be always firſt drawn on tranſparent planes, this ſimple operation, with the principle on which it is founded, would compromiſe the whole theory and practice of perſpective. As this, however, is far from being the caſe, rules muſt be deduced from the ſciences of optics and geometry for drawing repreſentations of viſible objects on opaque planes; and the application of theſe rules conſtitutes what is properly called the *art* of perſpective.

Previous to our laying down the fundamental principles of this art, it may not be improper to obſerve, that when a perſon ſtands right againſt the middle of one end of a long avenue or walk, which is ſtraight and equally broad throughout, the ſides thereof ſeem to approach nearer and nearer to each other as they are further and further from his eye; or the angles, under which their different parts are ſeen, become leſs and leſs according as the diſtance from his eye increaſes; and if the avenue be very long, the ſides of it at the fartheſt end will ſeem to meet: and there an object that would cover the whole breadth of the avenue, and be of a height equal to that breadth, would appear only to be a mere point. See OPTICS, n° 219, 220.

Having made theſe preliminary obſervations, we now proceed to the practice of perſpective, which is built upon the following

(Fundamental) THEOREM I.

Let *a b c d* (fig. 1. Plate CCCLXXXIII.) repreſent the ground-plan of the figure to be thrown into perſpective, and *e f g h* the tranſparent plane through which it is viewed by the eye at E. Let theſe planes interſect in the ſtraight line *k l*. Let B be any point in the ground-plan, and B E a ſtraight line, the path of a ray of light from that point to the eye. This will paſs through the plane *e f g h* in ſome point *b*; or B will be ſeen through that point, and *b* will be the picture, image, or repreſentation of B.

If BA be drawn in the ground-plan, making any angle BAK with the common interſection, and EV be drawn parallel to it, meeting the picture plane or perſpective-plane in V, and VA be drawn, the point *b* is in the line VA ſo ſituated that BA is to EV as *b*A to *b*V.

For ſince EV and BA are parallel, the figure BA*b*VE*b*B is in one plane, cutting the perſpective-plane in the ſtraight line VA; the triangles BA*b*, EV*b*, are ſimilar, and $BA : EV = bA : bV$.

Cor. 1. If B be beyond the picture, its picture *b* is above the interſection *k b*; but if B be between the eye and the picture as at B′, its picture *b*′ is below *k b*.

2. If two other parallel lines BA′, ES, be drawn, and A′, S, be joined, the picture of B is in the interſection of the lines AV and A′S.

3. The line BA is repreſented by *b*A, or *b*A is the picture of BA; and if AB be infinitely extended, it will be repreſented by AV. V is therefore called the *vaniſhing point* of the line AB.

4. All lines parallel to AB are repreſented by lines converging to V from the points where theſe lines interſect the perſpective plane; and therefore V is the vaniſhing point of all ſuch parallel lines.

5. The pictures of all lines parallel to the perſpective plane are parallel to the lines themſelves.

6. If through V be drawn HVD parallel to *k l*, the angle EVH is equal to BAK.

Remark. The propoſition now demonſtrated is not limited to any inclination of the picture-plane to the ground-plane; but it is uſual to conſider them as perpendicular to each other, and the ground-plane as horizontal. Hence the line *k l* is called the *ground line*, and OH the *horizon line*; and VK, perpendicular to both, is called the *height of the eye*.

If ES be drawn perpendicular to the picture-plane, it will cut it in a point S of the horizon-line directly oppoſite to the eye. This is called the *point of ſight*, or *principal point*.

7. The pictures of all vertical lines are vertical, and the pictures of horizontal lines are horizontal, becauſe theſe lines are parallel to the perſpective plane.

8. The point of ſight S is the vaniſhing point of all lines perpendicular to the perſpective plane.

The above propoſition is a ſufficient foundation for the whole practice of perſpective, whether on direct or inclined pictures, and ſerves to ſuggeſt all the various practical conſtructions, each of which has advantages which ſuit particular purpoſes. Writers on the ſubject have either confined themſelves to one conſtruction, from an affectation of ſimplicity or fondneſs for ſyſtem; or have multiplied precepts, by giving every conſtruction for every example, in order to make a great book, and give the ſubject an appearance of importance and difficulty. An ingenious practitioner will avoid both extremes, and avail himſelf of the advantage of each conſtruction as it happens to ſuit his purpoſe. We ſhall now proceed to the practical rules, which require no conſideration of interſecting planes, and are all performed on the perſpective plane by means of certain ſubſtitutions for the plane of the eye and the original figure. The general ſubſtitution is as follows:

Let the plane of the paper be firſt ſuppoſed to be the ground-plan, and the ſpectator to ſtand at F (fig. 2.) Let it be propoſed that the ground-plan is to be repreſented on a plane ſurface, ſtanding perpendicularly on a line GKl of the plan, and that the point K is immediately oppoſite to the ſpectator, or that FK is perpendicular to GL; then FK is equal to the diſtance of the ſpectator's eye from the picture.

Now ſuppoſe a piece of paper laid on the plan with its ſtraight edge lying on the line GL; draw on this paper KS perpendicular to GL, and make it equal to the height of the eye above the ground-plan. This may be much greater than the height of a man, becauſe the ſpectator may be ſtanding on a place much raiſed above the ground-plan. Obſerve alſo that KS muſt be meaſured on the ſame ſcale on which the ground-plan and the diſtance FK were meaſured. Then draw HSO parallel to GL. This will be a horizontal line, and (when the picture is ſet upright on GL) will be on a level with the ſpectator's eye, and the point S will be directly oppoſite to his eye. It is therefore called the *principal point*, or *point of ſight*. The diſtance of his eye from this point will be equal to FK. Therefore make SP (in the line SK) equal to FK, and P is the projecting point or ſubſtitute for the place of the eye. It is ſometimes convenient to place P above S, ſometimes to one ſide of it on the horizontal line, and in various other ſituations; and writers, ignorant of, or inattentive to, the principles of the theory, have given it different denominations, ſuch as *point of diſtance*, *point of view*, &c. It is merely a ſubſtitute for the point E in fig. 1. and its moſt natural ſituation is below, as in this figure.

The art of perſpective is conveniently divided into ICHNOGRAPHY, which teaches how to make a perſpective draught of figures on a plane, commonly called the ground-plan; and SCENOGRAPHY, which teaches how to draw ſolid figures, or ſuch figures as are raiſed above this plan.

Fundamental PROB. I. *To put into perſpective any given point of the ground-plan.*

First general conſtruction.

Plate CCCLXXXIII. From B and P (fig. 2.) draw any two parallel lines BA, PV, cutting the ground-line and horizon-line in A and V, and draw BP, AV, cutting each other in b; b is the picture of B.

For it is evident that BA, PV, of this figure are analogous to BA and EV of fig. 1. and that $BA : PV = bA : bV$.

If BA′ be drawn perpendicular to GL, PV will fall on PS, and need not be drawn. A′V will be A′S. —This is the moſt eaſy conſtruction, and is nearly the ſame with Ferguſon's.

Second general conſtruction.

Draw two lines BA, BA″, and two lines PV, PD, parallel to them, and draw AV, A″D, cutting each other in b: b is the picture of B by Cor. 2.—This conſtruction is the foundation of all the rules of perſpective that are to be found in the books on this ſubject. They appear in a variety of forms, owing to the ignorance or inattention of the authors to the principles. The rule moſt generally adhered to is as follows:

Draw BA (fig. 3.) perpendicular to the ground-line, and AS to the point of ſight, and ſet off Aβ equal to BA. Set of SD equal to the diſtance of the eye in the oppoſite direction from S that β is from A, where B and E of fig. 1. are on oppoſite ſides of the picture; otherwiſe ſet them the ſame way. D is called the point of diſtance. Draw βD, cutting AS in B. This is evidently equivalent to drawing BA and PS perpendicular to the ground line and horizon-line, and Bβ and PD making an angle of 45° with theſe lines, with the additional puzzle about the way of ſetting of Aβ and SD, which is avoided in the conſtruction here given.

This uſual conſtruction, however, by a perpendicular and the point of diſtance, is extremely ſimple and convenient; and two points of diſtance, one on each ſide of S, ſerve for all points of the ground plan. But the firſt general conſtruction requires ſtill fewer lines, if BA be drawn perpendicular to GL, becauſe PV will then coincide with PS.

Third general conſtruction.

Draw BA from the given point B perpendicular to the ground-line, and AS to the point of ſight. From the point of diſtance D ſet off Dd equal to BA, on the ſame or the contrary ſide as S, according as B is on the ſame or the contrary ſide of the picture as the eye. Join d A, and draw Db parallel to dA. b is the picture of B. For SD, Dd, are equal to the diſtances of the eye and given point from the picture, and $SD : Dd = bS : bA$.

This conſtruction does not naturally ariſe from the original lines, but is a geometrical conſequence from their poſition and magnitude; and it is of all others the moſt generally convenient, as the perpendicular diſtances of any number of points may be arranged along SD without confuſion, and their direct ſituations transferred to the ground-line by perpendiculars ſuch as BA; and nothing is eaſier than drawing parallels, either by a parallel ruler or a bevel-ſquare, uſed by all who practice drawing.

PROB. 2. *To put any ſtraight line* BC (fig. 4.) *of the ground plan in perſpective.*

Find the pictures b, c, of its extreme points by any of the foregoing conſtructions, and join them by the ſtraight line bc.

Perhaps the following conſtruction will be found very generally convenient.

Produce CB till it meet the ground-line in A, and draw PV parallel to it, and AV, and PB, PC, cutting AV in b, c. V is its vaniſhing point, by Cor. 3. of the fundamental theorem.

It muſt be left to the experience and ſagacity of the drawer to ſelect ſuch conſtructions as are moſt ſuitable to the multiplicity of the figures to be drawn.

PROB. 3. *To put any rectilineal figure of the ground-plan in perſpective.*

Put the bounding lines in perſpective, and the problem is ſolved.

The variety of conſtructions of this problem is very great, and it would fill a volume to give them all. The moſt generally convenient is to find the vaniſhing points of the bounding lines, and connect theſe with the points of their interſection with the ground-line. For example, to put the ſquare ABCD (fig. 5.) into perſpective.

Draw from the projecting point PV, PW, parallel to AB, BC, and let AB, BC, CD, DA, meet the ground-line in α, κ, β, δ, and draw αV, δV, κW, βW, cutting each other in $a\,b\,c\,d$, the picture of the ſquare ABCD. The demonſtration is evident.

This conſtruction, however, runs the figure to great diſtances on each ſide of the middle line when any of the lines of the original figure are nearly parallel to the ground-line.

The following conſtruction (fig. 6.) avoids this inconvenience.

Let D be the point of diſtance. Draw the perpendiculars Aα, Bβ, Cκ Dδ, and the lines Ae, Bf, Cg, Dh, parallel to PD. Draw Sα, Sβ, Sκ, Sδ, and De, Df, Dg, Dh, cutting the former in a, b, c, d, the angles of the picture.

It is not neceſſary that D be the point of diſtance, only the lines Ae, Bf, &c. muſt be parallel to PD.

Remark. In all the foregoing conſtructions the neceſſary lines (and even the finiſhed picture) are frequently confounded with the original figure. To avoid this great inconvenience, the writers on perſpective direct us to tranſpoſe the figure; that is, to transfer it to the other ſide of the ground line, by producing the perpendiculars $A\alpha$, $B\beta$, $C\kappa$, $D\delta$, till $A'\alpha$, $\beta B'$, &c. are reſpectively equal to $A\alpha$, $B\beta$ &c.; or, inſtead of the original figure, to uſe only its tranſpoſed ſubſtitute A B′ C D′. This is an extremely proper method. But in this caſe the point P muſt alſo be tranſpoſed to P′ above S, in order to retain the firſt or moſt natural and ſimple conſtruction, as in fig. 7.;
Plate ccclxxxiii where it is evident, than when BA=AB, and SP=SP′ and B′P′ is drawn, cutting AS in b, we have $bA : bS = B'A : PS, = BA : PS$, and b is the picture of B: whence follows the truth of all the ſubſequent conſtructions with the tranſpoſed figure.

Prob. 4. *To put any curvilineal figure to the ground-plan into perſpective.*

Put a ſufficient number of its points in perſpective by the foregoing rules, and draw a curve line through them.

It is well known that the conic ſections and ſome other curves, when viewed obliquely, are conic ſections or curves of the ſame kinds with the originals, with different poſitions and proportions of their principal lines, and rules may be given for deſcribing their pictures founded on this property. But theſe rules are very various, unconnected with the general theory of perſpective, and more tedious in the execution, without being more accurate than the general rule now given. It would be a uſeleſs affectation to inſert them in this elementary treatiſe.

We come in the next place to the delineation of figures not in a horizontal plane, and of ſolid figures. For this purpoſe it is neceſſary to demonſtrate the following

THEOREM II.

The length of any vertical line ſtanding on the ground plane is to that of its picture as the height of the eye to the diſtance of the horizon line from the picture of its foot.

Let BC be the vertical line ſtanding on B, and let EF be a vertical line through the eye. Make BD equal to EF, and draw DE, CE, BE. It is evident that DE will cut the horizon line in ſome point d, CE, will cut the picture plane in c, and BE will cut it in b, and that $b\,c$ will be the picture of BC, and is vertical, and that BC is to $b\,c$ as BD to $b\,d$, or as EF to $b\,d$.

Cor. The picture of a vertical line is divided in the ſame ratio as the line itſelf. For $BC : BM = b\,c : b\,m$.

Prob. 5. *To put a vertical line of a given length in perſpective ſtanding on a given point of the picture.*

Through the given point b (Fig. 8.) of the picture, draw S b A from the point of ſight, and draw the vertical line AD, and make AE equal to the length or height of the given line. Join ES, and draw $b\,c$, parallel to AD, producing $b\,c$, when neceſſary, till it cut the horizontal line in d, and we have $b\,c : b\,d, = AD : AE$, that is, as the length of the given line to the height of the eye, and $b\,d$ is the diſtance of the horizon-line from the point b, which is the picture of the foot of the line. Therefore (Theor. 2) $b\,c$ is the required picture of the vertical line.

This problem occurs frequently in views of architecture; and a compendious method of ſolving it would be peculiarly convenient. For this purpoſe, draw a vertical line XZ at the margin of the picture, or on a ſeparate paper, and through any point V of the horizon-line draw VX. Set off XY, the height of the vertical line, and draw VY. Then from any points b, r, on which it is required to have the pictures of lines equal to XY, draw bS, $r\,t$, parallel to the horizon line, and draw the verticals Su, $t\,v$: theſe have the lengths required, which may be transferred to b and r. This, with the third general conſtruction for the baſe points, will ſave all the confuſion of lines which would ariſe from conſtructing each line apart.

Prop. 6. *To put any ſloping line in perſpective.*

From the extremities of this line, ſuppoſe perpendiculars making the ground plane in two points, which we ſhall call the baſe points of the ſloping line. Put theſe baſe points in perſpective, and draw, by laſt problem, the perpendiculars from the extremities. Join theſe by a ſtraight line. It will be the picture required.

Prob. 7. *To put a ſquare in perſpective, as ſeen by a perſon not ſtanding right againſt the middle of either of its ſides, but rather nearly even with one of its corners.*

In fig. 9. let ABCD be a true ſquare, viewed by an obſerver, not ſtanding at o, directly againſt the middle of its ſide AD, but at O almoſt even with its corner D, and viewing the ſide AD under the angle AOD; the angle AoD (under which he would have ſeen AD from o) being 60 degrees.

Make AD in fig. 10. equal to AD in fig. 9. and draw SP and OO parallel to AD. Then, in fig. 10. let O be the place of the obſerver's eye, and SO be perpendicular to SP; then S ſhall be the point of ſight in the horizon SP.

Take SO in your compaſſes, and ſet that extent from S to P: then P ſhall be the true point of diſtance, taken according to the foregoing rules.

From A and D draw the ſtraight lines AS and DS; draw alſo the ſtraight line AP, interſecting DS in C.

Laſtly, to the point of interſection C draw BC parallel to AD; and ABCD in fig. 10. will be a true perſpective repreſentation of the ſquare ABCD in fig. 9. The point M is the centre of each ſquare, and AMC and BMD are the diagonals.

Prob. 8. *To put a reticulated ſquare in perſpective, as ſeen by a perſon ſtanding oppoſite to the middle of one of its ſides.*

A reticulated ſquare is one that is divided into ſeveral little ſquares, like net-work, as fig. 11. each ſide of which is divided into four equal parts, and the whole ſurface into four times four (or 16) equal ſuqares.

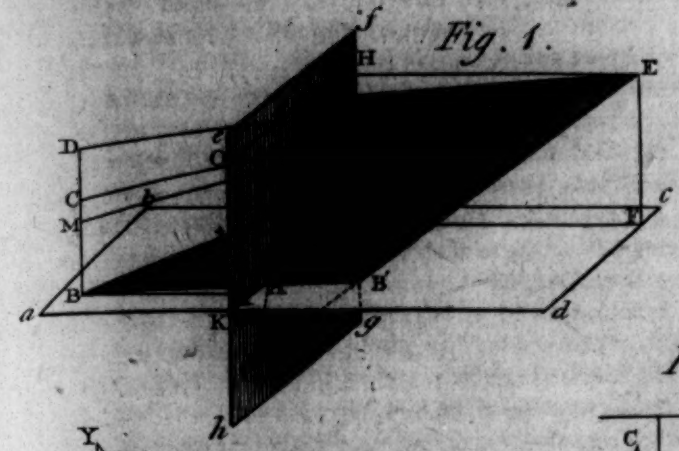
Having divided this ſquare into the given number of leſs ſquares, draw the two diagonals A x C and B x D.

Make AD in fig. 12. equal to AD in fig. 11. and divide it into four equal parts, as Ae, $e\,g$, $g\,i$, and i D.

Draw SP for the horizon, parellel to AD, and, through

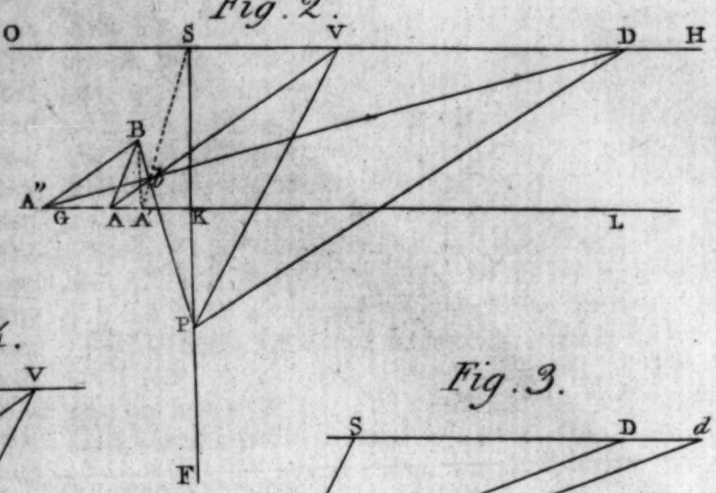
PERSPECTIVE. Plate CCCLXXXIII.

Fig. 1.



f
H
E
D
e
O
C
b
M
c
F
B
B'
a
K
g
d
h

Fig. 2.



O
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V
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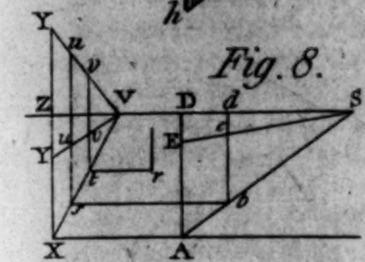
H
B
A''
G
A
A'
K
L
P
F

Fig. 8.



Y
u
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A
b

Fig. 4.

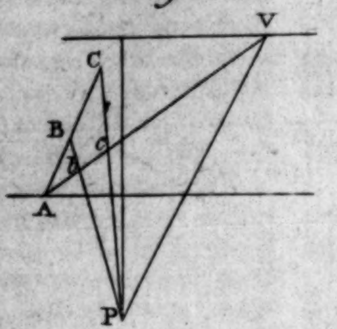


Fig. 3.

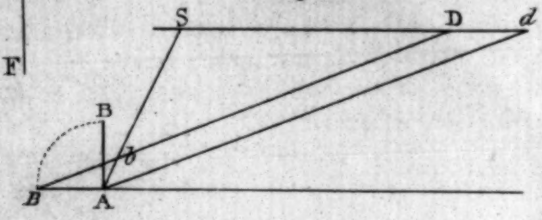
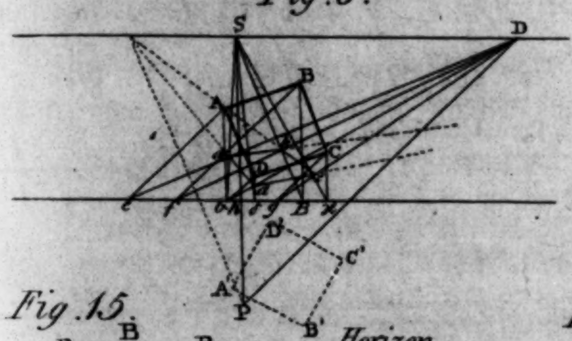
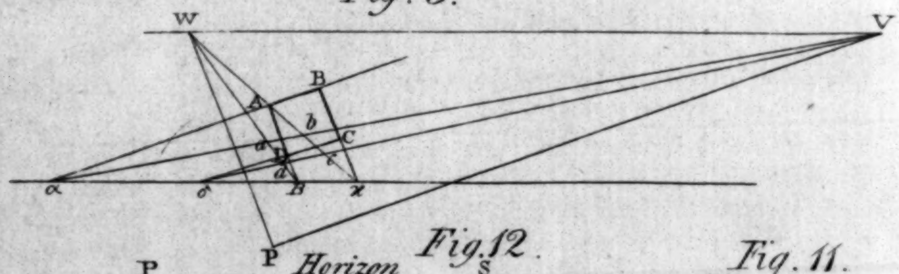


Fig. 6.



S
D
A
B
C
D'
C'
A'
P
B'

Fig. 5.



W
V
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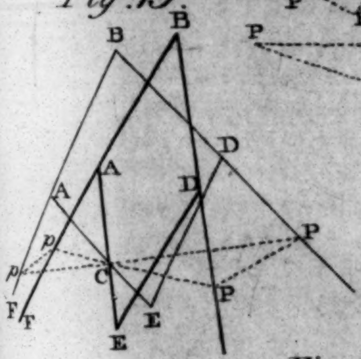
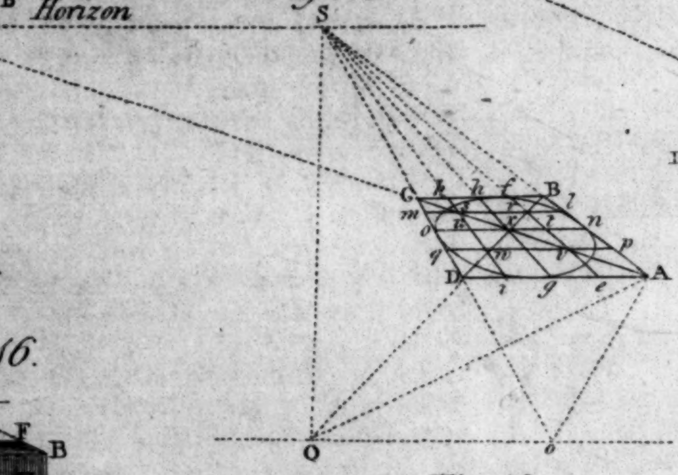
A
b
C
a
d
c
α
δ
B
x
P

Fig. 15.



B
B'
A
D
A
D
P
p
C
P
F
E
E

Fig. 13.



Horizon
S
C
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o
q
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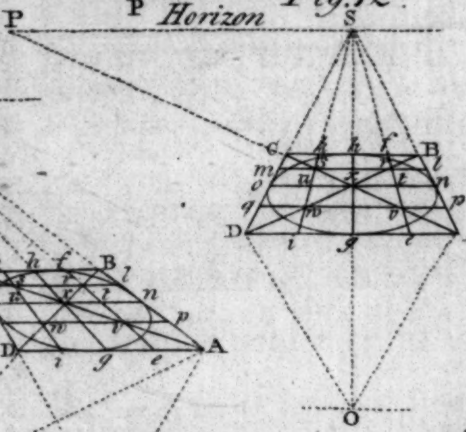
D
A
i
g
e
O
o

Fig. 12.



P
Horizon
S
C
k
h
f
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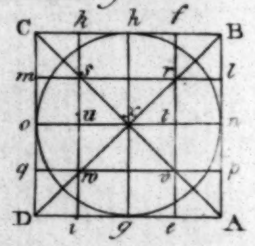
o
n
q
p
D
i
g
e
A
O

Fig. 11.



C
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e
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Fig. 14.

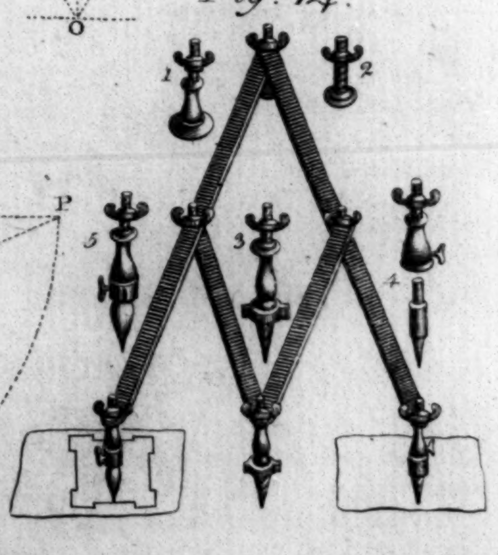
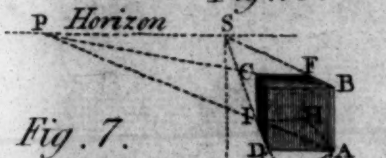


Fig. 16.



P
Horizon
S
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F
B
E
H
D
A
O
o

Fig. 7.

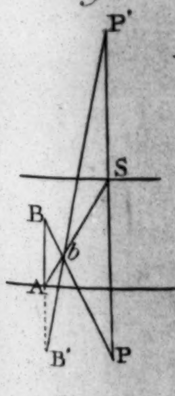


Fig. 9.

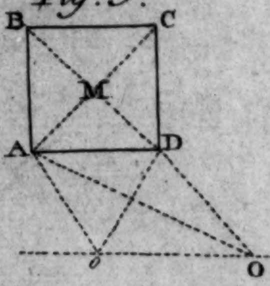
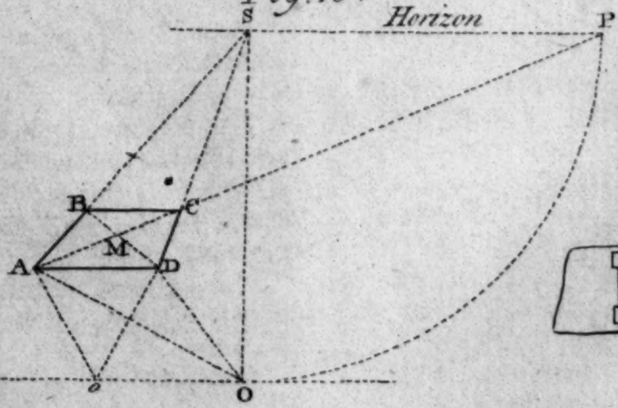


Fig. 10.



S
Horizon
P
B
C
M
A
D
o
O

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through the middle point *g* of AD, draw OS perpendicular to AD and SP.—Make S the point of ſight, and O the place of the obſerver's eye.

Take SP equal to SO, and P ſhall be the true point of diſtance.—Draw AS and DS to the point of ſight, and AP to the point of diſtance, interſecting DS in C: then draw BC parallel to AD, and the outlines of the reticulated ſquare ABCD will be finiſhed.

From the diviſion points *e*, *g*, *i*, draw the ſtraight lines *e f*, *g h*, *i k*, tending towards the point of ſight S; and draw BD for one of the diagonals of the ſquare, the other diagonal AC being already drawn.

Through the points *r* and *s*, where theſe diagonals cut *e f* and *i k*, draw *l m* parallel to AD. Through the centre-point *x*, where the diagonals cut *g h*, draw *n o* parallel to AD.—Laſtly, through the points *v* and *w*, where the diagonals cut *e f* and *i k*, draw *p q* parallel to AD; and the reticulated perſpective ſquare will be finiſhed.

This ſquare is truly repreſented, as if ſeen by an obſerver ſtanding at O, and having his eye above the horizontal plane ABCD on which it is drawn; as if OS was the height of his eye above that plane: and the lines which form the ſmall ſquares within it have the ſame letters of reference with thoſe in fig. 11. which is drawn as it would appear to an eye placed perpendicularly above its centre *x*.

Plate CCCLXXXIII

Prob. 9. *To put a circle in perſpective.*

If a circle be viewed by an eye placed directly over its centre, it appears perfectly round, but if it be obliquely viewed, it appears of an elliptical ſhape. This is plain by looking at a common wine-glaſs ſet upright on a table.

Make a true reticulated ſquare, as fig. 11. Plate CCCLXXXIII. of the ſame diameter as you would have the circle; and ſetting one foot of your compaſſes in the centre *x*, deſcribe as large a circle as the ſides of the ſquare will contain. Then, having put this reticulated ſquare into perſpective, as in fig. 12. obſerve through what points of the croſs lines and diagonals of fig. 11. the circle paſſes; and through the like points in fig. 12. draw the ellipſis, which will be as true a perſpective repreſentation of the circle, as the ſquare in fig. 12. is of the ſquare in fig. 11.

This is Mr Ferguſon's rule for putting a circle in perſpective; but the following rules by *Wolf* are perhaps more univerſal.

If the circle to be put in perſpective be ſmall, deſcribe a ſquare about it. Draw firſt the diagonals of the ſquare, and then the diameters *h a* and *d e* (fig. 1. Plate CCCLXXXIV.) cutting one another at right angles; draw the ſtraight lines *f g* and *b c* paralel to the diameter *d e*. Through *b* and *f* and likewiſe *c* and *g* draw ſtraight lines meeting DE, the ground line of the picture in the points 3 and 4. To the principal point V draw the ſtraight lines 1 V, 3 V, 4 V, 2 V, and to the points of diſtance L and K, 2 L and 1 K. Laſtly, join the points of interſection *a*, *b*, *d*, *f*, *h*, *g*, *e*, *c*, by the arcs *a*, *b*, *b d*, *f*, and *a b d f h g e c a* will be the circle in perſpective.

If the circle be large ſo as to make the foregoing practice inconvenient, biſect the ground line AB, deſcribing, from the point of biſection as a centre, the ſemicircle AGB (fig. 2. Plate CCCLXXXIV.), and from any number of points in the circumference C, F, G, H, I, &c. draw to the ground line the perpendiculars C 1, F 2, G 3, H 4, I 5, &c.: From the points A, 1, 2, 3, 4, 5, B, draw ſtraight lines to the principal point or point of ſight V, likewiſe ſtraight lines from B and A to the points of diſtance L and K. Through the common interſections draw ſtraight lines as in the preceding caſe; and you will have the points *a*, *c*, *f*, *g*, *h*, *i*, *b*, repreſentatives of A, C, F, G, H, I, B. Then join the points *a*, *c*, *f*, &c. as formerly directed, and you have the perſpective circle *a c f g h i b i h g f c a*.

Hence it is apparent how we may put not only a circle but alſo a pavement laid with ſtones of any form in perſpective. It is likewiſe apparent how uſeful the ſquare is in perſpective; for, as in the ſecond caſe, a true ſquare was deſcribed round the circle to be put in perſpective, and divided into ſeveral ſmaller ſquares, ſo in this third caſe we make uſe of the ſemicircle only for the ſake of brevity inſtead of that ſquare and circle.

Prob. 10. *To put a reticulated ſquare in perſpective, as ſeen by a perſon not ſtanding right againſt the middle of either of its ſides, but rather nearly even with one of its corners.*

In fig. 13. Plate CCCLXXXIII, let O be the place of an obſerver, viewing the ſquare ABCD almoſt even with its corner D.—Draw at pleaſure SP for the horizon, parallel to AD, and make SO perpendicular to SP: then S ſhall be the point of ſight, and P the true point of diſtance, if SP be made equal to SO.

Draw AS and DS to the point of ſight, and AP to the point of diſtance, interſecting DS in the point C; then draw BC parallel to AD, and the outlines of the perſpective ſquare will be finiſhed. This done draw the lines which form the leſſer ſquares, as taught in *Prob.* 8. and the work will be completed.—You may put a perſpective circle in this ſquare by the ſame rule as it was done in fig. 12.

Prob. 14. *To put a cube in perſpective, as if viewed by a perſon ſtanding almoſt even with one of its edges, and ſeeing three of its ſides.*

In fig. 16. Plate CCCLXXXIII. let AB be the breadth of either of the ſix equal ſquare ſides of the cube AG; O the place of the obſerver, almoſt even with the edge CD of the cube, S the point of ſight, SP the horizon parallel to AD, and P the point of diſtance taken as before.

Make ABCD a true ſquare; draw BS and CS to the point of ſight, and BP to the point of diſtance, interſecting CS in G.—Then draw FG parallel to BC, and the uppermoſt perſpective ſquare ſide BFGC of the cube will be finiſhed.

Draw DS to the point of ſight, and AP to the point of diſtance, interſecting DS in the point I: then draw GI parallel to CD; and, if the cube be an opaque one, as of wood or metal, all the outlines of it will be finiſhed; and then it may be ſhaded as in the figure.

But if you want a perſpective view of a tranſparent glaſs cube, all the ſides of which will be ſeen, draw AH toward the point of ſight, FH parallel to BA, and HI parallel to AD: then AHID will be the ſquare baſe of the cube, perſpectively parallel to the top BFGC; ABFH will be the ſquare ſide of the cube, parallel to CGID, and FGIH will be the ſquare ſide parallel to ABCD.

As to the ſhading part of the work, it is ſuch mere childrens play, in compariſon of drawing the lines which form the ſhape of any object, that no rules need be given for it. Let a perſon ſit with his left ſide toward a window, and he knows full well, that if any ſolid body be placed on a table before him, the light will fall on the left-hand ſide of the body, and the right-hand ſide will be in the ſhade.

Prob. 15. *To put any ſolid in perſpective.*

Put the baſe of the ſolid, whatever it be, in perſpective by the preceding rules. From each bounding point of the baſe, raiſe lines repreſenting in perſpective the altitude of the object; by joining theſe lines and ſhading the figure according to the directions in the preceding problem, you will have a ſcenographic repreſentation of the object. This rule is general; but as its application to particular caſes may not be apparent, it will be proper to give the following example of it.

Prob. 16. *To put a cube in perſpective as ſeen from one of its angles.*

Since the baſe of a cube ſtanding on a geometrical plane, and ſeen from one of its angles, is a ſquare ſeen from one of its angles, draw firſt ſuch a perſpective ſquare: then raiſe from any point of the ground-line DE (Fig. 3. Plate CCCLXXXIV.) the perpendicular HI equal to the ſide of the ſquare, and draw to any point V in the horizontal line HR the ſtraight lines VI and VH. From the angles *d b* and *c* draw the dotted lines *d* 2 and *c* 1 parallel to the ground line DE. Perpendicular to thoſe dotted lines, and from the points 1 and 2, draw the ſtraight lines L 1 and M 2. Laſtly, ſince HI is the altitude of the intended cube in *a*, L 1 in *c* and *b*, M 2 in *d*, draw from the point *a* the ſtraight line *f a* perpendicular to *a* E, and from the points *b* and *c*, *b g* and *c e*, perpendicular to *b c* 1, and *a b d c* being according to rule, make *a f*=HI, *b g*=*e c* =L 1, and *b d*=M 2. Then, if the points *g*, *b*, *e*, *f*, be joined, the whole cube will be in perſpective.

Prob. 17. *To put a ſquare pyramid in perſpective, as ſtanding upright on its baſe, and viewed obliquely.*

In fig. 4. n° 1. of Plate CCCLXXXIV. let AD be the breadth of either of the four ſides of the pyramid ATCD at its baſe ABCD; and MT its perpendicular height. Let O be the place of the obſerver, S his point of ſight, SE his horizon, parallel to AD and perpendicular to OS; and let the proper point of diſtance be taken in SE produced toward the left hand, as far from S as O is from S.

Draw AS and DS to the point of ſight, and DL to the point of diſtance, interſecting AS in the point B. Then, from B, draw BC parallel to AD; and ABCD ſhall be the perſpective ſquare baſe of the pyramid.

Draw the diagonal AC, interſecting the other diagonal BD at M, and this point of interſection ſhall be the centre of the ſquare baſe.

Draw MT perpendicular to AD, and of a length equal to the intended height of the pyramid: then draw the ſtraight outlines AT, CT, and DT; and the outlines of the pyramid (as viewed from O) will be finiſhed; which being done, the whole may be ſo ſhaded as to give it the appearance of a ſolid body.

If the obſerver had ſtood at *o*, he could have only ſeen the ſide ATD of the pyramid; and two is the greateſt number of ſides that he could ſee from any other place of the ground. But if he were at any height above the pyramid, and had his eye directly over its top, it would then appear as in N° 2. and he would ſee all its four ſides E, F, G, H, with its top *t* juſt over the centre of its ſquare baſe ABCD; which would be a true geometrical and not a perſpective ſquare.

Prob. 18. *To put two equal ſquares in perſpective, one of which ſhall be directly over the other, at any given diſtance from it, and both of them parallel to the plane of the horizon.*

In fig. 5. Plate CCCLXXXIV. let ABCD be a perſpective ſquare on a horizontal plane, drawn according to the foregoing rules, S being the point of ſight, SP the horizon (parallel to AD), and P the point of diſtance.

Suppoſe AD, the breadth of this ſquare, to be three feet; and that it is required to place juſt ſuch another ſquare EFGH directly above it, parallel to it and two feet from it.

Make AE and DH perpendicular to AD, and two thirds of its length: draw EH, which will be equal and parallel to AD, then draw ES and HS to the point of ſight S, and EP to the point of diſtance P, interſecting HS in the point G: this done, draw FG parallel to EH; and you will have two perſpective ſquares ABCD and EFGH, equal and parallel to one another, the latter directly above the former, and two feet diſtant from it; as was required.

By this method ſhelves may be drawn parallel to one another, at any diſtance from each other in proportion to their length.

Prob. 19. *To put a truncated pyramid in perſpective.*

Let the pyramid to be put in perſpective be quinquangular. If from each angle of the ſurface whence the top is cut off, a perpendicular be ſuppoſed to fall upon the baſe, theſe perpendiculars will mark the bounding points of a pentagon, of which the ſides will be parallel to the ſides of the baſe of the pyramid within which it is inſcribed. Join theſe points, and the interior pentagon will be formed with its longeſt ſide parallel to the longeſt ſide of the baſe of the pyramid. From the ground-line EH (Fig. 6. Plate CCCLXXXIV.) raiſe the perpendicular IH, and make it equal to the altitude of the intended pyramid. To any point V draw the ſtraight lines IV and HV, and by a proceſs ſimilar to that in Problem 16. determine the ſcenographical altitudes *a*, *b*, *c*, *d*, *e*. Connect the upper points *f*, *g*, *h*, *i*, *k*, by ſtraight lines; and draw *l k*, *f m*, *g n*, and the perſpective of the truncated pyramid will be completed.

Cor. If in a geometrical plane two concentric circles be deſcribed, a truncated cone may be put in perſpective in the ſame manner as a truncated pyramid.

Prob. 20. *To put in perſpective a hollow priſm lying on one of its ſides.*

Let ABDEC (fig. 7. n° 1.) be a ſection of ſuch a priſm. Draw HI parallel to AB, and diſtant from it the breadth of the ſide on which the priſm reſts; and from each angle internal and external of the priſm let fall perpendiculars to HI. The parallelogram will be thus divided by the ichnographical proceſs below the ground-line, ſo as that the ſide AB of the real priſm will be parallel to the correſponding ſide of the ſcenographic view of it.—To determine the altitude of the internal and external angles. From H (n° 2.) raiſe HI perpendicular to the ground-line, and on it mark off the true altitudes H 1, H2, H3, H4, and H5. Then if from any point V in the horizon be drawn the ſtraight lines VH, V1, V2, V3, V4, V5 or VI; by a proceſs ſimilar to that of the preceding problem, will be determined the heighth of the internal angles, viz. 1=*a a*, 2=*b b*, 4=*d d*; and of the external angles, 3=*c c*, and 5=*e e*; and when theſe angles are formed and put in their proper places, the ſcenograph of the priſm is complete.

Prob. 21. *To put a ſquare table in perſpective, ſtanding on four upright ſquare legs of any given length with reſpect to the breadth of the table*

In fig. 5. Plate CCCLXXXIV. let ABCD be the ſquare part of the floor on which the table is to ſtand, and EFGH the ſurface of the ſquare table, parallel to the floor.

Suppoſe the table to be three feet in breadth, and its height from the floor to be two feet; then two thirds of AD or EH will be the length of the legs *i* and *k*; the other two (*l* and *m*) being of the ſame length in perſpective.

Having drawn the two equal and parallel ſquares ABCD and EFGH, as ſhown in Prob. 10. let the legs be ſquare in form, and fixed in the table at a diſtance from its edges equal to their thickneſs. Take A*a* and D*d* equal to the intended thickneſs of the legs, and *a b* and *d c* alſo equal thereto. Draw the diagonals AC and BD, and draw ſtraight lines from the points *a*, *b*, *c*, *d*, toward the points of ſight S, and terminating at the ſide BC. Then, through the points where theſe lines cut the diagonals, draw the ſtraight lines *n* and *o*, *p* and *q*, parallel to AD; and you will have formed four perſpective ſquares (like ABCD in fig. 4 nº 1.) for the baſes of the four legs of the table: and then it is eaſy to draw the four upright legs by parallel lines, all perpendicular to AD; and to ſhade them as in the figure.

To repreſent the intended thickneſs of the table-board, draw *e h* parallel to EH, and HG toward the point of ſight S: then ſhade the ſpaces between theſe lines, and the perſpective figure of the table will be finiſhed.

Prob. 22. *To put five ſquare pyramids in perſpective, ſtanding upright on a ſquare pavement compoſed of the ſurfaces of* 81 *cubes.*

In fig. 8. Plate CCCLXXXIV. let ABCD be a perſpective ſquare drawn according to the foregoing rules; S the point of ſight, P the point of diſtance in the horizon PS, and AC and BD the two diagonals of the ſquare.

Divide the ſide AD into 9 equal parts (becauſe 9 times 9 is 81) as A*a*, *a b*, *b c*, &c. and from theſe points of diviſion, *a*, *b*, *c*, *d*, &c. draw lines toward the point of ſight S. terminating at the furthermoſt ſide BC of the ſquare. Then, through the points where theſe lines cut the diagonals, draw ſtraight lines parallel to AD, and the perſpective ſquare ABCD will be ſubdivided into 81 leſſer ſquares, repreſenting the upper ſurfaces of 81 cubes, laid cloſe to one another's ſides in a ſquare form.

Draw AK and DL, each equal to A*a*, and perpendicular to AD; and draw LN toward the point of ſight S: then draw KL parallel to AD, and its diſtance from AD will be equal to A*a*.—This done, draw *a l*, *b m*, *c n*, *d o*, *e p*, *f q*, *g r*, and *h s*, all parallel to AK; and the ſpace ADLK will be ſubdivided into nine equal ſquares, which are the outer upright ſurfaces of the nine cubes in the ſide AD of the ſquare ABCD.

Draw LN toward the point of ſight S; and from the points where the lines, which are parallel to AD in this ſquare, meet the ſide CD thereof, draw ſhort lines to LN, all parallel to DL, and they will divide that ſide into the outer upright ſurfaces of the nine cubes which compoſe it: and then the outſides of all the cubes that can be viſible to an obſerver, placed at a proper diſtance from the corner D of the ſquare, will be finiſhed.

As taught in Prob. 17. place the pyramid AE upright on its ſquare baſe A*t v a*, making it as high as you pleaſe; and the pyramid DH on its ſquare baſe *b u w* D, of equal height with AE.

Draw EH from the top of one of theſe pyramids to the top of the other; and EH will be parallel to AD.

Draw ES and HS to the point of ſight S, and HP to the point of diſtance P, interſecting ES in F.

From the point F, draw FG parallel to EH; then draw EG, and you will have a perſpective ſquare EFGH (parallel to ABCD) with its two diagonals EG and FH, interſecting one another in the centre of the ſquare at I. The four corners of this ſquare, E, F, G, H, give the perſpective heights of the four pyramids AE, BF, CG, and DH; and the interſection I of the diagonals gives the height of the pyramid MI, the centre of whoſe baſe is the centre of the perſpective ſquare ABCD.

Laſtly, place the three pyramids BF, CG, MI, upright on their reſpective baſes at B, C, and M; and the required perſpective repreſentation will be finiſhed, as in the figure.

Prob. 23. *To put upright pyramids in perſpective, on the ſide of an oblong ſquare or parallelogram; ſo that their diſtances from one another ſhall be equal to the breadth of the parallelogram.*

In moſt of the foregoing operations we have conſidered the obſerver to be ſo placed, as to have an oblique view of the perſpective objects: in this, we ſhall ſuppoſe him to have a direct view of fig. 8. Plate CCCLXXXIV. that is, ſtanding right againſt the middle of the end AD which is neareſt to his eye, and viewing AD under an angle of 60 degrees.

Having cut AD in the middle, by the perpendicular line S*s*, take S therein at pleaſure for the point of ſight, and draw ES for the horizon, parallel to AD.—Here S *s* muſt be ſuppoſed to be produced downward, below the limits of the plate, to the place of the obſerver; and SE to be produced towards the left hand beyond E, far enough to take a proper point of diſtance therein, according to the foregoing rules.

Take A*d* at pleaſure, and D*g* equal to a A*d*, for the breadths of the ſquare baſes of the two pyramids AE and DF next the eye: then draw AS and *d*S, and likewiſe DS and *g*S, to the point of ſight S; and DG on to the point of diſtance, interſecting AS in G: then, from G draw GI parallel to AD, and you will have the firſt perſpective ſquare AGID of the parallelogram ABCD.

From I draw IH to (or toward) the point of diſtance, interſecting AS in H; then, from H draw

HK parallel to AD, and you will have the ſecond perſpective ſquare GHKI of the parallolegram.—Go on in this manner till you have drawn as many perſpective ſquares up towards S as you pleaſe.

Through the point *e*, where DG interſects *g* S, draw *b f* parallel to AD; and you will have formed the two perſpective ſquare baſes A *b c d* and *e f* D *g* of the two pyramids at A and D.

From the point *f* (the upper outward corner of *e f* D*g*) draw *f h* toward the point of diſtance, till it meets AS in *h*: then, from this point of meeting, draw *h m* parallel to GI, and you will have formed the two perſpective ſquares G *h i k* and *l m* I *n*, for the ſquare baſes of the two pyramids at G and I.

Proceed in the ſame manner to find the baſes of all the other pyramids, at the corners of the reſt of the perſpective ſquares in the parallelogram ABCD, as ſhown by the figure.—Then,

Having placed the firſt two pyramids at A and D upright on their ſquare baſes, as ſhown in Prob. 9. and made them of any equal heights at pleaſure, draw ES and FS from the tops of theſe pyramids to the point of ſight S: place all the reſt of the pyramids upright on their reſpective baſes, making their tops touch the ſtraight lines ES and FS; and all the work, except the ſhading part, will be finiſhed

Prob. 24. *To put a ſquare pyramid of equal ſized cubes in perſpective.*

Fig. 2. Plate CCCLXXXV. repreſents a pyramid of this kind; conſiſting as it were of ſquare tables of cubes, one table above another; 81 in the loweſt, 49 in the next, 25 in the third, 9 in the fourth, and 1 in the fifth or uppermoſt. Theſe are the ſquare numbers of 9, 7, 5, 3, and 1.

If the artiſt is already maſter of all the preceeding operations, he will find leſs difficulty in this than in attending to the following deſcription of it; for it cannot be deſcribed in a few words, but may be executed in a very ſhort time.

In fig. 1. having drawn PS for the horizon, and taken S for the point of ſight therein (the obſerver being at O) draw AD parallel to PS for the ſide (next the eye) of the firſt or lowermoſt table of cubes. Draw AS and DS to the point of ſight S, and DP to the point of diſtance P, interſecting AS in the point B. Then, from B, draw BC parallel to AD, and you will have the ſurface ABCD of the firſt table.

Divide AD into nine equal parts, as A *a*, *a b*, *b c*, *c d*, &c. then make AK and DL equal to A *a*, and perpendicular to AD. Draw KL parallel to AD, and from the points of equal diviſion at *a*, *b*, *c*, &c. draw lines to KL, all parallel to AK. Then draw *h* S to the point of ſight S, and from the diviſion-points *a*, *b*, *e*, &c. draw lines with a black lead pencil, all tending towards the point of ſight, till they meet the diagonal BD of the ſquare.

From theſe points of meeting draw black lead lines to DC, all parallel to AD; then draw the parts of theſe lines with black ink which are marked 1, 2, 3, 4, &c. between *h* E and DC.

Having drawn the firſt of theſe lines *β q* with black ink, draw the parts *a i*, *b k*, *c l*, &c. (of the former lines which met the diagonal BD) with black ink alſo; and rub out the reſt of the black lead lines, which would otherwiſe confuſe the following part of the work. Then, draw LF toward the point of ſight S; and, from the points where the lines 1, 2, 3, 4, &c. meet the line DC, draw lines down to LF, all parallel to DL; and all the viſible lines between the cubes in the firſt table will be finiſhed.

Make *i*G equal and perpendicular to *βi*, and *q*M equal and parallel to *i*G: then draw GM, which will be equal and parallel to *i q*. From the points *k l*, *m n*, &c. draw *k n*, *l o*, *m p*, &c. all parallel to *i*G, and the outſides of the ſeven cubes in the ſide G*q* of the ſecond table will be finiſhed.

Draw GS and MS to the point of ſight S, and MP to the point of diſtance P, interſecting GS in H; then, from the point of interſection H, draw HI parallel to AD; and you will have the ſurface GHIM of the ſecond table of cubes.

From the points *n*, *o*, *p*, *q*, &c. draw black lead lines towards the point of ſight S, till they meet the diagonal MH of the perſpective ſquare ſurface GHIM; and draw *s*M, with black ink, toward the point of ſight.

From thoſe points where the lines drawn from *n*, *o*, *p*, *q*, &c. meet the diagonal MH, draw black lead lines to MI, all parallel to AD; only draw the whole firſt line *γ* 1 with black ink, and the parts 2, 3, 4, &c. and *n t*, *o u*, *p v*, &c. of the other lines between *y* N and MI, and GM and *γ* 1, with the ſame; and rub out all the reſt of the black lead lines, to avoid further confuſion. Then, from the points where the ſhort lines 1, 2, 3, &c. meet the line MI, draw lines down to *q*E, all parallel to M*q*, and the outer ſurfaces of the ſeven cubes in the ſide ME will be finiſhed: and all theſe laſt lines will meet the former parallels 2, 3, 4, &c. in the line *q*E.

Make *t*O equal and perpendicular to *γ t*, and *y* P equal and parallel to *t*O; then draw OP, which will be equal and parallel to *ty*.—This done, draw OS and PS to the point of ſight S, and PP to the point of diſtance P in the horizon. Laſtly, from the point Q, where PP interſects OS, draw QR parallel to OP; and you will have the outlines OQRP of the ſurface of the third perſpective table of cubes.

From the points *u*, *v*, *w*, *x*, draw upright lines to OP, and parallel to *t*O, and you will have the outer ſurfaces of the five cubes in the ſide O*y* of this third table.

From the points where theſe upright lines meet OP, draw lines toward the point of ſight S, till they meet the diagonal PQ; and from theſe points of meeting draw lines to PR, all parallel to OP, making the parts 2, 3, 4, 5, of theſe lines with black ink which lie between ZY and PR. Then, from the points where theſe lines meet PR, draw lines down to *y* N; which will bound the outer ſurface of the five cubes in the ſide PN of the third table.

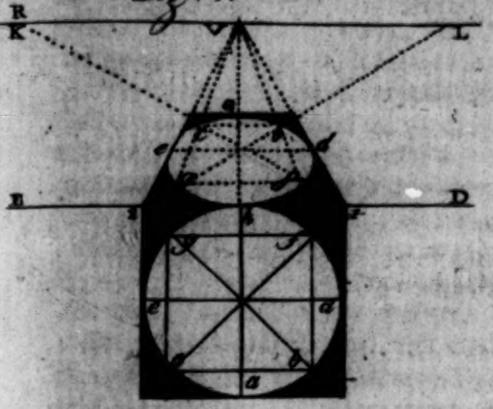
Draw the line *δ* 1 with black ink; and, at a fourth part of its length between *δ* and Z, draw an upright line to S, equal in length to that fourth part, and another equal and parallel thereto from Z to V: then draw SV parallel to *δ*Z, and draw the two upright and equidiſtant lines between *δ*Z and SV, and you will have the outer ſurfaces of the three cubes in the ſide SZ of the fourth table.

Draw SS and VS to the point of ſight S in the horizon, and VP to the point of diſtance therein, interſecting

PERSPECTIVE.

Plate CCCLXXXIV.

Fig. 1.


R
K
V
L
e
c
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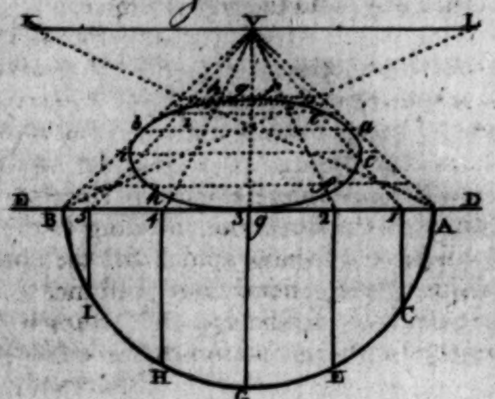
D
a

Fig. 2.


K
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5
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2
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Fig. 4. N.° 1.

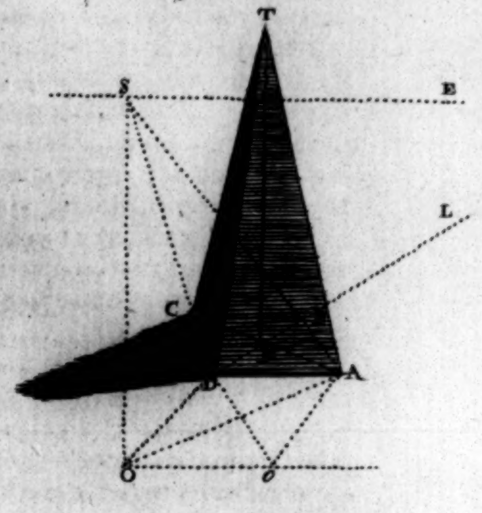

Fig. 5.

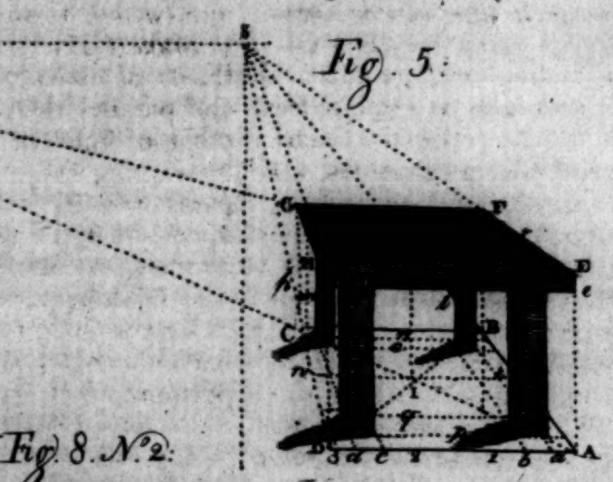
Horizon.
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Fig. 3.

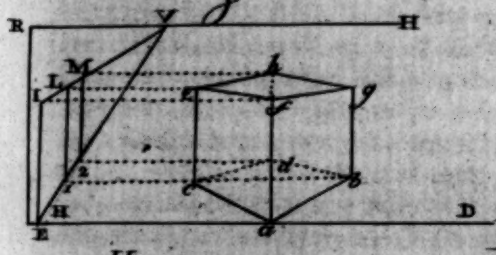
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Fig. 4. N.° 2.

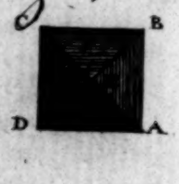

Fig. 8. N.° 2.

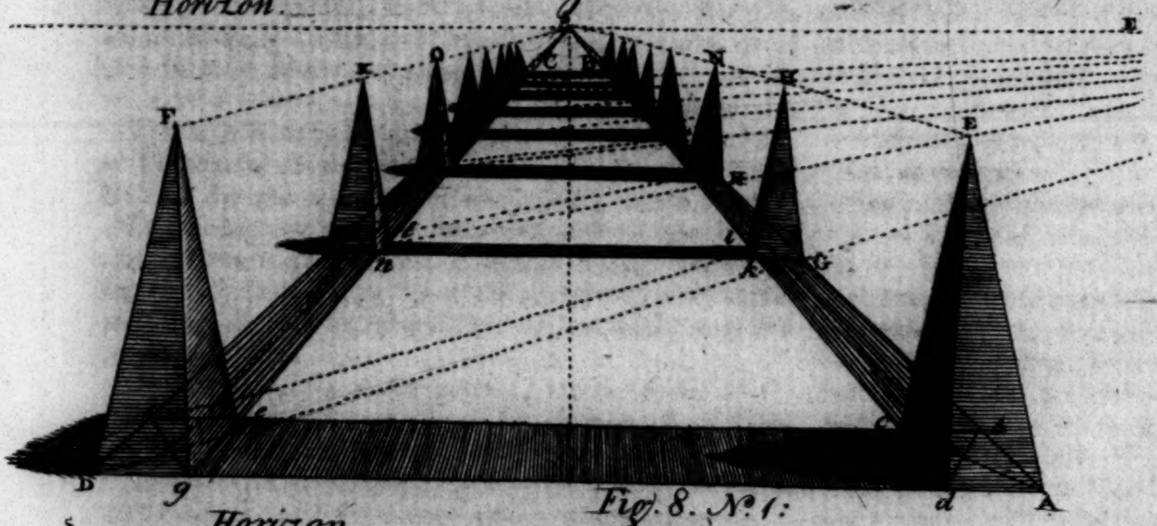
Horizon.
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Fig. 6.

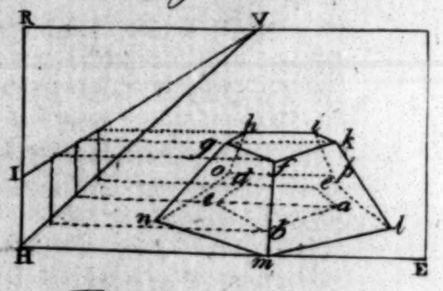
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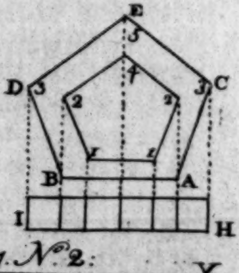
Fig. 7. N.° 1.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2
1

Fig. 8. N.° 1.

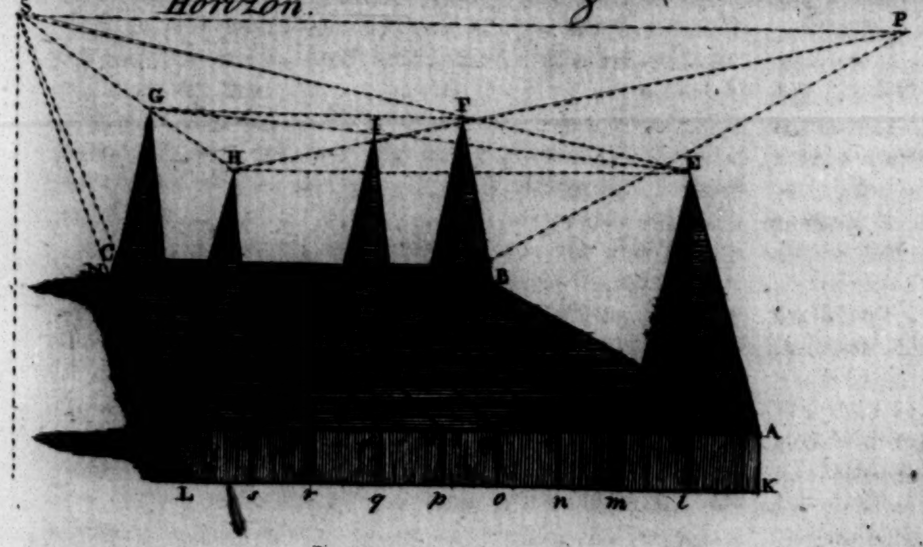
Horizon.
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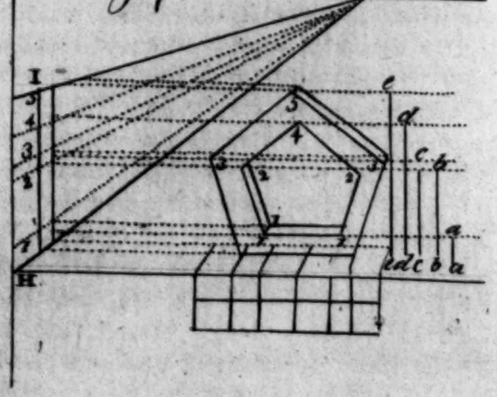
Fig. 7. N.° 2.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terſecting SS in T; then draw TU parallel to SV, and you have STUV, the ſurface of the fourth table; which being reticulated or divided into 9 perſpective ſmall ſquares, and the uppermoſt cube W placed on the middlemoſt of the ſquares, all the outlines will be finiſhed; and when the whole is properly ſhaded, as in fig. 2. the work will be done.

Prob. 25. *To repreſent a double croſs in perſpective.*

In fig. 3. Plate CCCLXXXV. let ABCD and EFGH be two perſpective ſquares, equal and parallel to one another, the uppermoſt directly above the lowermoſt, drawn by the rules already laid down, and as far aſunder as is equal to the given height of the upright part of the croſs; S being the point of ſight, and P the point of diſtance, in the horizon PS taken parallel to AD.

Draw AE, DH, and CG; then AEHD and DHGC ſhall be the two viſible ſides of the upright part of the croſs; of which, the length, AE is here made equal to three times the breadth EH.

Divide DH into three equal parts, HI, IK, and KD. Through theſe points of diviſion, at I and K, draw MO and PR parallel to AD; and make the parts MN, IO, PQ, KR, each equal to HI: then draw MP and OR parallel to DH.

From M and O, draw MS and OS to the point of ſight S; and from the point of diſtance P draw PN cutting MS in T: from T draw TU parallel to MO, and meeting OS in U; and you will have the uppermoſt ſurface MTUO of one of the croſs pieces of the figure.——From R, draw RS to the point of ſight S; and from U draw UV parallel to OR; and OUVR ſhall be the perſpective ſquare end next the eye of that croſs part.

Draw PM*x* (as long as you pleaſe) from the point of diſtance P, through the corner M; lay a ruler to N and S, and draw XN from the line P*x*:—then lay the ruler to I and S, and draw YZS.—Draw XY parallel to MO, and make XW and YB equal and perpendicular to XY: then draw WB parallel to XY, and WXYB ſhall be the ſquare viſible end of the other croſs-part of the figure.

Draw BK towards the point of ſight S; and from U draw UP to the point of diſtance P, interſecting YS in Z: then, from the Interſection Z, draw Z*a* parallel to MO, and Z*b* parallel to HD, and the whole delineation will be finiſhed.

This done, ſhade the whole, as in fig. 4. and you will have a true perſpective repreſentation of a double croſs.

Prob. 26. *To put three rows of upright ſquare objects in perſpective, equal in ſize, and at equal diſtances from each other, on an oblong ſquare plane, the breadth of which ſhall be of any aſſigned proportion to the length thereof.*

Fig. 5. Plate CCCLXXXV, is a perſpective repreſentation of an oblong ſquare plane, three times as long as it is broad, having a row of nine upright ſquare objects on each ſide, and one of the ſame number in the middle; all equally high, and at equal diſtances from one another, both long wiſe and croſswiſe, on the ſame plane.

In fig. 6. PS is the horizon, S the point of ſight, P the point of diſtance, and AD (parallel to PS) the breadth of the plane.

Draw AS, NS, and DS, to the point of ſight S; the point N being in the middle of the line AD: and draw DP to the point of diſtance P, interſecting AS in the point B: then, from B draw BC parallel to AD, and you have the perſpective ſquare ABCD.

Through the point *i*, where DB interſects NS, draw *a e* parallel to AD; and you will have ſubdivided the perſpective ſquare ABCD into four leſſer ſquares, as A *a i* N, N *i e* D, *a* B *k i*, and *i k* C *e*.

From the point C (at the top of the perſpective ſquare ABCD) draw CP to the point of diſtance P, interſecting AS in E; then, from the point E draw EF parallel to AD; and you will have the ſecond perſpective ſquare BEFC.

Through the point *l*, where CE interſects NS, draw *b f* parallel to AD; and you will have ſubdivided the ſquare BEFC into the four ſquares B *b l k*, *k l f* C, *b* E *m l*, and *l m* F *f*.

From the point F (at the top of the perſpective ſquare BEFG draw EP to the point of diſtance P, interſecting AS in I; then from the point I draw IK parallel to AD; and you will have the third perſpective ſquare EIKF.

Through the point *n*, where FI interſects NS, draw *c g* parallel to AD; and you will have ſubdivided the ſquare EIKF into four leſſer ſquares, E *c n m*, *m n g* F, *c* I *o n*, and *n o* K *g*.

From the point K (at the top of the third perſpective ſquare EIKF) draw KP to the point of diſtance P, interſecting AS in L; then from the point L draw LM parallel to AD; and you will have the fourth perſpective ſquare ILMK.

Through the point *p*, where KL interſects NS, draw *d h* parallel to AD; and you will have ſubdivided the ſquare ILMK into the four leſſer ſquares I *d p o*, *o p h* K, *d* L *q p*, and *p q* M *h*.

Thus we have formed an oblong ſquare ALMD, whoſe perſpective length is equal to four times its breadth, and it contains 16 equal perſpective ſquares.—If greater length was ſtill wanted, we might proceed further on toward S.

Take A 3, equal to the intended breadth of the ſide of the upright ſquare objects AQ (all the other ſides being of the ſame breadth), and AO for the intended height. Draw O 18 parallel to AD, and make D 8 and 4 7 equal to A 3; then draw 3 S, 4 S, 7 S, and 8 S to the point of ſight S; and among them we ſhall have the perſpective ſquare baſes of all the 27 upright objects on the plane.

Through the point 9, where DB interſects 8 S, draw 1 10 parallel to AD, and you have the three perſpective ſquare baſes A 1 2 3, 4 5 6 7, 8 9 10 D, of the three upright ſquare objects at A, N, and D.

Through the point 21, where *e b* interſects 8 S, draw 14, 11 parallel to AD; and you will have the three perſpective ſquares *a* 14 15 16 17 18 19 20, and 21 11 *e* 22, for the baſis of the ſecond croſs row of objects; namely, the next beyond the firſt three at A, N, and D.

Through the point *w*, where CE interſects 8 S, draw a line parallel to BC; and you will have three perſpective ſquares, at B, *k*, and C, for the baſes of the third row of objects; one of which is ſet up at B.

Through the point *x*, where *f c* interſects 8 S, draw a line parallel to *b f*; and you will have three perſpective ſquares, at *b*, *l*, and *x*, for the baſes of the fourth croſs row of objects.

Go on in this manner, as you ſee in the figure, to find the reſt of the ſquare baſes, up to LM; and you will have 27 upon the whole oblong ſquare plane, on which you are to place the like number of objects, as in fig. 5.

Plate CCCLXXXV.

Having aſſumed AO for the perſpective height of the three objects at A, N, and D (fig. 6.) next the obſerver's eye, and drawn O 18 parallel to AD, in order to make the objects at N and D of the ſame height as that at O; and having drawn the upright lines 4 15, 7 W, 8 X, and D 22, for the heights N and D; draw OS and RS, 15 S and WS, XS and 22 S, all to the point of ſight S: and theſe lines will determine the perſpectively equal heights of all the reſt of the upright objects, as ſhown by the two placed at *a* and B.

To draw the ſquare tops of theſe objects, equal and parallel to their baſes, we need only give one example, which will ſerve for all.

Draw 3 R and 2 Q parallel to AO, and up to the line RS; then draw PQ parallel to OR, and OPQR ſhall be the top of the object at A, equal and parallel to its ſquare baſe A 1 2 3.—In the ſame eaſy way the tops of all the other objects are formed.

When all the reſt of the objects are delineated, ſhade them properly, and the whole perſpective ſcheme will have the appearance of fig. 5.

Prob. 27. *To put a ſquare box in perſpective, containing a given number of leſſer ſquare boxes of a depth equal to their width.*

Let the given number of little ſquare boxes or cells be 16, then 4 of them make the length of each ſide of the four outer ſides *ab*, *bc*, *cd*, *da*, as in fig. 7. and the depth *af* is equal to the width *ae*. Whoever can draw the reticulated ſquare, by the rules laid down towards the beginning of this article, will be at no loſs about putting this perſpective ſcheme in practice.

Prob. 28. *To put ſtairs with equal and parallel ſteps in perſpective.*

In fig. 1. of Plate CCCLXXXVI. let *a b* be the given breadth of each ſtep, and *a i* the height thereof. Make *b c*, *c d*, *d e*, &c. each equal to *a b*; and draw all the upright lines *a i*, *b l*, *c n*, *d p*, &c. perpendicular to *a b* (to which the horizon *s* S is parallel); and from the points *i*, *l*, *n*, *p*, *r*, &c. draw the equidiſtant lines *i* B, *l* C, *n* D, &c. parallel to *a b*; theſe diſtances being equal to that of *i* B from *a b*.

Draw *x i* touching all the corner-points *l*, *n*, *p*, *r*, *t*, *v*; and draw 2 16 parallel to *x i*, as far from it as you want the length of the ſteps to be.

Toward the point of ſight S draw the lines *a* 1, *i* 2, *k* 3, *l* 4, &c. and draw 16 15, 14 13, 12 11, 10 9, 8 7, 6 5, 4 3, and 2 1, all parallel to A*b*, and meeting the lines *w* 15, *u* 13, *s* 11, &c. in the points 15, 13, 11, 9, 7, 5, 3, and 1: then from theſe points draw 15 14, 13 12, 11 10, 9 8, 7 6, 5 4, and 3 2, all parallel to *b a*; and the outlines of the ſteps will be finiſhed. From the point 16 draw 16 A parallel to *b a*, and A *x* 16 will be part of the flat at the top of the uppermoſt ſtep. This done, ſhade the work as in fig. 2. and the whole will be finiſhed.

Prob. 29. *To put ſtairs with flats and openings in perſpective, ſtanding on a horizontal pavement of ſquares.*

In fig. 3. of Plate CCCLXXXVI. having made S the point of ſight, and drawn a reticulated pavement AB with black lead lines, which may be rubbed out again; at any diſtance from the ſide AB of the pavement which is neareſt to the eye, and at any point where you chooſe to begin the ſtair at that diſtance, as *a*, draw G*a* parallel to BA, and take *a b* at pleaſure for the height of each ſtep.

Take *a b* in your compaſſes, and ſet that extent as many times upward from F to E as is equal to the firſt required number of ſteps O, N, M, L, K; and from theſe points of diviſion in EF draw 1*b*, 2*d*, 3*f*, 4*h*, and E*k*, all equidiſtant from one another, and parallel to F*a*: then draw the equidiſtant upright lines *a b*, *t d*, *u f*, *v h*, *w k*, and I *m*, all perpendicular to F*a*: then draw *m b*, touching the outer corners of theſe ſteps at *m*, *k*, *h*, *f*, *d*, and *b*; and draw *n s* parallel to *m b*, as far from it as you want the length of the ſteps K, L, M, N, O to be.

Towards the point of ſight S draw *m n*, *l* 5, *k o*, *i*6, *h p*, *f q*, *d r*, and *b s*. Then (parallel to the bottom-line BA) through the points *n*, *o*, *p*, *q*, *r*, *s*, draw *n* 8; 5, 14; 6, 15: 7, 16; 1, 17; and 2 *s*: which done, draw *n* 5 and *o* 6 parallel to *l m*, and the outlines of the ſteps K, L, M, N, O will be finiſhed.

At equal diſtances with that between the lines marked 8 and 14, draw the parallel lines above marked 9 10 11 12 and 13; and draw perpendicular lines upwards from the points *n*, *o*, *p*, *q*, *r*, *s*, as in the figure.

Make H *m* equal to the intended breadth of the flat above the ſquare opening at the left hand, and draw HW toward the point of ſight S, equal to the intended length of the flat; then draw WP parallel to H *m*, and the outlines of the flat will be finiſhed.

Take the width of the opening at pleaſure, as from F to C, and draw CD equal and parallel to FE. Draw GH parallel to CD, and the ſhort lines marked 33, 34, &c. juſt even with the parallel lines 1, 2, &c. From the points where theſe ſhort lines meet CD draw lines toward the point of ſight S till they meet DE; then from the points where the lines 38, 39, 40, &c. of the pavement meet C *y*, draw upright lines parallel to CD; and the lines which form the opening will be finiſhed.

The ſteps P, Q, R, S, T, and the flat U above the arch V, are done in the ſame manner with thoſe in fig. 1. as taught in Prob. 28. and the equidiſtant parallel lines marked 18, 19, &c. are directly even with thoſe on the left-hand ſide of the arch V, and the upright lines on the right hand ſide are equidiſtant with thoſe on the left.

From the points where the lines 18, 19, 20, &c. meet the right-hand ſide of the arch, draw lines toward the point of ſight S; and from the points where the pavement lines 29, 30, 31, 32, meet the line drawn from A towards the point of ſight, draw upright lines toward the top of the arch.

Having done the top of the arch, as in the figure, and the few ſteps to the right hand thereof, ſhade the whole as in fig. 4. and the work will be finiſhed.

Prob. 30. *To put upright conical objects in perſpective, as if ſtanding on the ſides of an oblong ſquare, at diſtances from one another equal to the breadth of the oblong.*

In fig. 5. of Plate CCCLXXXVI. the baſes of the upright cones are perſpective circles inſcribed in ſquares of the ſame diameter; and the cones are ſet upright

on

Fig. 1.

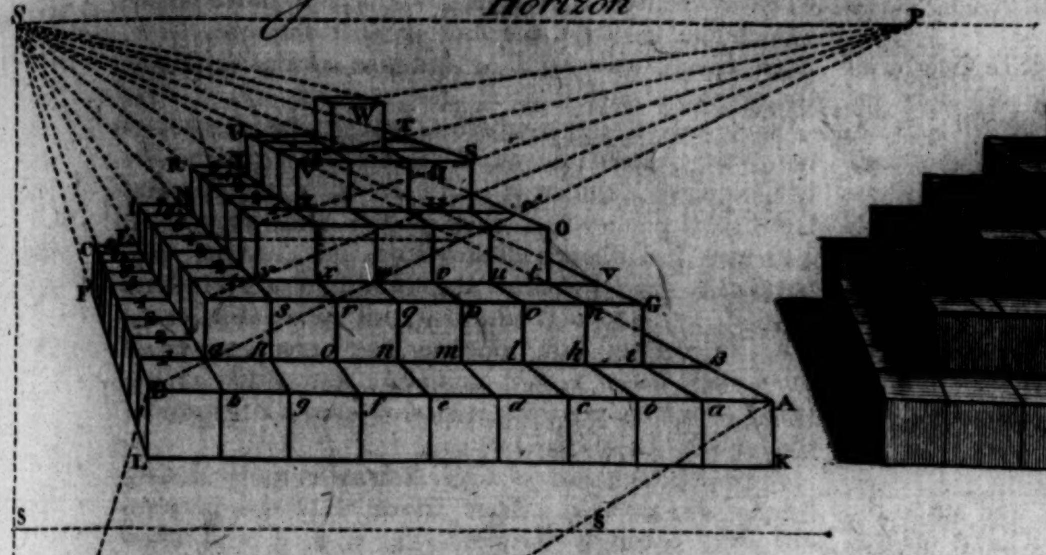
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Fig. 2.

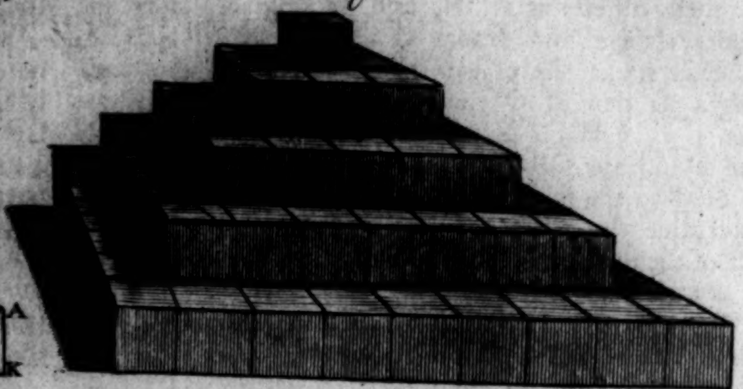

Fig. 3

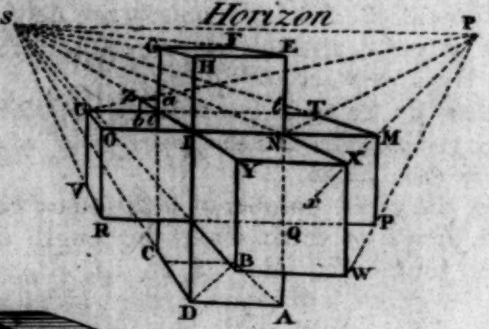
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Fig. 5.

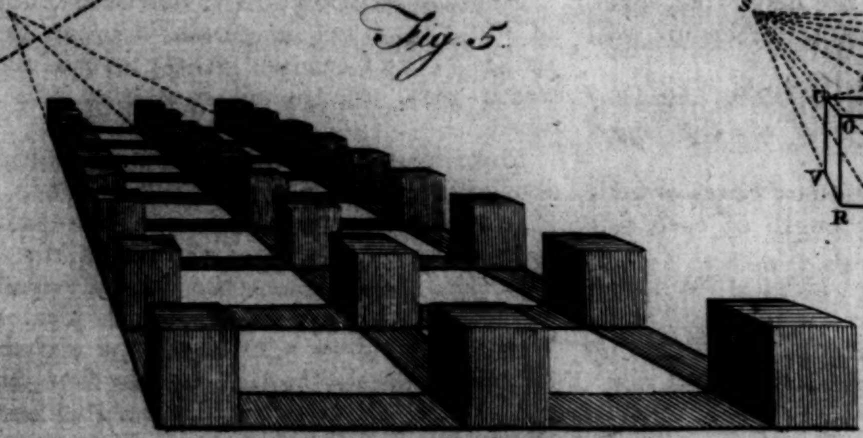

Fig. 7

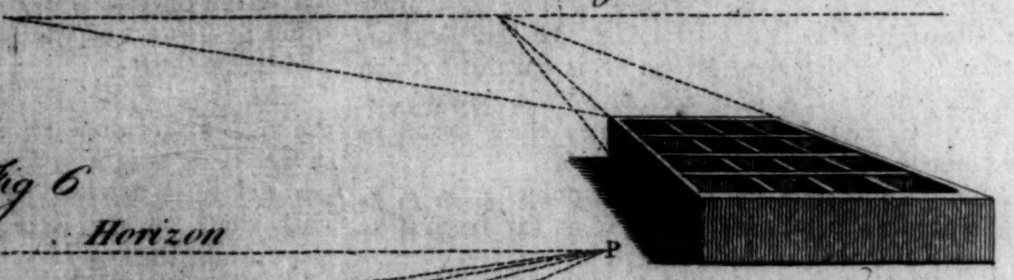

Fig 6

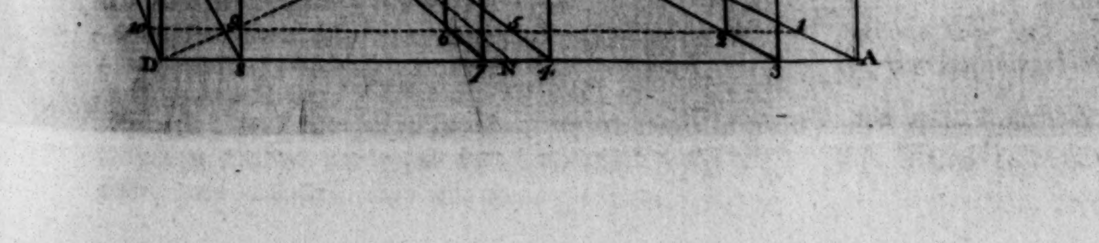
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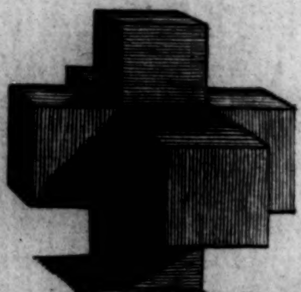
Fig. 4.



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on their baſes by the ſame rules as are given for pyramids, which we need not repeat here.

In moſt of the foregoing operations we have conſidered the obſerver's eye to be above the level of the tops of all the objects, as if he viewed them when ſtanding on high ground. In this figure, and the firſt and ſecond of the next plate, we ſhall ſuppoſe him to be ſtanding on low ground, and the tops of the objects to be above the level of his eye.

Plate CCCLXXVI.

In fig. 5. let AD be the perſpective breadth of the oblong ſquare ABCD; and let A*a* and D*d* (equal to A*a*) be taken for the diameters of the circular baſes of the two cones next the eye, whoſe intended equal heights ſhall be AE and DF.

Having made S the point of ſight in the horizon parallel to AD, and found the proper point of diſtance therein, draw AS and *a*S to contain the baſes of the cones on the left-hand ſide, and DS and *d*S for thoſe on the right.

Having made the two firſt cones at A and D of equal height at pleaſure, draw ES and FS from their tops to the point of ſight, for limiting the perſpective heights of all the reſt of the cones. Then divide the parallelogram ABCD into as many equal perſpective ſquares as you pleaſe; find the baſis of the cones at the corners of theſe ſquares, and make the cones thereon, as in the figure.

If you would repreſent a ceiling equal and parallel to ABCD, ſupported on the tops of theſe cones, draw EF, then EFGH ſhall be the ceiling; and by drawing *ef* parallel to EF, you will have the thickneſs of the floor-boards and beams, which may be what you pleaſe.

This ſhows how any number of equidiſtant pillars may be drawn of equal heights to ſupport the ceiling of a long room, and how the walls of ſuch a room may be repreſented in perſpective at the backs of theſe pillars. It alſo ſhows how a ſtreet of houſes may be drawn in perſpective.

Prob. 31. *To put a ſquare hollow in perſpective, the depth of which ſhall bear any aſſigned proportion to its width.*

Fig. 1. of Plate CCCLXXXVII. is the repreſentation of a ſquare hollow, of which the depth AG is equal to three times its width AD; and S is the point of ſight over which the obſerver's eye is ſuppoſed to be placed, looking perpendicularly down into it, but not directly over the middle.

Draw AS and DS to the point of ſight S; make ST the horizon parallel to AD, and produce it to ſuch a length beyond T that you may find a point of diſtance therein not nearer S than if AD was ſeen under an angle of 60 degrees.

Draw DU to the point of diſtance, interſecting AS in B; then from the point B draw BC parallel to AD; and you will have the firſt perſpective ſquare ABCD, equal to a third part of the intended depth.

Draw CV to the point of diſtance, interſecting AS in E; then from the point E draw EF parallel to AD; and you will have the ſecond perſpective ſquare BEFC, which, added to the former one, makes two-thirds of the intended depth.

Draw FW to the point of diſtance, interſecting AS in G; then from the point G draw GH parallel to AD; and you will have the third perſpective ſquare EGHF, which, with the former two, makes the whole depth AGHD three times as great as the width AD, in a perſpective view.

Divide AD into any number of equal parts, as ſuppoſe 8; and from the diviſion-points *a*, *b*, *c*, *d*, &c. draw lines toward the point of ſight S, and ending at GH; then through the points where the diagonals BD, EC, GF, cut theſe lines, draw lines parallel to AD; and you will have the parallelogram AGHD reticulated, or divided into 192 ſmall and equal perſpective ſquares.

Make AI and DM equal and perpendicular to AD; then draw IM, which will be equal and parallel to AD; and draw IS and MS to the point of ſight S.

Divide AI, IM, and MD, into the ſame number of equal parts as AD is divided: and from theſe points of diviſion draw lines toward the point of ſight S, ending reſpectively at GK, KL, and LH.

From thoſe points where the lines parallel to AD meet AG and DH draw upright lines parallel to AI and DM; and from the points where theſe lines meet IK and LM draw lines parallel to IM; then ſhade the work, as in the figure.

Prob. 32. *To repreſent a ſemicircular arch in perſpective, as if it were ſtanding on two upright walls, equal in height to the height of the obſerver's eye.*

After having gone through the preceding operation, this will be more eaſy by a bare view of fig. 2. in Plate CCCLXXXVII. than it could be made by any deſcription; the method being ſo much like that of drawing and ſhading the ſquare hollow.—We need only mention, that *a*T*b*EA and DF *c t d* are the upright walls on which the ſemicircular arch is built; that S is the point of ſight in the horizon T *t*, taken in the centre of the arch; that *d* in fig. 1. is the point of diſtance; and that the two perſpective ſquares ABCD and BEFC make the parallelogram AEFD of a length equal to twice its breadth AD.

Prob. 33. *To repreſent a ſquare in perſpective, as viewed by an obſerver ſtanding directly even with one of its corners.*

In fig. 3. of Plate CCCLXXXVII. let A 9 BC be a true ſquare, viewed by an obſerver ſtanding at ſome diſtance from the corner C, and juſt even with the diagonal C 9.

Let *p*SP be the horizon, parallel to the diagonal AB; and S the point of ſight, even with the diagonal C 9. Here it will be proper to have two points of diſtance *p* and P, equidiſtant from the point of ſight S.

Draw the ſtraight line 1 17 parallel to AB, and draw A 8 and B 10 parallel to CS. Take the diſtance between 8 and 9 in your compaſſes, and ſet it off all the way in equal parts from 8 to 1, and from 10 to 17.—The line 1 17 ſhould be produced a good way further both to right and left hand from 9, and divided all the way in the ſame manner.

From theſe points of equal diviſion, 8, 9, 10, &c. draw lines to the point of ſight S, and alſo to the two points of diſtance *p* and P, as in the figure.

Now it is plain, that *a c b* 9 is the perſpective repreſentation of A9BC, viewed by an obſerver even with the corner C and diagonal C 9.—But if there are other ſuch ſquares lying even with this, and having the ſame poſition with reſpect to the line 1 17, it is evident that the obſerver, who ſtands directly even with the corner C of the firſt ſquare, will not be even with the like corners G and K of the others; but will have an oblique view of them, over the ſides FG and IK, which are neareſt his eye: and their perſpective repreſentations will be *e g f* 6 and *h k i* 3, drawn among the lines in the figure: of which, the ſpaces taken up by each ſide lie between three of the lines drawn toward the point of diſtance *p*, and three drawn to the other point of diſtance P.

Prob. 34. *To repreſent a common chair, in an oblique in perſpective.*

The original lines to the point of ſight S, and points of diſtance *p* and P, being drawn as in the preceding operation, chooſe any part of the plane, as *l m n* 13, on which you would have the chair L to ſtand.—There are juſt as many lines (namely two) between l and *m* or 13 and *n*, drawn toward the point of diſtance *p*, at the left hand, as between *l* and 13, or *m* and *n*, drawn to the point of diſtance P on the right: ſo that *l m*, *m n. n* 13, and 13 *l*, form a perſpective ſquare.

From the four corners *l*, *m*, *n*, 13, of this ſquare raiſe the four legs of the chair to the perſpective perpendicular height you would have them: then make the ſeat of the chair a ſquare equal and parallel to *l m n* 13, as taught in Prob. 18. which will make the two ſides of the ſeat in the direction of the lines drawn toward the point of diſtance *p*, and the fore and back part of the ſeat in direction of the lines drawn to the other point of diſtance P. This done, draw the back of the chair leaning a little backward, and the croſs bars therein tending toward the point of diſtance P. Then ſhade the work as in the figure; and the perſpective chair will be finiſhed.

Prob. 35. *To preſent an oblong ſquare table in an oblique perſpective view.*

In fig. 3. of Plate CCCXXXVII. M is an oblong ſquare table, as ſeen by an obſerver ſtanding directly even with C 9 (ſee *Prob.* 33.) the ſide next the eye being perſpectively parallel to the ſide *a c* of the ſquare *a c b* 9.—The forementioned lines drawn from the line 1 17 to the two points of diſtance *p* and P, form equal perſpective ſquares on the ground plane.

Chooſe any part of this plane of ſquares for the feet of the table to ſtand upon; as at *p*, *q*, *r*, and *s*, in direction of the lines *o p* and *r s* for the two long ſides, and *t s* and *q r* for the two ends; and you will have the oblong ſquare or parallelogram *q r s t* for the part of the floor or ground-plane whereon the table is to ſtand: and the breadth of this plane is here taken in proportion to the length as 6 to 10; ſo that, if the length of the table be ten feet, its breadth will be ſix.

On the four little perſpective ſquares at *q*, *r*, *s*, and *t*, place the four upright legs of the table, of what height you pleaſe, ſo that the height of the two next the eye, at *o* and *p*, ſhall be terminated by a ſtraight line *u v* drawn to the point of diſtance P. This done, make the leaf M of the table an oblong ſquare, perſpectively equal and parallel to the oblong ſquare *q r s t* on which the feet of the table ſtands. Then ſhade the whole, as in the figure, and the work will be finiſhed.

If the line 1 17 was prolonged to the right and left hand, and equally divided throughout (as it is from 1 to 17), and if the lines which are drawn from *p* and to the right and left hand ſides of the plate were prolonged till they came to the extended line 1 17, they would meet it in equal points of diviſion. In forming large plans of this ſort, the ends of ſlips of paper may be paſted to the right and left edges of the ſheet on which the plan is to be formed.

Of the Anamorphoſis, or reformation of diſtorted images.

By this means pictures that are ſo miſhapen, as to exhibit no regular appearance of any thing to the naked eye, ſhall, when viewed by reflection, preſent a regular and beautiful image. The inventor of this ingenious device is not known. Simon Stevinus, who was the firſt that wrote upon it, does not inform us from whom he learned it. The principles of it are laid down by S. Vauzelard in his *Perſpective Conique et Cylindrique*; and Gaſper Schott profeſſes to copy Marius Bettinus in his deſcription of this piece of artificial magic.

It will be ſufficient for our purpoſe to copy one of the ſimpleſt figures of this writer, as by this means the myſtery of this art will be ſufficiently unfolded. Upon the cylinder of paper, or paſteboard, ABCD, draw whatever is intended to be exhibited, as the letters IHS. Then with a needle make perforations along the whole outline; and placing a candle, G, behind this cylinder, mark upon the ground plane the ſhadow of them, which will be diſtorted more or leſs, according to the poſition of the candle or the plane, &c. This being done, let the picture be an exact copy of this diſtorted image, let a metallic ſpeculum be ſubſtituted in the place of the cylinder, and let the eye of the ſpectator have the ſame poſition before the cylinder that the candle had behind it. Then looking upon the ſpeculum, he will ſee the diſtorted image reſtored to its proper ſhape. The reformation of the image, he ſays, will not eaſily be made exact in this method, but it will be ſufficiently ſo to anſwer the purpoſe.

Plate CCCLXXXVI. fig.

Other methods, more exact and geometrical than this, were found out afterwards: ſo that theſe pictures could be drawn by certain rules, without the uſe of a candle. Schott quotes one of theſe methods from Bettinus, another from Herigonius, and another from Kircher, which may be ſeen in his *Magia*, vol i. p. 162, &c. He alſo gives an account of the methods of reforming pictures by ſpeculums of conical and other figures.

Inſtead of copying any of theſe methods from Schott or Bettinus, we ſhall preſent our readers with that which Dr Smith hath given us in his Optics, vol. i. p. 250, as, no doubt, the beſt, and from which any perſon may eaſily make a drawing of this kind. The ſame deſcription anſwers to two mirrors, one of which, fig. 7. is convex, and the other, fig. 8. is concave.

In order to paint upon a plane a deformed copy ABCDEKIHGF of an original picture, which ſhall appear regular, when ſeen from a given point O, elevated above the plane, by rays reflected from a poliſhed cylinder, placed upon the circle *l n p*, equal to its given baſe; from the point R, which muſt be ſuppoſed to lie perpendicularly under O, the place of the eye, draw two lines R *a* R *e*; which ſhall either touch the baſe of the cylinder, or elſe cut off two ſmall equal ſegments from the ſides of it, according as the copy is intended to be more or leſs deformed. Then, taking the eye, raiſed above R, to the given height RO, ſomewhat greater than that of the cylinder for a luminous point, deſcribe the ſhadow *aekf* (of a ſquare *aexz*, fig. 36. or parallelogram ſtanding upright upon its baſe *ae*, and containing the picture required) anywhere behind the arch *lnp*. Let the lines drawn from R to the extremities and diviſions of the baſe *a, b, c, d, e*, cut the remoteſt part of the ſhadow in the points *f, g, h, i, k*, and the arch of the baſe in *l, m, n, o, p*; from which points draw the lines *l*AF, *m*BG, *n*CH, *o*DI, *p*EK, as if they were rays of light that came from a focus R, and were reflected from the baſe *lnp*; ſo that each couple, as *l*A, *l*R, produced, may cut off equal ſegments from the circle. Laſtly, transfer the lines *laf*, *mbg*, &c. and all their parts, in the ſame order, upon the reſpective lines *l*AF, *m*BG, &c. and having drawn regular curves, by eſtimation, through the points A, B, C, D, E, through F, G, H, I, K, and through every intermediate order of points; the figure ACEKHF, ſo divided, will be the deformed copy of the ſquare, drawn and divided upon the original picture, and will appear ſimilar to it, when ſeen in the poliſhed cylinder, placed upon the baſe *lnp*, by the eye in its given place O.

The practical methods of drawing theſe images ſeem to have been carried to the greateſt perfection by J. Leopold, who, in the Acta Lipſienſia for the year 1712, has deſcribed two machines, one for the images to be viewed with a cylindrical, and the other with a conical mirror. The perſon poſſeſſed of this inſtrument has nothing to do but to take any print he pleaſes, and while he goes over the outlines of it with one pen, another traces the anamorphoſis.

By methods of this kind, groves of trees may be cut, ſo as to repreſent the appearance of men, horſes, and other objects from ſome one point of view, which are not at all diſcernible in any other. This might eaſily be effected by one perſon placing himſelf in any particular ſituation, and giving directions to other perſons what trees to lop, and in what manner. In the ſame method it has been contrived, that buildings of circular and other forms, and alſo whole groups of buildings, conſiſting of walls at different diſtances, and with different poſitions to one another, ſhould be painted ſo as to exhibit the exact repreſentation of particular objects, which could only be perceived in one ſituation. Bettinus has illuſtrated this method by drawings in his *Apiaria*.

It may appear a bold aſſertion to ſay, that the very ſhort ſketch now given of the art of perſpective is a ſufficient foundation for the whole practice, and includes *all* the expeditious rules peculiar to the problems which moſt generally occur. It is, however, true, and the intelligent reader will ſee, that the two theorems on which the whole reſts, include every poſſible caſe, and apply with equal facility to pictures and originals in any poſition, although the examples are ſelected of perpendicular pictures, and of originals referred to horizontal planes, as being the moſt frequent. The ſcientific foundation being ſo ſimple, the ſtructure need not be complex, nor ſwell into ſuch volumes as have been publiſhed on the ſubject: volumes which, by their ſize deter from the peruſal, and give the ſimple art the appearance of intricate myſtery; and, by their prices, defeat the deſign of their authors, viz. the diſſemination of knowledge among the practitioners. The treatiſes on perſpective acquire their bulk by long and tedious diſcourſes, minute explanations of common things, or by great numbers of examples; which indeed do make ſome of theſe books valuable by the variety of curious cuts, but do not at all inſtruct the reader by any improvements made in the art itſelf. For it is evident, that moſt of thoſe who have treated this ſubject have been more converſant in the practice of deſigning than in the principles of geometry; and therefore when, in their practice, the caſes which have offered have put them on trying particular expedients, they have thought them worth communicating to the public as improvements of the art; and each author, fond of his own little expedient (which a ſcientific perſon would have known for an eaſy corollary from the general theorem), have made it the principle of a practical ſyſtem—and in this manner narrowing inſtead of enlarging the knowledge of the art; and the practitioner, tired of the bulk of the volume, in which a ſingle maxim is tediouſly ſpread out, and the principle on which it is founded kept out of his ſight, contents himſelf with a remembrance of the maxim (not underſtood), and keeps it ſlightly in his eye, to avoid groſs errors. We can appeal to the whole body of painters and draughtſmen for the truth of this aſſertion; and it muſt not be conſidered as an imputation on them of remiſſneſs or negligence, but as a neceſſary conſequence of the ignorance of the authors from whom they have taken their information. This is a ſtrong term, but it is not the leſs juſt. Several mathematicians of eminence have written on perſpective, treating it as the ſubject of pure geometry, as it really is; and the performances of Dr Brook Taylor, Graveſande, Wolf, De la Caille, Emerſon, are truly valuable, by preſenting the art in all its perſpicuous ſimplicity and univerſality. The works of Taylor and Emerſon are more valuable, on account of the very ingenious and expeditious conſtructions which they have given, ſuited to every poſſible caſe. The merit of the firſt author has been univerſally acknowledged by all the Britiſh writers on the ſubject, who never fail to declare that their own works are compoſed on the principle of Dr Brook Taylor: but any man of ſcience will ſee that theſe authors have either not underſtood them, or aimed at pleaſing the public by fine cuts and uncommon caſes; for, without exception, they have omitted his favourite conſtructions, which had gained his predilection by their univerſality, and attached themſelves to inferior methods, more uſually expedients perhaps, or inventions (as they thought) of their own. What has been given in this article is not *profeſſed* to be according to the principles of Dr Brook Taylor, becauſe the principles are not peculiar to him, but the neceſſary reſults of the theory itſelf, and inculcated by every *mathematician* who had taken the trouble to conſider the ſubject. They are ſufficient not only for directing the ordinary practice, but alſo for ſuggeſting modes of conſtruction for every caſe out of the common track. And a perſon of ingenuity will have a laudable enjoyment in thus, without much ſtretch of thought, inventing rules for himſelf; and will be better pleaſed with ſuch fruits of his own ingenuity, than in reading the tedious explanations of examples deviſed by another. And for this purpoſe we would, with Dr Taylor, " adviſe all our readers not to be contented with the ſcheme they find here; but on every occaſion, to draw new ones of their own, in all the variety of circumſtances they can think of. This will take up more time at firſt, but they will find the vaſt benefit and pleaſure of it by the extenſive notions it will give them of the nature of the principles."

The art of perſpective is neceſſary to all arts where there is any occaſion for deſigning; as architecture, fortification, carving, and generally all the mechanical arts; but it is more particularly neceſſary to the art of painting, which can do nothing without it. A figure in a picture, which is not drawn according to the rules of perſpective, does not repreſent what is intended, but ſomething elſe. Indeed we heſitate not to ſay, that a picture which is faulty in this particular, is as blameable, or more ſo, than any compoſition in writing which is faulty in point of orthography, or grammar. It is generally thought very ridiculous to pretend to write an heroic poem, or a fine diſcourſe, upon any ſubject, without underſtanding the propriety of the language in which we write; and to us it ſeems no leſs ridiculous for one to pretend to make a good picture without underſtanding perſpective: Yet how many pictures are there to be ſeen, that are highly valuable in other reſpects, and yet are entirely faulty in this point? Indeed this fault is ſo very general, that we cannot remember that we ever have ſeen a picture that has been entirely without it; and what is the more to be lamented, the greateſt maſters have been the moſt guilty of it. Thoſe examples make it to be the leſs regarded; but the fault is not the leſs, but the more to be lamented, and deſerves the more care in avoiding it for the future. The great occaſion of this fault, is certainly the wrong method that is generally uſed in educating of perſons in this art: for the young people are generally put immediately to drawing; and when they have acquired a facility in that, they are put to colouring. And theſe things they learn by rote, and by practice only; but are not at all inſtructed in any rules of art. By which means, when they come to make any deſigns of their own, though they are very expert at drawing out and colouring every thing that offers itſelf to their fancy; yet for want of being inſtructed in the ſtrict rules of art, they do not know how to govern their inventions with judgment, and become guilty of ſo many groſs miſtakes; which prevent themſelves, as well as others, from finding that ſatisfaction they otherwiſe would do in their performances. To correct this for the future, we would recommend it to the maſters of the art of painting, to conſider if it would not be neceſſary to eſtabliſh a better method for the education of their ſcholars, and to begin their inſtructions with the technical parts of painting, before they let them looſe to follow the inventions of their own uncultivated imaginations.

The art of painting, taken in its full extent, conſiſts of two parts; the inventive, and the executive. The inventive part is common with poetry, and belongs more properly and immediately to the original deſign (which it invents and diſpoſes in the moſt proper and agreeable manner) than to the picture, which is only a copy of that deſign already formed in the imagination of the artiſt. The perfection of this art of painting depends upon the thorough knowledge the artiſt has of all the parts of his ſubject; and the beauty of it conſiſts in the happy choice and diſpoſition that he makes of it: And it is in this that the genius of the artiſt diſcovers and ſhows itſelf, while he indulges and humours his fancy, which here is not confined. But the other, the executive part of painting, is wholly confined and ſtrictly tied to the rules of art, which cannot be diſpenſed with on any account; and therefore in this the artiſt ought to govern himſelf entirely by the rules of art, and not to take any liberties whatſoever. For any thing that is not truly drawn according to the rules of perſpective, or not truly coloured or truly ſhaded, does not appear to be what the artiſt intended, but ſomething elſe. Wherefore, if at any time the artiſt happens to imagine that his picture would look the better, if he ſhould ſwerve a little from theſe rules, he may aſſure himſelf, that the fault belongs to his original deſign, and not to the ſtrictneſs of the rules; for what is perfectly agreeable and juſt in the real original objects themſelves, can never appear defective in a picture where thoſe objects are exactly copied.

Therefore to offer a ſhort hint of thoughts we have ſome time had upon the method which ought to be followed in inſtructing a ſcholar in the executive part of painting; we would firſt have him learn the moſt common effections of practical geometry, and the firſt elements of plain geometry and common arithmetic. When he is ſufficiently perfect in theſe, we would have him learn perſpective. And when he has made ſome progreſs in this, ſo as to have prepared his judgment with the right notions of the alterations that figures muſt undergo when they come to be drawn on a flat, he may then be put to drawing by view, and be exerciſed in this along with perſpective, till he comes to be ſufficiently perfect in both. Nothing ought to be more familiar to a painter than perſpective; for it is the only thing that can make the judgment correct, and will help the fancy to invent with ten times the eaſe that it could do without it.

We earneſtly recommend to our readers the *careful* peruſal of Dr Taylor's Treatiſe, as publiſhed by Colſon in 1749, and Emerſon's publiſhed along with his Optics. They will be ſurpriſed and delighted with the inſtruction they will receive; and will then truly eſtimate the ſplendid volumes of other authors and ſee their frivolity.

Perſpective.

PERSPECTIVE is alſo uſed for a kind of picture or painting, frequently ſeen in gardens, and at the ends of galleries; deſigned expreſsly to deceive the ſight by repreſenting the continuation of an alley, a building, landſcape, or the like.

Perſpective.

Aerial **PERSPECTIVE**, is ſometimes uſed as a general deno-

PERSPECTIVE.

Plate CCCLXXXVI.

Fig. 3. Fig. 1.

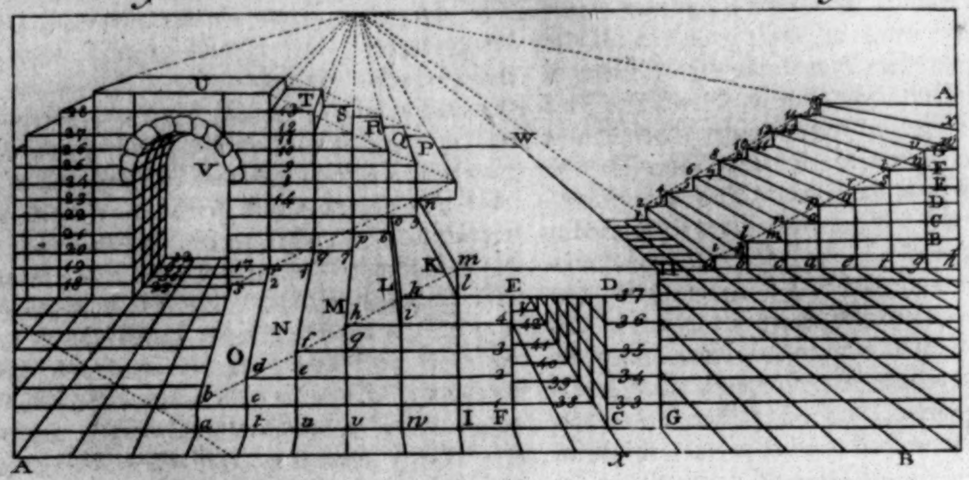

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Fig. 4. Fig. 2.

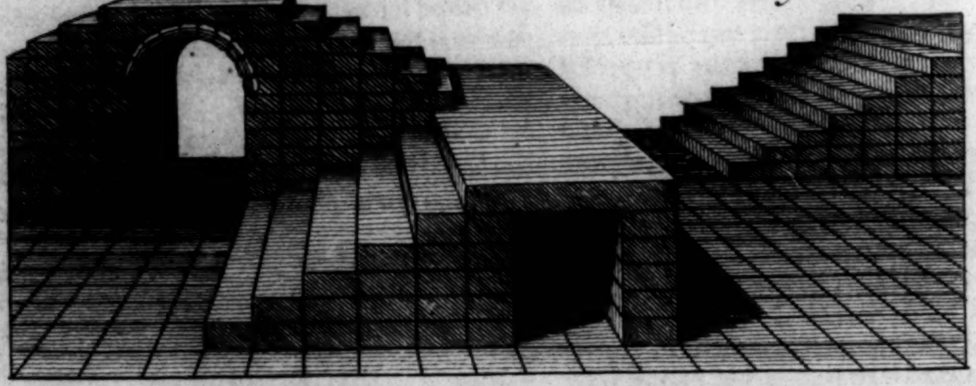

Fig. 7.

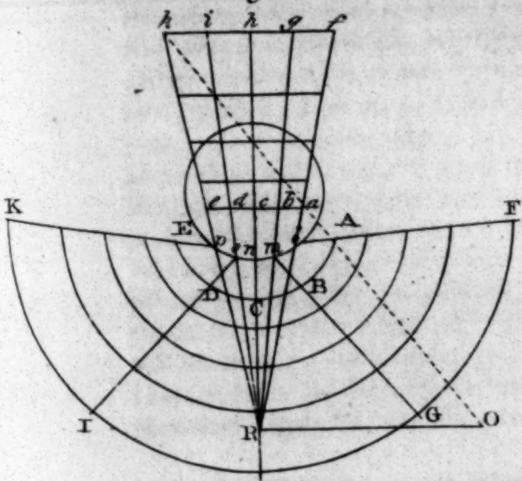

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Fig. 6.

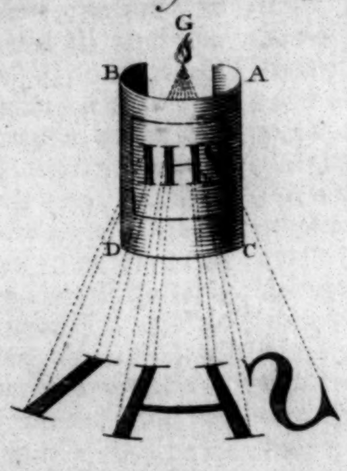

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Fig. 8.

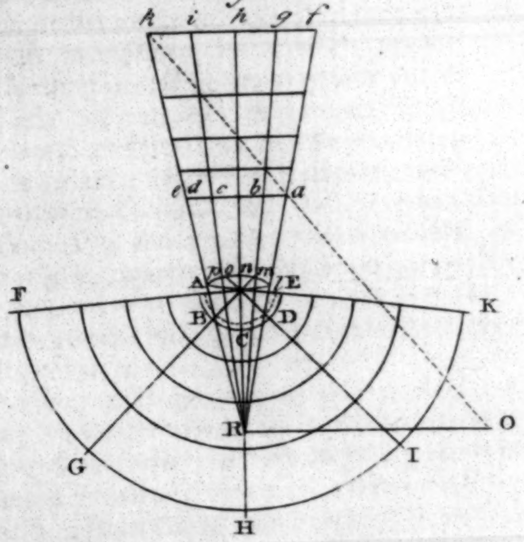

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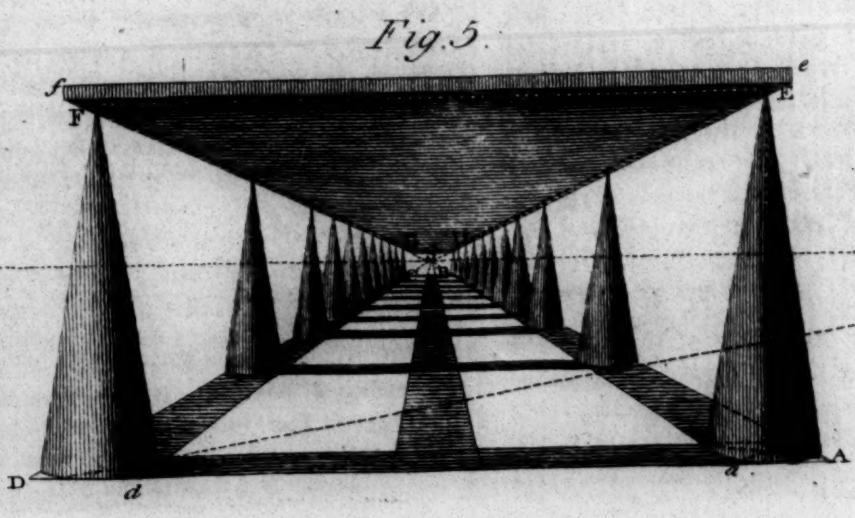
Fig. 5.



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denomination ſor that which more reſtrictedly is called *aerial perſpective*, or the art of giving a due diminution or degradation to the ſtrength of light, ſhade, and colours of objects, according to their different diſtances, the quantity of light which falls upon them, and the medium through which they are ſeen; the *chiaro obſcuro*, or *clair obſcure*, which conſiſts in expreſſing the different degrees of light, ſhade, and colour of bodies, ariſing from their own ſhape, and the poſition of their parts with reſpect to the eye and neighbouring objects, whereby their light or colours are affected; and keeping, which is the obſervance of a due proportion in the general light and colouring of the whole picture, ſo that no light or colour in one part may be too bright or ſtrong for another. A painter, who could ſucceed in *aerial perſpective*, ought carefully to ſtudy the effects which diſtance, or different degrees or colours of light, have on each particular original colour, to know how its hue or ſtrength is changed into the ſeveral circumſtances that occur, and to repreſent it accordingly. As all objects, in a picture take their meaſures in proportion to thoſe placed in the front, ſo, in *aerial perſpective*, the ſtrength of light and the brightneſs of the colours of objects cloſe to the picture, muſt ſerve as a meaſure, with reſpect to which all the ſame colours at ſeveral diſtances muſt have a proportional degradation in like circumſtances.

Bird's eye view in PERSPECTIVE, is that which ſuppoſes the eye to be placed above any building, &c. as in the air at a conſiderable diſtance from it. This is applied in drawing the repreſentations of fortifications, when it is neceſſary not only to exhibit one view as ſeen from the ground, but ſo much of the ſeveral buildings as the eye can poſſibly take in at one time from any ſituation. In order to this, we muſt ſuppoſe the eye to be removed a conſiderable height above the ground, and to be placed as it were in the air, ſo as to look down into the building like a bird that is flying. In repreſentations of this kind, the higher the horizontal line is placed, the more of the fortification will be ſeen, and *vice verſa*.

PERSPECTIVE *Machine*, is an inſtrument by which any perſon, without the help of the rules of art, may delineate the true perſpective figures of objects. Mr Ferguſon has deſcribed a machine of this ſort of which he aſcribes the invention to Dr Bevis.

Fig. 4. of Plate CCCLXXXVII. is a plane of this machine, and fig. 5. is a repreſentation of it when made uſe of in drawing diſtant objects in perſpective.

In fig. 4. *a b e f* is an oblong ſquare board, repreſented by ABEF in fig. 5. *x* and *y* (X and Y) are two hinges on which the part *c l d* (CLD) is moveable. This parts conſiſts of two arches or portions of circles *c m l* (CML) and *d n l* (DNL) joined together at the top *l* (L), and at bottom to the croſs bar *d c* (DC), to which one part of each hinge is fixed, and the other part to a flat board, half the length of the board *a b e f* (ABEF), and glued to its uppermoſt ſide. The centre of the arch *c m l* is at *d*, and the centre of the arch *d n l* is at *c*.

On the outer ſide of the arch *d n l* is a ſliding piece *n* (much like the nut of the quadrant of altitude belonging to a common globe), which may be moved to any part of the arch between *d* and *l*: and there is ſuch another ſlider *o* on the arch *c m l*, which may be ſet to any part betwen *c* and *l*.—A thread *c p n* (CPN) is ſtretched tight from the centre *c* (C) to the ſlider *n* (N), and ſuch another thread is ſtretched from the centre *d* (D) to the ſlider *o* (O); the ends of the threads being faſtened to theſe centres and ſliders.

Now it is plain, that by moving theſe ſliders on their reſpective arches, the interſection *p* (P) of the threads may be brought to any point of the open ſpace within the arches.—In the groove *k* (K) is a ſtraight ſliding bar *i* (I), which may be drawn further out, or puſhed further in at pleaſure.

To the outer end of this bar I (fig. 5.) is fixed the upright piece HZ, in which is a groove for receiving the ſliding piece Q. In this ſlider is a ſmall hole *r* for the eye to look through, in uſing the machine; and there is a long ſlit in HZ, to let the hole *r* be ſeen through when the eye is placed behind it at any height of the hole above the level of the bar I.

How to delineate the perſpective figure of any diſtant object, or objects, by means of this machine.

Suppoſe you wanted to delineate a perſpective repreſentation of the houſe *q s r p* (which we muſt imagine to be a great way off, without the limits of the plate), place the machine on a ſteady table, with the end EF of the horizontal board ABEF toward the houſe, ſo that when the Gothic-like arch DLC is ſet upright, the middle part of the open ſpace (about P) within it may be even with the houſe when you place your eye at Z and look at the houſe through the ſmall hole *r*. Then fix the corners of a ſquare piece of paper with four wafers on the ſurface of that half of the horizontal board which is neareſt the houſe; and all is ready for drawing.

Set the arch upright, as in the figure; which it will be when it comes to the perpendicular ſide *t* of the upright piece *s t* fixed to the horizontal board behind D. Then place your eye at Z, and look through the hole *r* at any point of the houſe, as *q*, and move the ſliders N and O till you bring the interſection of the threads at P directly between your eye and the point *q*: then put down the arch flat upon the paper on the board, as at ST, and the interſection of the threads will be at W. Mark the point W on the paper with the dot of a black lead pencil; and ſet the arch upright again as before: then look through the hole *r*, and move the ſliders N and O till the interſection of the threads comes between your eye and any other point of the houſe, as *p*: then put down the arch again to the paper, and make a pencil mark thereon at the interſection of the threads, and draw a line from that mark to the former one at W; which line will be a true perſpective repreſentation of the corner *p q* of the houſe.

Proceed in the ſame mannner, by bringing the interſection of the threads ſucceſſively between your eye and other points of the outlines of the houſe, as *r*, *s*, &c. and put down the arch to mark the like points on the paper, at the interſection of the threads: then connect theſe points by ſtraight lines, which will be the perſpective outlines of the houſe. In like manner find points for the corners of the door and windows, top of the houſe, chimneys, &c. and draw the finiſhing lines from point to point: then ſhade the whole, making the lights and ſhades as you ſee them on the houſe itſelf, and you will have a true perſpective figure of it.—Great care muſt be taken, during the whole time, that the poſition of the machine be not ſhifted on the table; and to prevent ſuch an inconvenience, the table ſhould be very ſtrong and ſteady, and the machine fixed to it either by ſcrews or clamps.

In the ſame way, a landſcape, or any number of objects within the field of view through the arch, may be delineated, by finding a ſufficient number of perſpective points on the paper, and connecting them by ſtraight or curved lines as they appear to the eye. And as this makes every thing in perſpective equally eaſy, without taking the trouble to learn any of the rules for drawing, the operations muſt be very pleaſing and agreeable. Yet as ſcience is ſtill more ſo, we would by all means recommend it to our readers to learn the rules for drawing particular objects; and to draw landſcapes by the eye, for which we believe, no perſpective rules can be given. And although any thing may be very truly drawn in perſpective by means of this machine, it cannot be ſaid that there is the leaſt degree of ſcience in going *that* way to work.

The arch ought to be at leaſt a foot wide at bottom, that the eye at Z may have a large field of view through it: and the eye ſhould then be, at leaſt, $10\frac{1}{2}$ inches from the interſection of the threads at P when the arch is ſet upright. For if it be nearer, the boundaries of view at the ſides near the foot of the arch will ſubtend an angle at Z of more than 60 degrees, which will not only ſtrain the eye, but will alſo cauſe the outermoſt parts of the drawing to have a diſagreeable appearance.—To avoid this, it will be proper to draw back the ſliding bar I, till Z be $14\frac{1}{2}$ inches diſtant from P; and then the whole field of view, through the foot wide arch, will not ſubtend an angle to the eye at Z of more than 45 degrees; which will give a more eaſy and pleaſant view, not only of all the objects themſelves, but alſo of their repreſentations on the paper whereon they are delineated. So that, whatever the width of the arch be, the diſtance of the eye from it ſhould be in this proportion: As 12 is to the width of the arch, ſo is $14\frac{1}{2}$ to the diſtance of the eye (at Z) from it.

If a pane of glaſs, laid over with gum water, be fixed into the arch, and ſet upright when dry, a perſon who looks through the hole *r* may delineate the objects upon the glaſs which he ſees at a diſtance through and beyond it, and thence transfer the delineation to a a paper put upon the glaſs, as mentioned in the beginning of the article Perspective.

Mr Peacock likewiſe invented three ſimple inſtruments for drawing architecture and machinery in perſpective, of which the reader will find ſketches and deſcriptions in the 75th volume of the Philoſophical Tranſactions. We do not inſert theſe deſcriptions here becauſe we do not think the inſtruments ſuperior to that deſcribed by Ferguſon, and becauſe we wiſh that our readers who have occaſion to *draw* may make themſelves ſo much maſters of the art of perſpective, as to be above the aid of ſuch mechanical contrivances.

Perspective Glaſs, or *Graphical Perſpective*. See Dioptrics.

PERSPIRATION, in medicine, the evacuation of the juices of the body through the pores of the ſkin. Perſpiration is diſtinguiſhed into ſenſible and inſenſible; and here ſenſible perſpiration is the ſame with ſweating, and inſenſible perſpiration that which eſcapes the notice of the ſenſes; and this laſt is the idea affixed to the word *perſpiration* when uſed alone

PERSPICUITY, properly ſignifies the property which any thing has of being eaſily ſeen through; hence it is generally applied to ſuch writings or diſcourſes as are eaſily underſtood.

Perspicuity, in compoſition. See Oratory, nº 43.

PERTH, a county of Scotland, including Monteith, Braidalbin, Athol, Stratherne, part of Gowrie, and Perth Proper; is bounded by Badenoch and Lochabar on the north and north weſt; by Marr on the north-eaſt; by Argyle and Lennox on the weſt and ſouth-weſt; having Clackmannanſhire, part of Stirlingſhire, and the Forth to the ſouth; the ſhires of Kinroſs and Fife to the ſouth eaſt, and Angus to the eaſt. It extends above 70 miles in length, and near 60 at its greateſt breadth, exhibiting a variety of Highlands and Lowlands; mountains, hills, dales, and ſtraths, diverſified with paſture-grounds, corn fields, and meadows; rivers, lakes, foreſts woods, plantations, incloſures, towns, villages, and a great number of elegant ſeats, beautifully ſituated, belonging to noblemen and gentlemen. The chief rivers of Perthſhire are the Tay, the Teith, and the Erne, beſides a great number of ſubordinate ſtreams. The river Teith is famous for its ſalmon-fiſhery, and its ſteep cataract, near the Blair of Drummond, the noiſe of which is ſo loud, as to deafen thoſe who approach it. The river Erne riſes from Loch Erne, a lake ſeven miles long, in the mountainous country of Stratherne: this river, after a courſe of 34 miles from weſt to eaſt, during which it receives many ſtreams and rivulets, falls into the Tay at Abernethy.

Freeſtone, lead, iron, and copper ores, with ſome lapis calaminaris, are found in different parts of Perthſhire. The ſoil, being generally rich and well manured, produces excellent wheat, and all kinds of grain. The hilly country abounds with paſture for the black cattle, horſes, ſheep, goats. and deer. The heaths, woods, and foreſts, are ſtored with variety of game; the rivers teem with ſalmon and trout; the gardens and orchards, are ſtored with all kinds of herbs, roots, apples, pears, cherries, plums, and almoſt every ſpecies of fruit found in South Britain. The houſes and attire, even of the commonalty, are neat and decent; and every peaſant can produce a good quantity of linen, and great ſtore of blankets, made in his own family. Indeed, this is the caſe through all the Lowlands of Scotland. Flax is reared by every huſbandman; and being dreſſed at home, is ſpun by the females of his family into thread for linen; this is woven by country weavers, of whom there is a great number through all the Low Country, and afterwards bleached or whitened by the good-wiſe and her ſervants; ſo that the whole is made fit for uſe at a very ſmall expence. They likewiſe waſh, card, ſpin, and weave their wool into tartan for plaids, kerſies, and coarſe ruſſet-cloth, for common wearing, beſides great part of which is knit into caps, ſtockings, and mitts. Plaids, made of the fineſt worſted, are worn either plain or variegated, as veils, by women of the lower, and even of the middle rank; nay, ſome years ago, ladies of faſhion wore ſilken plaids with an undreſs:

PERSPECTIVE. Plate CCCLXXXVII.

Fig. 2.

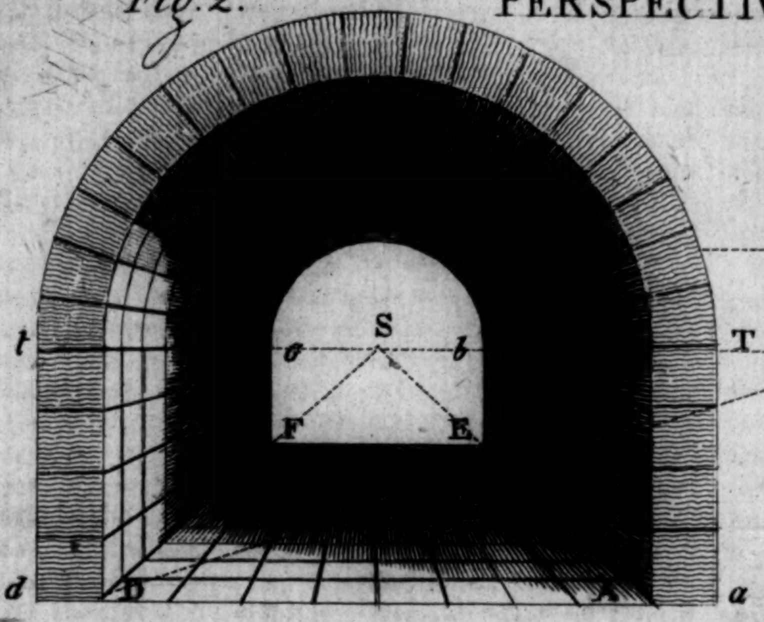

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Fig. 1.

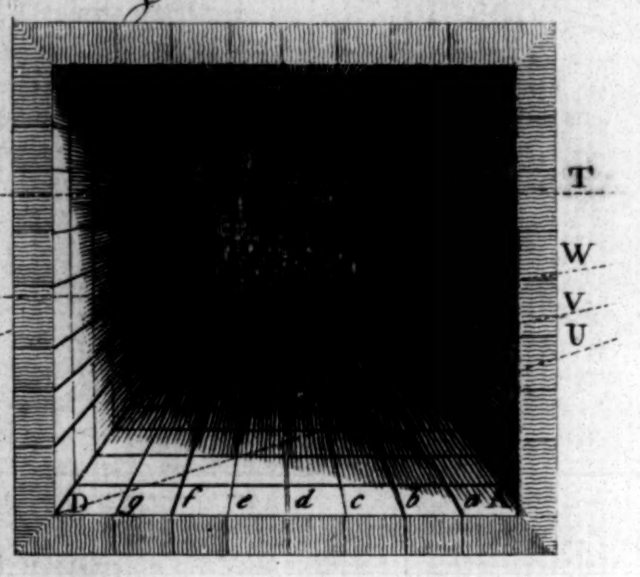

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Fig. 3.

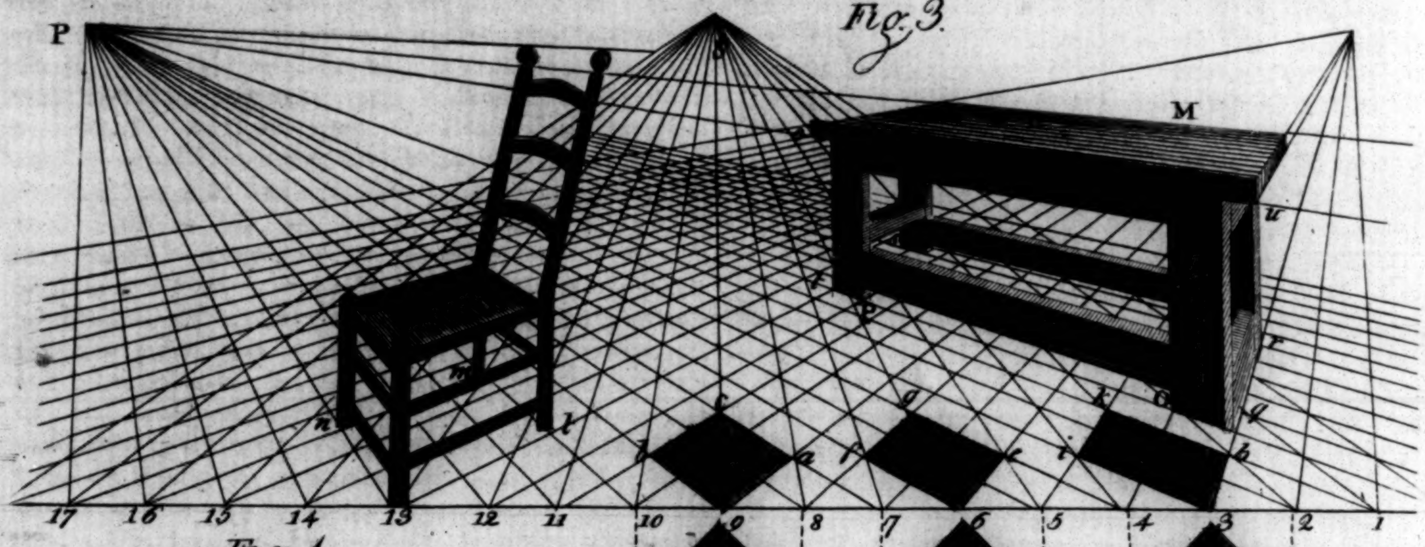

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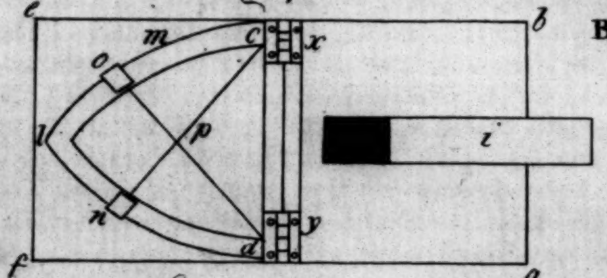
Fig. 4.



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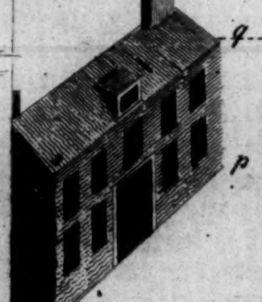
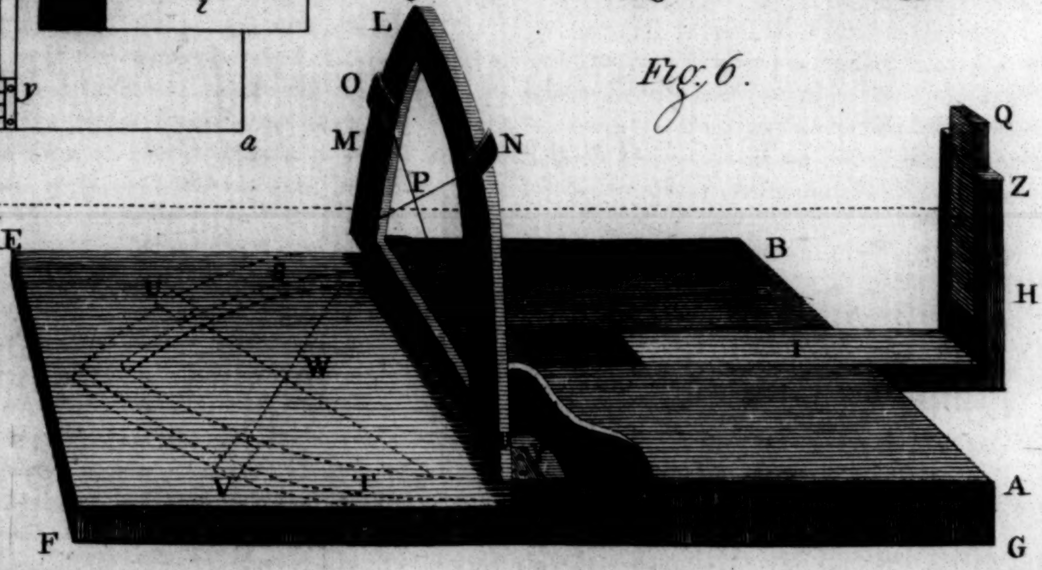


Fig. 6.



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Trenchard sc.

BRITISH MUSEUM

this is a looſe piece of drapery, gathered about the head, ſhoulders, and waiſt, on which it is croſſed ſo, as to leave the hands at liberty, and produces a very good effect to the eye of the ſpectator. The Lowlanders of Perthſhire are civilized, hoſpitable, and induſtrious: the commerce of the country conſiſts chiefly in corn, linen, and black cattle: there are, moreover, ſome merchants who trade to foreign countries.—For an account of the different diviſions of this country above-mentioned, ſee the articles as they occur in the order of the alphabet.

PERTH-Proper, ſtretching 20 miles in length, and at ſome places 15 in breadth, is bounded on the north eaſt, by the Carſe of Gowrie; on the eaſt, by Angus; on the weſt by Stratherne; on the north, by Athol; and on the ſouth, by the Frith of Tay. This is likewiſe a fruitful country, populous and well cultivated, abounding with gentlemen who poſſeſs opulent eſtates; with farmers who underſtand agriculture: and with manufacturers who turn their induſtry to great account. North eaſtward from Perth to Brechin lies the vale of Strathmore, one of the moſt fertile diſtricts in Scotland, which gives the title of *Earl* to the noble family of Lyon.

PERTH, the capital of the county of that name, is an agreeable, populous town, ſituated 20 miles within land, on the ſouth bank of the river Tay. It was otherwiſe called *St Johnſton's*, from a church dedicated to St John, as the patron of the place. It is a royal borough, ſecond in dignity to the metropolis, the ſeat of a large preſbytery, and gave the title of *Earl* to the family of Drummond, which is now forfeited. James Drummond, 4th earl, was created duke of Perth by James II. for adhering to whoſe intereſts he was outlawed. His two grandſons were attainted in 1745. No leſs than 14 national councils have been held at Perth between 1201 and 1459. But the oldeſt was at Scone, A. D. 906. Perth, in the reign of Edward I. of England, was poſſeſſed by the Engliſh, who ſecured it with fortifications: but after an obſtinate reſiſtance, they were expelled by Robert Bruce. In the year 1715, the rebels made it a place of arms, and retired to it, after the battle of Dumblane; but they were in a little time diſlodged by the duke of Argyle, and retreated northwards with the pretender. They poſſeſſed it alſo in 1745. The pretender was proclaimed king, new magiſtrates were appointed, and an attempt was made to fortify it. The town is populous and handſome, the ſtreets are well paved, and tolerably clean at all times; and the houſes, though not ſtately, make a very decent appearance. Both the ſtreets and houſes are, for the greater part, diſpoſed in a regularity of plan, which proves them not to be of the moſt remote antiquity. It is indeed true, that the level ſituation, being ſingularly favourable to regularity, might even from the firſt, give this an advantage over many of the old boroughs. Several ſtreets run in a direction parallel with the river, as far as a right can bear this relation to a curve line, nearly between eaſt and weſt: theſe are again interſected by others extending between north and ſouth. It ſhould ſeem that anciently particular ſtreets were inhabited, each by a particular claſs of artiſans. The names ſtill preſerved ſeem to indicate as much. The ſhop keepers or merchants occupied one ſtreet; the hammermen a ſecond; and other crafts occupied in the ſame manner, each a ſeparate ſtreet. Many of the houſes in that ſtreet called the *Water-Gate*, ſeem to be very old buildings. Towards the ſouthern end of the Water-Gate ſtands the famous gate of the Gowrie family. The houſe, and the very room where the attempt of the Gowries to ſeize or aſſaſſinate the king was ſuppoſed to have been made, is now converted into barracks for a train of artillery; but the back-ſtair, down which the Ruthvens were thrown is pulled down. This ſtrange event, however magnified or atteſted by contemporary writers, is made up of ſo many improbabilities, or circumſtances for which no reaſon can be aſſigned, that Sir David Dalrymple, in republiſhing the account printed by authority, 1600, preparatory to his further obſervations on it, ſeems juſtified in abſolutely diſcrediting a fact which paſſed for problematical with ſo many perſons at the very time. Dr Robertſon ſuppoſes it a plot of Elizabeth to get James into her power. Mr Cant having diſcuſſed the whole ſtory of the conſpiracy in his Muſe's Threnodie, p. 185—261, concludes, "that as this would have been a very impolitic meaſure, the beſt way of accounting for it is by James's known hatred to the Puritans, and wiſh to get rid of two popular characters." The king had been ſeized and forced from his favourites by the father of the Ruthvens 12 years before (1582), and though he affected to forgive him, took the firſt opportunity to condemn and execute him as a traitor, 1584. Mr Camden was too good a courtier to ſpeak with impartiality of any part of this weak monarch's conduct. Though the name of *Gowrie* was aboliſhed, the title of *Ruthven* was revived in the perſon of Sir Thomas Ruthven of Freeland, whom Charles II. 1651, created Lord Ruthven: but the honour, on the death of his ſon David in 1704, devolved on Iſabel ſurviving daughter of his ſecond ſiſter, who married Sir Francis Ruthven, and was ſucceeded, 1732, by his ſon James.

Heron's Tour, 1792.

Gough's Camden.

The caſtle of Perth ſtood near the red bridge, which terminated the narrow ſtreet called *Skinner-gate*. At the end of the Caſtle-ſtreet another narrow ſtreet leads weſt to the Blak-friars called *Couver-ſeu-row*, where the Curfeu bell was. The kings of Scotland before James II. were crowned at Scone, and reſided at Perth as the metropolis of the nation. James reſided and was educated in the caſtle of Edinburgh, and was crowned there 1437. The parliaments and courts of juſtice were removed from Perth to Edinburgh, but Perth kept its priority till 22 James III. 1482.

The church in which John Knox harangued is ſtill ſtanding, and is now divided into three; named the *eaſt*, the *middle*, and the *weſt* kirks. The eaſt kirk was lately very handſomely modernized within. There is an old hoſpital, a conſiderable building, the founding of which is aſcribed to James VI. The town-houſe ſhuts up the eaſtern end of the High-ſtreet. A monaſtery of Carthuſians was here eſtabliſhed by King James I. of Scotland, who loſt his life on the very ſpot by the treachery of Athol and his accomplices. The king was buried in a very ſtately monument in this place, which was called *monaſterium vallis virtutis*, one of the moſt magnificent buildings in the kingdom, which with the reſt was deſtroyed by the populace. James VI. created George Hay commendator of the Carthuſian priory, giving him all its emoluments, with a vote and ſeat in parliament; but theſe not being ſufficient to ſupport the title, he ſurrendered it back to the king. The only remains of this magnificent ſtructure is to be ſeen in the carved ſtones with which the ſouth-eaſt porch of St John's church is built, now greatly decayed. The king's garment full of ſtabs was preſerved here after the reformation.

The town was anciently provided with a ſtone-bridge over the river, which an inundation ſwept away; but a new and very fine one has lately been built, the moſt beautiful ſtructure of the kind in North Britain, and was deſigned and executed by Mr Smeaton. Its length is 900 feet; the breadth (the only blemiſh) 22 within the parapets. The piers are founded 10 feet beneath the bed of the river, upon oaken and beechen piles, and the ſtones laid in puzzalane, and cramped with iron. Theſe are nine arches, of which the centre is 75 feet in diameter. This noble work opens a communication with all the different great roads of the kingdom, and was completed at the expence of 26,000l. Of this the commiſſioners of forfeited eſtates, by his majeſty's permiſſion, gave 11,000l. Perth 2000l. private ſubſcribers 4756l. the royal boroughs 500l. But ſtill this great work would have met with a check for want of money, had not the ear of Kinnoul, with his characteriſtic public ſpirit, advanced the remaining ſum, and taken the ſecurity of the tolls, with the hazard only to himſelf. The whole expence has now been defrayed, and the toll has ceaſed.

Heron's Tour, 1792.

"The Tay (ſays a late traveller), over which this bridge is thrown, and on the ſouthern bank of which the city of Perth ſtands, is truly a noble river. It riſes in Braidalbin, on the frontiers of Lorne. Before it has advanced many miles from its ſource, its ſtream is conſiderably augmented by the acceſſion of ſeveral ſmall rills. Soon after, it diffuſes its waters into a ſmall lake called Loch Dochart; and indeed the river itſelf there bears rather the name of the Dochart. Continuing its courſe from Loch Dochart, it ſoon again expands into another lake. Out of this it proceeds to Killan, ſtill bearing, if I remember right, the name of the Dochart. Here it meets with another river which flows hither by a more north-eaſterly courſe. The waters are diffuſed into the famous Loch Tay, 16 miles in length. Iſſuing from this ſpacious lake at Kenmore, the Tay is ſoon after increaſed by the acceſſion of the Lyon. It proceeds onward in an eaſtern direction through Athol, receiving as it advances, all the waters in the county, till at Logierait it is joined by the large river of Tummel. Here it bends to the ſouth and advancing about 8 miles reaches Dunkeld; whence taking a more northern direction, it continues its courſe towards Perth; being as it advances ſtill augmented by the acceſſion of various tributary ſtreams, the moſt conſiderable of which is the Almond. At Perth it turns to the ſouth eaſt, and receiving as it proceeds the waters of the Erne, paſſes by Abernethy, once the capital of the Pictiſh kingdom. Soon after this, it expands itſelf to the breadth of three miles. Contracting its breadth, as it approaches Dundee, it there opens into the German ocean.

"Such is the noble river; on the ſouthern bank of which, where it has increaſed into a vaſt body of water, and not a great many miles above where it diſcharges itſelf into the ocean, Perth is advantageouſly ſituated. A perſon acquainted with the general character of great rivers, and with their influence in determining the aſpect and the fertility of the diſtricts thro' which they paſs, might readily without farther knowledge of the local circumſtances than what is conveyed in this account of the courſe of the Tay, and of the ſituation of Perth upon it, conclude the city to ſtand amid delightful ſcenery, and to enjoy moſt of the advantages which natural circumſtances afford, for the promotion of trade and induſtry."

This town has but one pariſh, which has two churches, beſides meetings for ſeparatiſts, who are very numerous. One church, which belonged to a monaſtery, is very ancient: not a veſtige of the laſt is now to be ſeen; for the diſciples of Knox made a general deſolation of every edifice that had given ſhelter to the worſhippers of the church of Rome: it being one of his maxims, to pull down the neſts, and then the rooks would fly away.

The flouriſhing ſtate of Perth is owing to two accidents: the firſt, that of numbers of Cromwell's wounded officers and ſoldiers chooſing to reſide here, after he left the kingdom, who introduced a ſpirit of induſtry among the people; the other cauſe was the long continuance of the earl of Marr's army here in 1715, which occaſioned vaſt ſums of money being ſpent in the place. But this town as well as all Scotland, dates its proſperity from the year 1745; the government of this part of Great Britain having never been ſettled till a little after that time.

That this town does not owe its origin to William I. 1201, as Boethius ſays, is evident from its being mentioned as a conſiderable place in the foundation charter of Holyrood houſe by David I. 1128.

The trade of Perth is conſiderable. It exports annually 150,000 l. worth of linen, from 24,000 to 30,000 bolls of wheat and barley to London and Edinburgh, and a very large quantity of cured ſalmon. That fiſh is taken there in vaſt abundance; 3000 have been caught in one morning; weighing, one with another, 16 pounds; the whole capture 48,000 pounds. The fiſhery begins on St Andrew's day, and ends Auguſt 26th old ſtyle. The rents of the fiſheries amount to conſiderably upwards of 3000 l. per annum. Smelts come up this river in May and June. See PEARLS. W. Long. 3. 27. N. Lat. 56. 22.

PERTH Amboy. See *New JERSEY*.

PERTINAX, was an illuſtrious Roman emperor after the death of Commodus. He was deſcended of a mean family; and like his father, who was either a ſlave or the ſon of a manumitted ſlave, he for ſome time followed the employment of drying wood and making charcoal. His poverty did not, however, prevent him from receiving a liberal education. For ſome time he was employed in teaching a number of pupils the Greek and the Roman languages in Etruria. He left this laborious profeſſion and became a ſoldier, and by his valour and intrepidity gradually roſe to offices of the higheſt truſt in the army, and was made conſul by M. Aurelius for his ſervices. He was afterwards entruſted with the government of Mœſia, and at length he preſided over the city of Rome as governor. When Commodus was murdered, Pertinax was univerſally choſen to ſucceed to the imperial dignity, Pertinax.

nity; and his refuſal, on the plea of old age and increaſing infirmities, did not prevent his being ſaluted emperor and Auguſtus. He complied with reluctance; but his mildneſs, his economy, and popularity, convinced the ſenate and the people of the prudence and the juſtice of their choice. He forbad his name to be inſcribed on ſuch places or eſtates as were part of the imperial domains, and aſſerted that they belonged not to him but to the public. He melted all the ſilver ſtatues which had been raiſed to his predeceſſor, and he expoſed to ſale all his concubines, horſes, arms, and all the inſtruments of his pleaſure and extravagance. With the money raiſed from theſe relics he enriched the empire, and was enabled to aboliſh all the taxes which Commodus had laid on the rivers, ports, and highways, through the empire. Theſe patriotic actions gained him the affection of the worthieſt and moſt diſcerning of his ſubjects; but the extravagant, luxurious, and vicious, raiſed their clamours againſt him; and when the emperor attempted to introduce among the pretorian guards ſuch diſcipline as was abſolutely neceſſary, to preſerve the peace and tranquility of Rome, the flames of rebellion were kindled, and the minds of the ſoldiers totally alienated. Pertinax was apprized of their mutinying, but he refuſed to fly at the hour of danger. He ſcorned the advice of ſuch of his friends as wiſhed him to withdraw from the impending ſtorm: and he unexpectedly appeared before the ſeditious troops, and without fear or concern boldly aſked them, whether they who were bound by duty to defend the perſon of their prince and emperor, were come to betray him and to ſhed his blood? His undaunted courage and intrepidity would have had the deſired effect, and the ſoldiers had begun to retire, when one of the moſt ſeditious of them advanced and darted his javelin at the emperor's breaſt, exclaiming, *The ſoldiers ſend you this.* The reſt inſtantly followed the example; and Pertinax muffling up his head, and calling upon Jupiter to avenge his death, remained unmoved, and was immediately diſpatched. His head was cut off and carried upon the point of a ſpear in triumph to the camp. This abominable murder happened in the 103d year of the Chriſtian era.

It was no ſooner known that Pertinax had been murdered, than the enraged populace flocked from all quarters of the city; and uttering dreadful menaces againſt the authors of his death, ran up and down the ſtreets in queſt of them. The ſenators were no leſs concerned for his death than the people; the more, becauſe they were now convinced, that the ſoldiers would ſuffer none to reign but tyrants. However, as they had more to loſe than the common people, they did not offer to revenge his death; but either ſhut themſelves up in their own houſes, or in thoſe of the ſoldiers of their acquaintance, thinking themſelves there moſt ſafe. Such was the unfortunate and much-lamented end of Publius Helvius Pertinax, after he had lived 66 years 7 months and 26 or 28 days: and reigned, according to Dio Caſſius, 87 days, that is, from the 1ſt of January to the 28th of March. His body, together with his head, was interred with great pomp by Didius Julianus, his ſucceſſor, in the burying place of his wife's family. The emperor Septimius Severus, with the title of emperor, aſſumed the name of Pertinax, which he knew would above any thing elſe recommend him to the army in Illyricum; and to the Roman people. He puniſhed with great ſeverity all thoſe who had been acceſſory to his death, diſbanded the prætorian guards, honoured his memory with a moſt magnificent funeral, at which was carried the effigies of the deceaſed prince, pronounced his panegyric, and cauſed him to be ranked in the number of the gods, appointing the ſon chief-prieſt to his father. The day of his acceſſion to the empire was yearly celebrated with the Circenſian games; and his birth-day for many years after, with other ſports. He performed great things, ſays Herodian, during his ſhort adminiſtration, and would have reſtored the empire to its former luſtre, had he been indulged with a longer reign.

Pertinent, Peru.

PERTINENT of lands, in Scots law. See Law, N° clxvii. 6. p. 670.

1 How diſcovered by the Spaniards.

PERU, a country of South America, is bounded on the north by Popayan, on the eaſt by Amazonia, on the ſouth by Chili, and on the weſt by the Pacific ocean; extending from 1° 40′ north to 26° 10′ ſouth latitude, and between 56° and 81° weſt longitude from Greenwich; being about 1800 miles in length, but its greateſt breadth does not much exceed 390.

This country was diſcovered by the Spaniards; and the firſt intelligence they had of it was on the following occaſion. Nunezde Balboa having been raiſed to the government of the ſmall colony at Santa Maria in Darien by the ſuffrages of his companions, was very deſirous of having that authority confirmed by the court of Spain. For this purpoſe he endeavoured to recommend himſelf to the Spaniſh miniſtry by ſome important ſervice; that is, by extorting from the Indians as much gold and ſilver as he could. He therefore made frequent inroads into the adjacent country, ſubdued ſeveral of the caciques or pretty princes, and collected a conſiderable quantity of gold. In one of theſe expeditions, the Spaniards contended ſo violently about the diviſion of ſome gold which they had taken, that they were on the point of coming to blows with one another. A young cacique who was preſent, aſtoniſhed at ſuch contention about a thing of which he knew not the uſe, tumbled the gold out of the balance with indignation, and turning to the Spaniards, told them, that ſince they valued gold ſo very highly, he would conduct them to a country where the moſt common utenſils were made of that metal. The Spaniards eagerly catched at this hint; and upon further queſtioning the cacique, were informed, that at the diſtance of ſix days journey, towards the ſouth, from the place where they were at that time, they ſhould diſcover another ocean, near which this deſirable country was ſituated; but if they intended to attack that powerful ſtate, they muſt aſſemble a much greater number of forces than had hitherto appeared on the continent.

Balboa was tranſported at the news. He immediately concluded, that the ocean mentioned by the cacique was that which Columbus had ſo long ſought for in vain, and that the rich territory deſcribed to him muſt be part of the Eaſt Indies. He was therefore impatient till he ſhould arrive at that happy country, in compariſon with the diſcovery of which all former exploits almoſt vaniſhed into nothing. In order therefore to procure a force ſufficient to enſure ſucceſs in his enterpriſe, he firſt ſecured the friendſhip of the neighbouring caciques, and then diſpatched ſome of his officers to Hiſpaniola, with a large quantity of gold as a proof of his paſt ſucceſs, and an earneſt of what he expected. By this means he ſecured the friendſhip of the governor, and procured a conſiderable reinforcement. But though he now imagined himſelf ſufficiently ſtrong to attempt the diſcovery, there were ſtill prodigious difficulties to be ſurmounted. This iſthmus of Darien, though not above 60 miles in breadth, has a chain of lofty mountains running through its whole extent. Being ſituated between two vaſt oceans, the Atlantic and Pacific, the climate is exceſſively moiſt, inſomuch that it rains for two thirds of the year. In conſequence of this the valleys are marſhy, and ſo frequently overflowed, that the inhabitants find it neceſſary in ſome places to build their houſes upon trees, in order to be elevated at ſome diſtance from the damp ſoil, and the odious reptiles engendered in the waters. There are alſo many large rivers very difficult to be croſſed; and as the country at that time was only inhabited by a few wandering ſavages, the enterpriſe of Balboa was looked upon as the moſt difficult that had been undertaken by any Spaniſh adventurer.

2
Difficulties they had to overcome.

On this arduous taſk Balboa ſet out on the 1ſt day of September 1513, about the time that the periodical rains began to abate. He had only 190 Spaniards along with him; but all of them were hardy veterans, inured to the climate of America, and very much attached to their leader. A thouſand Indians attended in order to carry their proviſions and other neceſſaries; and they had along with them ſome of thoſe fierce dogs ſo terrible to the natives of America.

Balboa proceeded by ſea, and without difficulty, to the territories of a cacique whoſe friendſhip he had gained; but as ſoon as he began to advance into the interior parts of the country, he met with all the difficulties above-mentioned. Some of the caciques alſo, at his approach, fled with all their people to the mountains, carrying off or deſtroying whatever could afford ſubſiſtence to an army. Others collected their force in order to oppoſe him; however, Balboa continued unmoved in ſpite of all difficulties; and at laſt, after a moſt painful journey of 25 days, he arrived at the South Sea; when with the moſt extravagant tranſports of joy, he went into it up to the middle, and took poſſeſſion of the ocean in his maſter's name, vowing to defend it againſt all the enemies of Spain.

3
Balboa firſt gets a ſight of the South Sea.

That part of the South Sea which Balboa now diſcovered, he called the *Gulf of St Michael*; which name it ſtill retains, and is ſituated to the eaſt of Panama. From ſome of the neighbouring caciques he extorted proviſions and gold by force; others ſent him preſents voluntarily; and he had the ſatisfaction to hear, that the adjacent coaſts abounded with pearl-oyſters. The inhabitants were alſo unanimous in declaring, that there was to the ſouthward a very rich and populous country where the people had tame animals, which they endeavoured to deſcribe to him, meaning the Peruvian ſheep. But however impatient he might be to viſit this empire, he conſidered it as highly improper to venture thither with a handful of men exhauſted by labour and diſeaſe. He therefore led back his followers to Santa Maria, in order to refreſh them after their fatigues; and from thence he ſent an account to the court of Spain of the important diſcovery he had made, demanding a reinforcement of 1000 men in order to conquer the country he had newly diſcovered. But here his hopes were all blaſted at once. The king indeed determined to proſecute the diſcovery, but refuſed to continue Balboa in his government, appointing Pedrarias Davila to ſuperſede him, and giving him the command of 15 ſtout veſſels, with 1200 ſoldiers, to enſure his ſucceſs.

4
He is deprived of his command,

Balboa, though much mortified by his diſgrace, ſubmitted to the king's pleaſure without repining. It was not long, however, before he met with an additional misfortune; the new governor tried him for ſome pretended irregularities committed before his arrival, and fined him of almoſt all he was worth. In the mean time the Spaniards, paying no regard to the treaties concluded by Balboa with the Indians, plundered and deſtroyed all indiſcriminately, inſomuch that the whole country, from the gulph of Darien to the lake Nicaragua, was deſolated. The new comers had alſo arrived at the moſt unlucky time of the year, namely, about the middle of the wet ſeaſon, when the exceſſive rains produced the moſt violent and fatal diſeaſes. To this was joined an extreme ſcarcity of proviſions; ſo that in the ſpace of a month above 600 Spaniards periſhed in the utmoſt miſery.

Balboa failed not to ſend violent remonſtrances to Spain againſt the conduct of the new governor; and he, on the other hand, accuſed his antagoniſt of having deceived the king by falſe accounts of the country, and magnifying his own exploits beyond meaſure. At laſt the king, ſenſible of his error in ſuperſeding Balboa, appointed him adelantado, or lieutenant-governor of the countries on the South Sea, with very extenſive privileges and authority: enjoining Pedrarias to ſupport him in all his enterpriſes, and to conſult with him in every thing which he himſelf undertook. It was impoſſible however, to extinguiſh the envy of Pedrarias; and therefore, though a reconciliation took place in appearance, even ſo far, that Pedrarias agreed to give his daughter in marriage to Balboa, yet he ſoon after had him condemned and executed on pretence of diſloyalty, and an intention to revolt from the king.

5
And put to death.

On the death of Balboa, the thoughts of conquering Peru were for a time laid aſide; however, it ſtill remained an object of deſire to all the Spaniſh adventurers in America. Accordingly, ſeveral armaments were fitted out with a deſign to explore and take poſſeſſion of the countries to the eaſt of Panama; but, either through the difficulties which attended the undertaking itſelf, or the bad conduct of the adventurers, all of them proved unſucceſsful, until at laſt it became a general opinion, that Balboa's ſcheme had been entirely viſionary.

6
A new expedition ſet on foot.

Still, however, there were three perſons ſettled at Panama, on whom the common opinion made ſo little impreſſion, that they determined to go in queſt of this country, looked upon to be chimerical by the generality of their neighbours. Their names were *Franciſco, Pizarro, Diego de Almagro*, and *Hernando Luque*. Pizarro and Almagro were ſoldiers of fortune, and Luque was an eccleſiaſtic, who acted both as prieſt and ſchoolmaſter at Panama. Their confederacy was authoriſed by Pedrarius governor of Panama; and each engaged to employ his whole fortune in the adventure. Pizarro, being the leaſt wealthy of the three, engaged to take upon himſelf the greateſt ſhare of the fatigue and danger, and to command in perſon the armament which was to go firſt upon the diſcovery. Almagro offered to conduct the ſupplies of proviſions and reinforcement of troops which might be neceſſary; and Luque was to remain at Panama, in order to negociate with the governor, and to ſuperintend whatever was carrying on for the general intereſt.

7
Meets with bad ſucceſs at firſt.

In 1524, Pizarro ſet ſail from Panama with a ſingle veſſel of ſmall burden, and 112 men; and ſo little was he or his countrymen at that time acquainted with the climate of America, that the moſt improper ſeaſon of the whole year was choſen for his departure; the periodical winds, which were then ſet in, being directly oppoſite to the courſe which he propoſed to ſteer. The conſequence of this was, that after beating about for 70 days, with much danger and fatigue, he had advanced ſcarce as far to the ſouth-eaſt as a ſkilful navigator will now make in three days. He touched at ſeveral places of Terra Firma; but finding that country exceedingly inhoſpitable and unhealthy, he was obliged to retire to Chuchama, oppoſite to the Pearl Iſlands, where he hoped to receive ſome reinforcements from Panama. Here he was found by Almagro, who had ſet out in queſt of him with a reinforcement of 70 men, and had ſuffered diſtreſſes very much reſembling thoſe of Pizarro himſelf. In particular, he had loſt an eye in a combat with the Indians. However, he had advanced as far as the river of St Juan in the province of Popayan, where the country ſhowing a better aſpect, and the inhabitants more friendly, our projectors again began to indulge themſelves in hopes, and determined by no means to abandon their ſcheme.

Almagro returned to Panama, in hopes of recruiting their ſhattered troops. But the bad accounts of the ſervice gave his countrymen ſuch an unfavourable idea of it, that Almagro could levy no more than 80 men, and theſe with great difficulty. Slender as this reinforcement was, however, the adventurers did not heſitate at renewing their enterpriſe. The diſaſters and diſappointments they met with in this new attempt, were ſcarce inferior to thoſe they had already experienced, when part of the armament at laſt reached the bay of St Matthew on the coaſt of Quito, and landed at Tacamez, to the ſouth of the river of Emeralds, where they met with a more fertile and champaign country than any they had yet ſeen; the natives alſo were more civilized, and clothed in garments of cotton or wollen ſtuff, adorned with trinkets of gold and ſilver. But notwithſtanding theſe favourable appearances, Pizarro did not think fit to attack ſuch a powerful empire with a handful of ſoldiers already exhauſted; and therefore retired to a ſmall iſland called *Gallo*, with part of the troops; from whence he diſpatched Almagro to Panama, in hopes of obtaining a reinforcement.

The reception which Almagro met with was by no means agreeable. Some of the adventurers had informed their friends of the many dangers and loſſes which they had ſuſtained; which not only diſheartened people from engaging in the ſervice, but weighed ſo much with Pedro de los Rois, the ſucceſſor of Pedrarius, that he prohibited the raiſing of new recruits, and even diſpatched a veſſel to bring home Pizarro and his companions from the iſland of Gallo. Almagro and Luque, though much mortified with this diſappointment, privately adviſed Pizarro not to relinquiſh an enterpriſe on which they had built all their hopes. He therefore poſitively refuſed to obey the orders of the governor, and employed all his addreſs in perſuading his men not to abandon him. But the calamities to which they had been expoſed had ſuch an effect upon them, that when he drew a line upon the ſand with his ſword, telling ſuch as wiſhed to return that they might paſs over it, only 13 had reſolution to remain with him.

8
Pizarro abandoned by all his men but thirteen.

Pizarro with his little troop now fixed their reſidence on the iſland of Gorgona, which they conſidered as a ſafer retreat than Gallo, as being farther removed from the coaſt and uninhabited, ſo that they might with the greater ſecurity wait for ſupplies. Here they continued five months in the moſt unwholeſome climate imaginable, and at laſt had come to a reſolution of committing themſelves to ſea on a float, when a veſſel arrived from Panama to their relief. This was the effect of the continued ſolicitations of Almagro and Luque; who, though they could not prevail upon the governor to favour the undertaking, had ſucceeded ſo far as to induce him to ſend a ſmall veſſel to the relief of Pizarro and his unfortunate aſſociates. However, the more effectually to ſhow his diſapprobation of Pizarro's ſcheme, the governor refuſed to allow one landman to go on board of the ſhip which he ſent.—The hopes of the adventurers, however, were now again revived, and Pizarro eaſily induced them to reſume their ſcheme. Inſtead of returning to Panama, therefore, they ſailed to the ſouth-eaſt, and in 20 days after the diſcovery of Gorgona they diſcovered the coaſt of Peru. Having touched at ſome places of leſs note, they at length arrived at Tumbez, remarkable for its ſtately temple, and a palace of the Incas or ſovereigns of the country. Here they found that what had been told them concerning the riches of the country was true; not only ornaments and ſacred veſſels being made of gold and ſilver, but even ſuch as were for common uſe. Yet to attempt the conqueſt of this opulent empire with their ſlender force, would have been madneſs; they contented themſelves therefore with viewing it, procuring two of the beaſts of burden called *Llamas*, to which they gave the name of ſheep, ſome veſſels of gold and ſilver, and two young men, whom they propoſed to inſtruct in the Caſtilian language. With theſe Pizarro arrived at Panama in the year 1527, near three years after he had ſet out from that place in his expedition.

9
Goes on with his ſcheme at all adventures.

10
Hiſtory of the Incas of Peru.

The empire of Peru thus diſcovered, is ſaid to have been originally poſſeſſed by independent tribes, juſtly reckoned among the moſt ſavage even in America; living more like wild beaſts than men. For ſeveral ages they lived in this manner, when ſuddenly there appeared on the banks of a lake called *Titiaca*, a man and woman of majeſtic form, and clothed in decent garments. They declared themſelves to be the children of the ſun, ſent by their beneficent parent to inſtruct and reclaim mankind.

The names of theſe two extraordinary perſonages were *Manco Capac* and *Mama Ocollo*. At their perſuaſion,

ſion, ſeveral of the diſperſed ſavages united, and, receiving their commands as heavenly injunctions, followed them to Cuzco, where they ſettled, and began to lay the foundations of a city. Manco Capac inſtructed the men in agriculture, and other uſeful arts; while Mama Ocollo taught the women to ſpin and weave; after which Manco turned his attention towards the introducing of proper laws and regulations into his new eſtate.

Thus, according to the Indian tradition, was founded the empire of the Incas, or lords of Peru. At firſt its extent was ſmall, the territory of Manco Capac reaching not above eight leagues from Cuzco his capital. Within theſe narrow limits, however, he exerciſed the moſt perfect deſpotiſm, and the ſame was maintained by his ſucceſſors, all of whom were not only obeyed as monarchs, but reverenced as deities. Their blood was held to be ſacred, and, by prohibiting intermarriages with the people, was never contaminated by mixing with that of any other race. The family, thus ſeparated from the reſt of the nation, was diſtinguiſhed by peculiarities in dreſs and ornaments, which it was unlawful for others to aſſume. Among the Peruvians, however, it is ſaid, that this high degree of veneration was made uſe of by the monarchs only to promote the good of their ſubjects. If we may believe the accounts given by their countrymen, the Peruvian monarchs extended their empire not with a view to increaſe their own power and wealth, but from a deſire of diffuſing the bleſſings of civilization, and the knowledge of the arts which they poſſeſſed, among the barbarous people whom they reduced, and, during a ſucceſſion of 12 monarchs, not one deviated from this character.

Carver's Modern General Traveller.

11
Religion of the Peruvians.

The Peruvians were taught by Manco to adore the Creator of heaven and earth, whom they denominated *Paca Camac*, that intelligence which animated the world. They ſeldom built temples or offered ſacrifices to him, but worſhipped him in their hearts. One temple, however dedicated to *The unknown God*, the Spaniards found at their arrival, erected in a valley, thence named *the valley of Paca Camac*. The ſacrifices inſtituted in honour of the ſun conſiſted chiefly of lambs; beſides which they offered all ſorts of cattle, fowls, and corn, and even burnt their fineſt clothes on the altar by way of incenſe. They had alſo drink-offerings made of maize or Indian corn, ſteeped in water. Nor were thoſe oblations the only acts of adoration in general uſe among them. When they firſt drank after their meals, they dipped the tip of their finger into the cup, and lifting up their eyes with great devotion, gave the ſun thanks for their liquor, before they preſumed to take a draught of it.

Beſides the worſhip of the ſun, they paid ſome kind of veneration to the images of ſeveral animals and vegetables that had a place in their temples. Thoſe were generally the images brought from the conquered nations, where the people worſhipped all ſorts of creatures, animate or inanimate; it being the cuſtom, when a province was ſubdued, to remove all their idols to the temple of the ſun at Cuzco.

Excluſive of the ſolemnities at every full moon, four grand feſtivals were celebrated annually. The firſt of thoſe, called *Raymi*, was held in the month of June, immediately after the ſummer ſolſtice, and was kept not only in honour of the ſun, but of their firſt Inca, Manca Capac, and Coya Mama Ocollo, his wife and ſiſter, whom the Incas conſidered as their firſt parents, deſcended immediately from the ſun, and ſent by him into the world to reform and poliſh mankind. At this feſtival, all the viceroys, generals, governors, and nobility, were aſſembled at the capital city of Cuzco; and the emperor, or Inca, officiated in perſon as high-prieſt; though on other occaſions the ſacerdotal function was diſcharged by the regular pontiff, who was uſually either the uncle or brother of the Inca.

The morning of the feſtival being come, the Inca, accompanied by his near relations, drawn up in order according to their ſeniority, went barefoot in proceſſion, at break of day, to the market-place, where they remained looking attentively towards the eaſt in expectation of the riſing ſun. The luminary no ſooner appeared, than they fell proſtrate on their faces in the moſt profound veneration, and univerſally acknowledged it to be their god and father.

The vaſſal princes, and nobility, that were not of the blood royal, aſſembled in another ſquare, and performed the like ceremony. Out of a large flock of ſheep the prieſts then choſe a black lamb, which they offered in ſacrifice, firſt turning its head towards the eaſt. From the entrails of the victim, on this occaſion, they ſuperſtitiouſly drew prognoſtics relating to peace and war, and other public events.

That the Peruvians believed in the immortality of the ſoul, appears from the practice of the Incas, who conſtantly inculcated to the people, that on leaving this world, they ſhould enter into a ſtate of happineſs provided for them by their god and father the ſun.

12
They were acquainted with aſtronomy before the arrival of the Spaniards.

Before the arrival of the Spaniards in America, the Peruvians were acquainted with ſome points of aſtronomy. They had obſerved the various motions of the planet Venus, and the different phaſes of the moon. The common people divided the year only by the ſeaſons; but the Incas who had diſcovered the annual revolution of the ſun, marked out the ſummer and winter ſolſtices by high towers, which they erected on the eaſt and weſt of the city of Cuzco. When the ſun came to riſe directly oppoſite to four of thoſe towers, on the eaſt ſide of the city, and to ſet againſt thoſe of the weſt, it was then the ſummer ſolſtice; and in like manner, when it roſe and ſet againſt the other towers, it was the winter ſolſtice. They had alſo erected marble pillars in the great court before the temple of the ſun, by which they obſerved the equinoxes. This obſervation was made under the equator, when the ſun being directly vertical, the pillars caſt no ſhade. At thoſe times they crowned the pillars with garlands of flowers and adoriferous herbs, and celebrating a feſtival, offered to their adored luminary rich preſents of gold and precious ſtones.

They diſtinguiſhed the months by the moon, and their weeks were called quarters of the moon; but the days of the week they marked only by the ordinal numbers, as firſt, ſecond, &c. They were aſtoniſhed at the eclipſes of the ſun and moon. When the former hid his face, they concluded it was on account of their ſins, imagining that this phenomenon portended famine, war, and peſtilence, or ſome other terrible calamity. In a ſimilar ſtate of the moon, they apprehended that ſhe was ſick, and when totally obſcured, that ſhe was dying. At this alarming criſis they ſounded their trumpets, and endeavoured by every kind of noiſe to rouſe the lunar planet from her ſuppoſed lethargy; teaching their children to cry out, and call upon *mama quilla*, or "mother moon," that ſhe would not die and leave them to periſh.

They made no predictions from any of the ſtars, but conſidered dreams, and the entrails of beaſts which they offered in ſacrifice, as inſtructive objects of divination. When they ſaw the ſun ſet, they imagined that he plunged into the ocean, to appear next morning in the eaſt.

13
They had teachers of morality;

Among a people wholly void of letters, the ſpeculative eſſays of the underſtanding muſt have been very rude and imperfect. They had, however, among them amentas, or philoſophers, who delivered moral precepts, and likewiſe cultivated poetry. Comedies and tragedies compoſed by thoſe bards were acted on their feſtivals before the king and the royal family, the performers being the great men of the court, and the principal officers of the army. The amentas alſo compoſed ſongs and ballads; but if we may judge from the rudeneſs of the muſic with which they are ſaid to have been accompanied, they were far from being agreeable to a poliſhed ear.

14
And were not unacquainted with paining and ſtatuary.

That the Peruvians were not unacquainted with painting and ſtatuary, appears from the furniture and ornaments of their temples and palaces; but in all the implements of mechanic arts they were extremely deficient. Though many goldſmiths were conſtantly employed, they had never invented an anvil of any metal, but in its ſtead made uſe of a hard ſtone. They beat their plate with round pieces of copper in place of hammers; neither had they any files or graving tools. Inſtead of bellows for melting their metals, they uſed copper pipes, of a yard long, almoſt of the form of a trumpet. Having no tongs to take their heated metal out of the fire, they made uſe of a ſtick or copper bar. The carpenters had no other tools than hatchets made of copper or flint; nor had they learned the uſe of iron; though the country affords mines of that metal. Inſtead of nails, they faſtened their timber with cords or the tough twigs of trees. A thorn, or a ſmall bone, ſerved them for a needle; and inſtead of thread, the ſinews of animals, or the fibres of ſome plant. Their knives were made of flint or copper.

15
Progreſs of the Spaniards facilitated by a civil war among the natives;

When the Spaniards firſt viſited this country, they found it agitated by a civil war. Huana Capac, the 12th monarch from the founder of the ſtate, was ſeated on the throne; who is repreſented as a prince no leſs conſpicuous for his abilities in war than for his pacific virtues. By him the kingdom of Quito was ſubdued, which almoſt doubled the extent of the dominions and power of the Peruvian empire. Notwithſtanding the ancient and fundamental law againſt polluting the blood of the Inca with any foreign alliance, Huana married the daughter of the conquered monarch, by whom he had a ſon named *Atabualpa*, commonly written *Atabalipa*, to whom, at his death in 1529, he left the kingdom of Quito, beſtowing the reſt of his dominions upon Huaſcar his eldeſt ſon by a mother of the royal race. This produced a civil war, in which Atabalipa proved victorious, and afterwards attempted to ſecure himſelf on the throne by putting to death all the deſcendants of Manco Capac, ſtyled *the children of the Sun*, whom he could ſeize either by force or ſtratagem; however, from a political motive, he ſpared the life of his rival Huaſcar, who had the misfortune to be taken priſoner in an engagement, that, by iſſuing out orders in his name, he might more eaſily eſtabliſh his own authority, and cover the illegality of his birth.

This conteſt had ſo much engaged the attention of the Peruvians, that they never once attempted to check the progreſs of the Spaniards. It was ſome time, however, before Pizarro was informed of this conteſt, ſo much in his favour. The firſt intelligence which he received of it was a meſſage from Huaſcar, aſking his aſſiſtance againſt Atabalipa, whom he repreſented as a rebel and an uſurper. Pizarro perceived the importance of the intelligence, and therefore determined to puſh forward, while inteſtine diſcord put it out of the power of the Peruvians to attack him with their whole force. Being obliged to divide his troops, in order to leave a garriſon in St Michael, which might ſerve for a place of retreat in caſe of a diſaſter, he began his march with only 62 horſemen and 102 foot-ſoldiers, 20 of whom were armed with croſs-bows, and only three with muſkets. He directed his courſe towards Caxamalca, a ſmall town at the diſtance of 12 days march from St Michael, where Atabalipa was encamped with a conſiderable body of troops. Before he had proceeded far, an officer diſpatched by the Inca met him with a valuable preſent from that prince, accompanied with a proffer of his alliance, and his aſſurances of a friendly reception at Caxamalca. Pizarro, according to the uſual artifice of his countrymen in America, pretended to come as the ambaſſador of a very powerful monarch, and declared that he was now advancing with intention to offer Atabalipa his aid againſt thoſe enemies who diſputed his title to the throne.

16
And by their ignorance of the motives of the Spaniards.

As the object of the Spaniards in entering their country was altogether incomprehenſible to the Peruvians, they had formed various conjectures concerning it, without being able to decide whether they ſhould conſider their new gueſts as beings of a ſuperior nature, who had viſited them from ſome beneficent motive, or as formidable avengers of their crimes, and enemies to their repoſe and liberty. The continual profeſſions of the Spaniards, that they came to enlighten them with the knowledge of truth, and lead them in the way of happineſs favoured the former opinion; the outrages which they committed, their rapaciouſneſs and cruelty, were awful confirmations of the latter. While in this ſtate of uncertainty, Pizarro's declaration of his pacific intentions ſo far removed all the Inca's fears, that he determined to give him a friendly reception. In conſequence of this reſolution, the Spaniards were allowed to march in tranquility acroſs the ſandy deſert between St Michael and Motupè, where the moſt feeble effort of an enemy, added to the unavoidable diſtreſſes which they ſuffered in paſſing through that comfortleſs region, muſt have proved fatal to them. From Motupè they advanced towards the mountains which encompaſs the low country of Peru, and paſſed ed through a defile ſo narrow and inacceſſible, that a few men might have defended it againſt a numerous army. But here likewiſe, from the ſame inconſiderate credulity of the Inca, the Spaniards met with no oppoſition, and took quiet poſſeſſion of a fort erected for the ſecurity of that important ſtation. As they now approached near to Caxamalca, Atabalipa renewed his profeſſions of friendſhip; and, as an evidence of his ſincerity, ſent them preſents of greater value than the former.

On entering Caxamalca, Pizarro took poſſeſſion of a large court, on one ſide of which was a houſe which the Spaniſh hiſtorians call a palace of the Inca, and on the other a temple of the ſun, the whole ſurrounded with a ſtrong rampart or wall of earth. When he had poſted his troops in this advantageous ſtation, he diſpatched Hernando Soto, and his brother Ferdinand, to the camp of Atabalipa, which was about a league diſtant from the town. He inſtructed them to confirm the declaration which he had formerly made of his pacific diſpoſition, and to deſire an interview with the Inca, that he might explain more fully the intention of the Spaniards in viſiting his country. They were treated with all the reſpectful hoſpitality uſual among the Peruvians in the reception of their moſt cordial friends, and Atabalipa promiſed to viſit the Spaniſh commander next day in his quarters. The decent deportment of the Peruvian monarch, the order of his court, and the reverence with which his ſubjects approached his perſon and obeyed his commands, aſtoniſhed thoſe Spaniards, who had never met in America with any thing more dignified than the petty cacique of a barbarous tribe. But their eyes were ſtill more powerfully attracted by the vaſt profuſion of wealth which they obſerved in the Inca's camp. The rich ornaments worn by him and his attendants, the veſſels of gold and ſilver in which the repaſt offered to them was ſerved up, the multitude of utenſils of every kind formed of thoſe precious metals, opened proſpects far exceeding any idea of opulence that a European of the 16th century could form.

17
Perfidious ſcheme of Pizarro to ſeize the Inca

On their return to Caxamalca, while their minds were yet warm with admiration and deſire of the wealth which they had beheld, they gave ſuch a deſcription of it to their countrymen, as confirmed Pizarro in a reſolution which he had already taken. From his own obſervation of American manners during his long ſervice in the New World, as well as from the advantages which Cortes had derived from ſeizing Montezuma, he knew of what conſequence it was to have the Inca in his power. For this purpoſe, he formed a plan as daring as it was perfidious. Notwithſtanding the character he had aſſumed of an ambaſſador from a powerful monarch, who courted an alliance with the Inca, and in violation of the repeated offers which he had made to him of his own friendſhip and aſſiſtance, he determined to avail himſelf of the unſuſpicious ſimplicity with which Atabalipa relied on his profeſſions, and to ſeize his perſon during the interview to which he had invited him. He prepared for the execution of his ſcheme with the ſame deliberate arrangement, and with as little compunction, as if it had reflected no diſgrace on himſelf or his country. He divided his cavalry into three ſmall ſquadrons, under the command of his brothers Ferdinand, Soto, and Benalcazar; his infantry was formed into one body, except 20 of moſt tried courage, whom he kept near his own perſon to ſupport him in the dangerous ſervice which he reſerved for himſelf; the artillery, conſiſting of two field-pieces, and the croſsbow men, were placed oppoſite to the avenue by which Atabalipa was to approach. All were commanded to keep within the ſquare, and not to move until the ſignal for action was given.

Early in the morning the Peruvian camp was all in motion. But as Atabalipa was ſolicitous to appear with the greateſt ſplendour and magnificence in his firſt interview with the ſtrangers, the preparations for this were ſo tedious, that the day was far advanced before he began his march. Even then, leſt the order of the proceſſion ſhould be deranged, he moved ſo ſlowly, that the Spaniards became impatient and apprehenſive that ſome ſuſpicion of their intention might be the cauſe of this delay. In order to remove this, Pizarro diſpatched one of his officers with freſh aſſurances of his friendly diſpoſition. At length the Inca approached. Firſt of all appeared 400 men in an uniform dreſs, as harbingers to clear the way before him. He himſelf, ſitting on a throne or couch, adorned with plumes of various colours, and almoſt covered with plates of gold and ſilver enriched with precious ſtones, was carried on the ſhoulders of his principal attendants. Behind him came ſome chief officers of his court, carried in the ſame manner. Several bands of ſingers and dancers accompanied this cavalcade; and the whole plain was covered with troops, amounting to more than 30,000 men.

As the Inca drew near the Spaniſh quarters, father Vincent Valverede, chaplain to the expedition, advanced with a crucifix in one hand, and a breviary in the other, and in a long diſcourſe explained to him the doctrine of the creation, the fall of Adam, the incarnation, the ſufferings and reſurrection of Jeſus Chriſt, the appointment of St Peter as God's vicegerent on earth, the tranſmiſſion of his apoſtolical power by ſucceſſion to the popes, the donation made to the king of Caſtile by pope Alexander of all the regions in the New World. In conſequence of all this, he required Atabalipa to embrace the Chriſtian faith, to acknowledge the ſupreme juriſdiction of the pope, and to ſubmit to the king of Caſtile as his lawful ſovereign; promiſing, if he complied inſtantly with this requiſition, that the Caſtilian monarch would protect his dominions, and permit him to continue in the exerciſe of his royal authority; but if he ſhould impiouſly refuſe to obey this ſummons, he denounced war againſt him in his maſter's name, and threatened him with the moſt dreadful effects of his vengeance.

This ſtrange harangue, unfolding deep myſteries, and alluding to unknown facts, of which no power of eloquence could have conveyed at once a diſtinct idea to an American, was ſo lamely tranſlated by an unſkilful interpreter, little acquainted with the idiom of the Spaniſh tongue, and incapable of expreſſing himſelf with propriety in the language of the Inca, that its general tenor was altogether incomprehenſible to Atabalipa. Some parts in it, of more obvious meaning, filled him with aſtoniſhment and indignation. His reply, however, was temperate. He began with obſerving, that he was lord of the dominions over which he reigned by hereditary ſucceſſion; and added, that he could not conceive how a foreign prieſt ſhould pretend to diſpoſe of territories which did not belong to him; that if ſuch a prepoſterous grant had been made, he, who was the rightful poſſeſſor, refuſed to confirm it; that he had no inclination to renounce the religious inſtitutions eſtabliſhed by his anceſtors; nor would he forſake the ſervice of the ſun, the immortal divinity whom he and his people revered, in order to worſhip the God of the Spaniards, who was ſubject to death; that with reſpect to other matters contained in his diſcourſe, as he had never heard of them before, and did not now underſtand their meaning, he deſired to know where he had learned things ſo extraordinary. "In this book," anſwered Valverede, reaching out to him his breviary. The Inca opened it eagerly; and turning over the leaves, lifted it to his ear: "This," ſays he, "is ſilent; it tells me nothing;" and threw it with diſdain to the ground. The enraged monk, running towards his countrymen, cried out, "To arms, Chriſtians, to arms; the word of God is inſulted; avenge this profanation on thoſe impious dogs."

18 Atabalipa ſeized by Pizarro.

Pizarro, who during this long conference had with difficulty reſtrained his ſoldiers, eager to ſeize the rich ſpoils of which they had now ſo near a view, immediately gave the ſignal of aſſault. At once the martial muſic ſtruck up, the cannon and muſkets began to fire, the horſe ſallied out fiercely to the charge, the infantry ruſhed on ſword in hand. The Peruvians, aſtoniſhed at the ſuddenneſs of an attack which they did not expect, and diſmayed with the deſtructive effects of the fire-arms, and the irreſiſtible impreſſion of the cavalry, fled with univerſal conſternation on every ſide, without attempting either to annoy the enemy or to defend themſelves. Pizarro, at the head of his choſen band, advanced directly towards the Inca: and though his nobles crowded around him with officious zeal, and fell in numbers at his feet, while they vied one with another in ſacrificing their own lives, that they might cover the ſacred perſon of their ſovereign, the Spaniards ſoon penetrated to the royal ſeat; and Pizarro ſeizing the Inca by the arm dragged him to the ground, and carried him as a priſoner to his quarters. The fate of the monarch increaſed the precipitate flight of his followers. The Spaniards purſued them towards every quarter, and, with deliberate and unrelenting barbarity, continued to ſlaughter wretched fugitives, who never once offered at reſiſtance. The carnage did not ceaſe until the cloſe of day. Above 4000 Peruvians were killed. Not a ſingle Spaniard fell, nor was one wounded but Pizarro himſelf, whoſe hand was ſlightly hurt by one of his own ſoldiers, while ſtruggling eagerly to lay hold on the Inca.

19 He offers an immenſe ſum for his liberty.

The plunder taken on this occaſion was immenſe, but the Spaniards were ſtill unſatisfied; which being obſerved by the Inca, he endeavoured to apply himſelf to their ruling paſſion, avarice, in order to obtain his liberty; and therefore offered ſuch a ranſom as aſtoniſhed them, even after all they knew concerning the opulence of the country. The apartment in which he was confined was 22 feet in length and 16 in breadth; and all this ſpace he engaged to fill with veſſels of gold as high as he could reach. This propoſal was eagerly caught by Pizarro, and a line was drawn upon the walls to mark the ſtipulated height.

Atabalipa, charmed with the thoughts of liberty, immediately ſet about performing his part of the agreement, and diſpatched meſſengers into all parts of the empire, in order to collect the immenſe quantity of gold which he had promiſed; and though the unfortunate monarch was now in the hands of his enemies, ſuch was the veneration which his ſubjects had for him, that his orders were obeyed with as great alacrity as though he had been at full liberty; while he, in the mean time flattering himſelf with the hopes of being ſoon releaſed, made no preparations for expelling the invaders from his dominions.

In a ſhort time Pizarro received intelligence that Almagro was arrived at St Michael with a reinforcement equal to the force he had with him. This was a matter of great joy to the Spaniards, and no ſmall vexation to Atabalipa, who now conſidered his kingdom as in danger of being totally over-run by theſe ſtrangers, whoſe force he neither knew, nor the means they had of tranſporting themſelves. For this reaſon he determined to put his brother Huaſcar to death, leſt he ſhould join the ſtrangers againſt him. To this he was the rather inclined, as he had got information that the captive prince had been making applications to them and had offered them, a much larger ſum than what was ſtipulated for the Inca's ranſom; and in conſequence of this determination the unfortunate prince loſt his life.

In the mean time the Indians daily arrived at Caxamalca with vaſt quantities of treaſure; the ſight of which ſo much inflamed the Spaniards, that they inſiſted upon an immediate diviſion: and this being complied with, there fell to the ſhare of each horſemen 8000 peſos, at that time not inferior to the value of as many pounds ſterling in the preſent century, and half as much to each foot-ſoldier, Pizarro and his officers receiving ſhares proportional to their dignity. A fifth part was reſerved for the emperor, together with ſome veſſels of curious workmanſhip as a preſent. In conſequence of this immenſe acquiſition of wealth, many of the Spaniards became clamorous for their diſcharge; which was readily granted by their general, as well knowing that the diſplay of their riches would not fail to allure adventurers more hardy, though leſs opulent, to his ſtandard.

20 Pizarro reſolves to put the Inca to death.

After this diviſion of the ſpoil, Atabalipa was very importunate with Pizarro in order to recover his liberty; but the Spaniard, with unparalleled treachery and cruelty, had now determined to put him to death. To this he was urged by Almagro's ſoldiers, who though they had received an equal ſhare with the reſt, were ſtill unſatiſfied. The Inca's ranſom had not been completed; and they were apprehenſive, that whatever ſums might afterwards be brought in, the troops of Pizarro would appropriate them to themſelves as part of that ranſom. They inſiſted with Pizarro, therefore, to put him to death, that all the adventurers might for the future be on an equal footing. Accounts were likewiſe received that troops were aſſembling in the remote provinces of the empire, which Pizarro ſuſpected to be done by the Inca's orders. Theſe accounts were heightened by one Philippillo an Indian interpreter, who had conceived a paſſion for one of the unhappy monarch's wives; and for that reaſon wiſhed to have him put to death. Atabalipa himſelf,

too,

tos, had the misfortune to haſten his own ruin by his conceiving a contemptuous notion of Pizarro, which he had not the precaution to conceal. He had, ſince they were firſt diſcovered by him, admired the European arts of reading and writing, and wiſhed much to know whether he ſhould regard it as a natural or acquired talent. In order to determine this, he deſired one of the ſoldiers who guarded him to write the name of God upon the nail of his thumb. This he ſhowed to ſeveral Spaniards ſucceſſively, aſking its meaning; and, to his ſurpriſe, they all returned the ſame anſwer. At length Pizarro entered; and, on preſenting it to him, he bluſhed, and was obliged to own his ignorance; which inſpired the Inca with the contemptuous notion of him abovementioned.

21
Atabalipa accuſed and condemned,

In order, however, to give ſome ſhow of juſtice to ſuch a deteſtable action, and that he might be exempted from ſtanding ſingly as the perpetrator, Pizarro reſolved to accuſe the Inca of ſome capital crime, and inſtitute a court of judicature for the purpoſe of trying him. For this purpoſe, he appointed himſelf and Almagro, with two aſſiſtants, as judges, with full powers to acquit or condemn: an attorney-general was named to carry on the proſecution in the king's name; counſellors were choſen to aſſiſt the priſoner in his defence; and clerks were ordained to record the proceedings of court. Before this ſtrange tribunal a charge was exhibited ſtill more amazing. It conſiſted of various articles: that Atabalipa, though a baſtard, had diſpoſſeſſed the lawful owner of the throne, and uſurped the regal power; that he had put his brother and lawful ſovereign to death; that he was an idolater, and had not only permitted, but commanded the offering up of human ſacrifices; that he had a great number of concubines; that ſince his impriſonment, he had waſted and embezzled the royal treaſures, which now belonged of right to the conquerors; and that he had excited his ſubjects to take up arms againſt the Spaniards. On theſe heads of accuſation they proceeded to try the ſovereign of a great empire, over whom they had no juriſdiction. To all theſe charges the Inca pleaded not guilty. With reſpect to the death of his brother, he alleged, that the Spaniards could take no cognizance of the fact. With regard to the taxes which he had levied, and the wars he had carried on, they were nothing to the Spaniards; and as to the conſpiracy againſt the Spaniards, he utterly denied it. He called heaven and earth to witneſs the integrity of his conduct, and how faithfully he had performed his engagements, and the perfidy of his accuſers. He deſired to be ſent over to Spain to take his trial before the emperor; but no regard was paid to his intreaties. He was condemned to be burnt alive; which cruel ſentence was mitigated, as a great favour, to ſtrangling; and the unhappy monarch was executed without mercy.

22
And ſtrangled.

23
A general revolt of the Peruvians.

The death of the Inca was followed by a revolution in the Spaniſh affairs, who now became generally odious. Hideous cries were ſet up by his women as the funeral proceſſion paſſed by their apartment; many offered to bury themſelves alive with him; and on being hindered, ſtrangled themſelves out of grief and vexation. The whole town of Caxamalca was filled with lamentation, which quickly extended itſelf over the whole kingdom. Friends and enemies accuſed the Spaniards of inhumanity and treachery. Loads of gold that were coming to Caxamalca by order of the deceaſed Inca were now ſtopped; and the loſs of the treaſure was the firſt unfortunate conſequence which the Spaniards felt from their late iniquitous conduct. The two factions of Indians united againſt Pizarro; and many of the Spaniards not only exclaimed againſt the cruelty of the judges, but would even have mutinied, had not a ſenſe of the impending danger kept them quiet. At Cuzco the friends of the emperor Huaſcar proclaimed Manco Capac the legitimate brother of the late Inca, determining to ſupport him to the laſt againſt all the machinations of his enemies. Pizarro, in the mean time, ſet up Taparpa, the ſon of Atabalipa, cauſing him to be treated with all the honours due to an emperor. Immediately he ſet out for Cuzco, the gaining of which was abſolutely neceſſary for his deſign. An army of Indians occupied the paſſes, and reſolved to diſpute his progreſs. The conteſt, however, was ſoon decided; the Spaniſh cavalry bore down every thing before them, and great numbers of Indians were ſlain. The conquerors gained a conſiderable booty; and Pizarro diſpatched Almagro to reduce Cuzco, while he himſelf founded a new colony in the fruitful valley of Xauna; which, however, was not permanent, being afterwards removed to the place where Lima now ſtands.

While Pizarro was thus employed, another commander, named *Ferdinando Soto*, was detached with 60 horſe to make the beſt of his way to Cuzco, and clear the road for the march of the remainder of the army. He was oppoſed by a formidable collection of Indians, who had fortified themſelves in order to defend a paſs againſt him; for which reaſon, fearing leſt his ſtrength might be unequal, he ſent a meſſage to Pizarro, deſiring that the Inca might join him, thinking that his preſence would awe the Peruvians, and prevent the further effuſion of blood; but his expectations were fruſtrated by the death of the Inca, which happened about this time; ſo that there was now a neceſſity for having recourſe to arms; for as the Spaniards ſet up no perſon in his room, the title of Manco Capac was univerſally acknowledged.

In the mean time, a new ſupply of ſoldiers arriving from Spain, Benalcazer, governor of St Michael, undertook an expedition againſt Quito, where, according to the report of the natives, Atabalipa had left the greateſt part of his treaſure. He accompliſhed his purpoſe with very great difficulty, having a country covered with rocks and mountains to paſs, and being oppoſed by large bodies of the natives. But when he got poſſeſſion of the city, to his extreme mortification he found that the inhabitants had carried off all their gold and ſilver; for they being now acquainted with the ruling paſſion of the Spaniards, had taken care to diſappoint it, by removing the treaſures which they knew very well had been the cauſe of the expedition.

24
Chili invaded by Alvarado.

About the ſame time Alvarado governor of Guatimala, invaded the province of Chili. In this expedition his troops endured ſuch hardſhips, and ſuffered ſo much from the cold among the Andes, that a fifth part of the men and all the horſes died, and at the ſame time the reſt were ſo much diſpirited and emaciated, that they became quite unfit for ſervice. What was worſt of all, when they had arrived at the end of their journey, they met with a body of Spaniards drawn up in hoſtile array to oppoſe them. Theſe had been ſent againſt him by Pizarro, who claimed Chili as part of his juriſdiction, and were now joined by Benalcazar, with the troops under his command. Alvarado, however, advanced boldly to the attack; but, on the interpoſition of ſome moderate men in each party, the difference was accommodated. Alvarado engaged to return to his government, upon his being paid 100,000 peſos to defray the expence of his armament. However, moſt of his followers remained in the country, and enliſted in the ſervice of Pizarro.

25 He is obli- ed by Pi- arro to bandon he enter- priſe.

26 Honours conferred on Pizarro by the court of Spain.

In the mean time Ferdinand Pizarro, the brother of the general, had landed in Spain, where he produced ſuch immenſe quantities of gold and ſilver as aſtoniſhed the court, even after all they had ſeen of the wealth of their new diſcovered territories. The general's authority was confirmed to him with new powers and privileges, and the addition of 70 leagues extending along the coaſt, to the ſouthward of the territory granted in his former patent. Almagro had the title of *adelantado* or *governor* conferred upon him, with juriſdiction over 200 leagues of a country lying ſouthward from the province allotted to Pizarro; he himſelf was made a knight of the order of St Jago.

Of theſe tranſactions ſome accounts were received at Peru before the arrival of Ferdinand Pizarro himſelf; and no ſooner did Almagro hear that he had obtained the royal grant of an independent government, than, pretending that Cuzco, the capital of all Peru, lay within his juriſdiction, he attempted to ſeize it. Pizarro was no leſs ready to oppoſe him; and a very dangerous civil war was about to take place, when the quarrel was made up, on condition that Almagro ſhould attempt the conqueſt of Chili; and if he did not find there an eſtabliſhment equivalent to his expectations, Pizarro ſhould yield up to him part of Peru.

By this reconciliation Pizarro was left at liberty to ſettle the internal policy of his province, which, though little qualified for a legiſlator, he attempted, by dividing the country into various diſtricts, appointing magiſtrates to preſide in each, and eſtabliſhing ſuch regulations concerning the adminiſtration of juſtice, the royal revenue, &c. as occurred to him. The ſeat of government he removed from Cuzco to Lima, which he named *Ceudad des los Reyes*, and which name it ſtill retains among the Spaniards in all legal and formal deeds. Its other name, *Lima*, is a corruption of *Rimac*, the name of the valley in which the city ſtands.

In the mean time Almagro had ſet out on his expedition to Chili; the event of which has been related under the article Chili; and while he was thus employed, Pizarro encouraged ſome of his moſt diſtinguiſhed officers to invade thoſe provinces of the empire which had not yet been viſited by the Spaniards. This he did with a view to keep them employed, and prevent tumults; but it was attended with very terrible conſequences. No ſooner did Manco Capac the Inca perceive the ſecurity of the Spaniards in thus dividing their forces, than he ſeized the opportunity of making one vigorous effort to redreſs the wrongs of himſelf and his countrymen, and expel the invaders, who had tyrannized in ſuch a cruel manner. Though ſtrictly guarded by the Spaniards, he found means to communicate his intentions to the chief men of his nation, whom he joined in the year 1536, under pretence of celebrating a feſtival which he had obtained liberty from Pizarro to attend.

27 A dreadful inſurrection of the Peruvians.

Upon this the ſtandard of war was immediately erected, and a moſt formidable army, according to the Spaniſh hiſtorians, of 200,000 men, collected. Many Spaniards were maſſacred in their habitations, and ſeveral detachments entirely cut off; and while this vaſt army laid ſiege to Cuzco, another formidable body inveſted Lima, and kept the governor cloſely ſhut up. The greateſt effort, however, was made againſt Cuzco, which was defended by Pizarro and his two brothers, with only 170 men. The ſiege laſted nine months; many of the Spaniards were killed; among whom was Juan Pizarro, the general's brother, and the beſt beloved of them all. The reſt were reduced to the moſt deſperate ſituation, when Almagro appeared ſuddenly in the neighbourhood of Cuzco. He had received ſuch accounts of the inſurrection in Peru, as would at any rate have determined him to return to the aſſiſtance of Pizarro; but beſides this, he had now received the royal patent, creating him governor of Chili, and deemed it certain beyond all contradiction, that Cuzco lay within his juriſdiction; for which reaſon he haſtened to prevent it from falling into the hands of the Peruvians. On his arrival his aſſiſtance was ſolicited by both parties. The Inca made many advantageous propoſals, but at length deſpairing of obtaining any cordial union with a Spaniard, he attacked him in the night by ſurpriſe with a great body of choſen troops.

28 They are defeated and diſperſed.

But the Spaniſh valour and diſcipline prevailed againſt all the numbers of their enemies; and the Peruvians were repulſed with ſuch ſlaughter, that a great part of the remainder diſperſed, and Almagro advanced to the gates of Cuzco without oppoſition. Pizarro's brothers took meaſures to oppoſe his entrance; but prudence for the preſent reſtrained both parties from entering into a civil war while they were ſurrounded with enemies; and therefore each leader endeavoured to corrupt the followers of his antagoniſt. In this Almagro had the advantage; and ſo many of Pizarro's troops deſerted in the night, that Almagro was encouraged to advance towards the city, where he ſurpriſed the centinels; and inveſting the houſe where the two brothers were lodged, he compelled them, after an obſtinate defence, to ſurrender at diſcretion; and Almagro's authority over Cuzco was immediately recognized as authentic.

29 Civil war between Pizarro and Almagro.

In this fray only two or three perſons were killed; but matters ſoon began to wear a more ſerious aſpect. Francis Pizarro, having diſperſed the Peruvians who inveſted Lima, and received conſiderable reinforcements from other provinces, ordered 500 men, under the command of Alonſo de Alvarado to march to Cuzco, in hopes of relieving his brothers, if they were not already cut off. They advanced to a ſmall diſtance from the capital, before they knew that they had a more formidable enemy than the Indians to encounter. When they ſaw their countrymen drawn up on the banks of a river to oppoſe them, they were greatly ſurpriſed; however, Almagro, who wiſhed rather to gain them than to fight, began with attempting to ſeduce their leader. Alvarado could not by any means be gained over; but being inferior in military ſkill, Almagro attacked him by ſurpriſe, entirely defeated and diſperſed his army, taking himſelf and ſome of his principal officers priſoners.

This victory ſeemed deciſive; and Almagro was adviſed to make it ſo by putting to death Gonzalo and Ferdinand Pizarro, Alvarado, and ſome others whom he could not hope to gain. This advice, however, he declined from motives of humanity, and a deſire of making his adverſary appear the aggreſſor. For theſe reaſons, inſtead of marching directly againſt Pizarro, he retired quietly to Cuzco; which gave his adverſary time to recollect himſelf from the diſorder into which the news of ſo many diſaſters had thrown him. He began again to practiſe upon Almagro thoſe arts which had before proved ſucceſsful; and Almagro again ſuffered himſelf to be deceived by pretended offers of pacification. The negociations for this purpoſe were protracted for ſeveral months; and while Almagro was employed in detecting and eluding the fraudulent intentions of the governor, Gonzalo Pizarro and Alvarado found means to corrupt the ſoldiers who guarded them, and not only made their own eſcape, but perſuaded 60 of Almagro's men to accompany them. There now remained only Ferdinand Pizarro in the hands of Almagro; and he was delivered by another act of treachery. The general propoſed that all points of controverſy ſhould be ſubmitted to the deciſion of their ſovereign; and that Ferdinand Pizarro ſhould be inſtantly ſet at liberty, and return to Spain, together with ſome other officers whom the general propoſed to ſend over to ſhow the juſtice of his claims. Though the intention of Pizarro by making this propoſal was evident, Almagro was deceived by it, and releaſed thoſe whom Pizarro wanted; which he had no ſooner done, than the latter threw off all diſguiſe, and openly declared, that arms alone muſt now decide the matter between them. He therefore immediately ſet out for Cuzco with an army of 700 men, to which Almagro had only 500 to oppoſe. From the weakneſs of his forces, probably, Almagro did not attempt to guard ſome ſtrong paſſes, through which Pizarro had to march, but waited patiently for his adverſary in a plain open country.

30 Almagro defeated and taken priſoner,

In the mean time, Pizarro advanced without any obſtruction from his enemy; and an engagement ſoon happened, in which Almagro was defeated and taken priſoner. The conquerors behaved with great cruelty, maſſacring a great number of officers, and treating Almagro himſelf with great ſeverity. The Indians had aſſembled in great numbers to ſee the battle, with an intention to join the vanquiſhed party; but were ſo much overawed by the Spaniards, that they retired quietly after the battle was over, and thus loſt the only opportunity they ever had of expelling their tyrants.—Almagro, after having for ſome months languiſhed in priſon, was at length formally tried, and condemned to die by Pizarro. Notwithſtanding his conſummate bravery, for which he was remarkable, this hardy veteran could not bear the deliberate approach of death, but condeſcended to uſe intreaties to ſave his life. The Pizarros, however, continued inflexible; 31 And ſtrangled. and he was firſt ſtrangled in priſon, and then publicly beheaded. He left one ſon by an Indian woman, whom he appointed his ſucceſſor, by virtue of a power granted him by the emperor.

As during theſe diſſenſions all intercourſe with Spain ceaſed, it was ſome time before the accounts of the civil war were received at court. The firſt intelligence was given by ſome of Almagro's ſoldiers, who had left America on the ruin of their cauſe; and they did not fail to repreſent the injuſtice and violence of Pizarro in the ſtrongeſt colours, which ſtrongly prejudiced the emperor againſt him. In a ſhort time, however, Ferdinand Pizarro arrived, and endeavoured to give matters a new turn. The emperor was uncertain which of them he ought to believe; and therefore thought it neceſſary to ſend over ſome perſon with ample powers to inquire into the merits of the cauſe, and to determine certainly who was in the wrong. If he found the governor ſtill alive, he was to aſſume only the title of judge, in order to have the appearance of acting in concert with him; but if he was dead, the viceroy might then produce his commiſſion appointing him Pizarro's ſucceſſor in the government. This complaiſance to Pizarro, however, proceeded more from a dread of his power than from any other thing; for in the mean time, his brother Ferdinand was arreſted at Madrid, and confined to a priſon, where he remained above 20 years. The perſon nominated to this important truſt was Chriſtoval Vaca de Caſtro.

32 Peru divided by Pizarro among his aſſociates.

While this gentleman was preparing for his voyage, Pizarro, conſidering himſelf as the unrivalled maſter of Peru, proceeded to parcel out its territories among the conquerors; and had this diviſion been made with any degree of impartiality, the extent of country which he had to beſtow was ſufficient to have gratified his friends, and to have gained his enemies. But Pizarro conducted this tranſaction, not with the equity and candour of a judge attentive to diſcover and to reward merit, but with the illiberal ſpirit of a party leader. Large diſtricts, in parts of the country moſt cultivated and populous, were ſet apart as his own property, or granted to his brothers, his adherents, and favourites. To others, lots leſs valuable and inviting were aſſigned. The followers of Almagro, amongſt whom were many of the original adventurers, to whoſe valour and perſeverance Pizarro was indebted for his ſucceſs, were totally excluded from any portion in thoſe lands, towards the acquiſition of which they had contributed ſo largely. As the vanity of every individual ſets an immoderate value upon his own ſervices, and the idea of each, concerning the recompence due to them, roſe gradually to a more exorbitant height in proportion as their conqueſts extended, all who were diſappointed in their expectations exclaimed loudly againſt the rapaciouſneſs and partiality of the governor. The partiſans of Almagro murmured in ſecret, and meditated revenge.

Rapid as the progreſs of the Spaniards in South America had been ſince Pizarro landed in Peru, their avidity of dominion was not yet ſatiſfied. The officers to whom Ferdinand Pizarro gave the command of different detachments, penetrated into ſeveral new provinces; and though ſome of them were expoſed to great hardſhips in the cold and barren regions of the Andes, and others ſuffered diſtreſs not inferior amidſt the woods and marſhes of the plains, they made diſco-

33 Expedition of Gonzales Pizarro.

veries and conqueſts which extended their knowledge of the country, as well as added to their power. Pedro de Valdivia re-aſſumed Almagro's ſcheme of invading Chili; and, notwithſtanding the fortitude of the natives in defending their poſſeſſions, made ſuch progreſs in the conqueſt of the country, that he founded the city of St Jago, and gave a beginning to the eſtabliſhment of the Spaniſh dominion there. But of all the enterpriſes undertaken about this period, that of Gonzales Pizarro was the moſt remarkable. The governor, who ſeems to have reſolved that no perſon in Peru ſhould poſſeſs any ſtation of diſtinguiſhed eminence or authority but thoſe of his own family, had deprived Benalcazar, the conqueror of Quito, of his command in that kingdom, and appointed his brother Gonzales to take the government of it. He inſtructed him to attempt the diſcovery and conqueſt of the country to the eaſt of the Andes; which, according to the information of the Indians, abounded with cinnamon and other valuable ſpices. Gonzales, not inferior to any of his brothers in courage, and no leſs ambitious of acquiring diſtinction, eagerly engaged in this difficult ſervice. He ſet out from Quito at the head of 340 ſoldiers, near one half of whom were horſemen, with 4000 Indians to carry their proviſions. In forcing their way through the defiles, or over the ridges of the Andes, exceſs of cold and fatigue, to neither of which they were accuſtomed, proved fatal to the greater part of the wretched attendants. The Spaniards, tho' more robuſt, and inured to a variety of climates, ſuffered conſiderably, and loſt ſome men; but when they deſcended into the low country, their diſtreſs increaſed. During two months it rained inceſſantly, without any interval of fair weather long enough to dry their clothes. The vaſt plains upon which they were now entering, either altogether without inhabitants, or occupied by the rudeſt and leaſt induſtrious tribes in the New World, yielded little ſubſiſtence. They could not advance a ſtep but as they cut a road through woods, or made it through marſhes. Such inceſſant toil, and continual ſcarcity of food, ſeem more than ſufficient to have exhauſted and diſpirited any troops. But the fortitude and perſeverance of the Spaniards in the 16th century were inſuperable. Allured by frequent but falſe accounts of rich countries before them, they perſiſted in ſtruggling on, until they reached the banks of the Coca or Napo, one of the large rivers whoſe waters pour into the Maragnon, and contribute to its grandeur. There, with infinite labour, they built a bark, which they expected would prove of great utility, both in conveying them over rivers, in procuring proviſions, and in exploring the country. This was manned with 50 ſoldiers, under the command of Francis Orellana, the officer next in rank to Pizarro. The ſtream carried them down with ſuch rapidity, that they were ſoon far a-head of their countrymen, who followed ſlowly and with difficulty by land.

34 Orellana ſails down the river Maragnon, and deſerts Pizarro.

At this diſtance from his commander, Orellana, a young man of an aſpiring mind, began to fancy himſelf independent; and, tranſported with the predominant paſſion of the age, he formed the ſcheme of diſtinguiſhing himſelf as a diſcoverer, by following the courſe of the Maragnon until it joined the ocean, and by ſurveying the vaſt regions through which it flows. This ſcheme of Orellana's was as bold as it was treacherous. For, if he be chargeable with the guilt of having violated his duty to his commander, and with having abandoned his fellow-ſoldiers in a pathleſs deſert, where they had hardly any hopes of ſucceſs, or even of ſafety, but what were founded on the ſervice which they expected from the bark, his crime is, in ſome meaſure, balanced by the glory of having ventured upon a navigation of near 2000 leagues, through unknown nations, in a veſſel haſtily conſtructed with green timber, and by very unſkilful hands, without proviſions, without a compaſs, or a pilot. But his courage and alacrity ſupplied every defect. Committing himſelf fearleſsly to the guidance of the ſtream, the Napo bore him along to the ſouth, until he reached the great channel of the Maragnon. Turning with it towards the coaſt, he held on his courſe in that direction. He made frequent deſcents on both ſides the river, ſometimes ſeizing by force of arms the proviſions of the fierce ſavages ſeated on its banks, and ſometimes procuring a ſupply of food by a friendly intercourſe with more gentle tribes. After a long ſeries of dangers, which he encountered with amazing fortitude, and of diſtreſſes which he ſupported with no leſs magnanimity, he reached the ocean, where new perils awaited him. Theſe he likewiſe ſurmounted, and got ſafe to the Spaniſh ſettlement in the iſland Cubagua; from thence he ſailed to Spain. The vanity natural to travellers who viſit regions unknown to the reſt of mankind, and the art of an adventurer, ſolicitous to magnify his own merit, concurred in prompting him to mingle an extraordinary proportion of the marvellous in the narrative of his voyage. He pretended to have diſcovered nations ſo rich, that the roofs of their temples were covered with plates of gold; and deſcribed a republic of women ſo warlike and powerful, as to have extended their dominion over a conſiderable tract of the fertile plains which he had viſited. Extravagant as thoſe tales were, they gave riſe to an opinion, that a region abounding with gold, diſtinguiſhed by the name of *El Dorado*, and a community of Amazons, were to be found in this part of the New World; and ſuch is the propenſity of mankind to believe what is wonderful, that it has been ſlowly, and with difficulty, that reaſon and obſervation have exploded thoſe fables. The voyage, however, even when ſtripped of every romantic embelliſhment, deſerves to be recorded, not only as one of the moſt memorable occurrences in that adventrous age, but as the firſt event that led to any certain knowledge of thoſe immenſe regions that ſtretch eaſtward from the Andes to the ocean.

No words can deſcribe the conſternation of Pizarro, when he did not find the bark at the confluence of the Napo and Maragnon, where he had ordered Orellana to wait for him. He would not allow himſelf to ſuſpect that a man, whom he had entruſted with ſuch an important command, could be ſo baſe and ſo unfeeling as to deſert him at ſuch a juncture. But imputing his abſence from the place of rendezvous to ſome unknown accident, he advanced above 50 leagues along the banks of the Maragnon, expecting every moment to ſee the bark appear with a ſupply of proviſions. At length he came up with an officer whom Orellana had left to periſh in the deſert, becauſe he had the courage to remonſtrate againſt his perfidy. From him he learned the extent of Orellana's crime; and his followers perceived at once their own deſperate ſituation, when deprived of their only reſource. The ſpirit of the ſtout-

35 Extreme diſtreſs of Gonzales Pizarro and his men.

eſt hearted veteran ſunk within him; and all demanded to be led back inſtantly. Pizarro, though he aſſumed an appearance of tranquillity, did not oppoſe their inclination. But he was now 1200 miles from Quito; and in that long march the Spaniards encountered hardſhips greater than thoſe they had endured in their progreſs outward, without the alluring hopes which then ſoothed and animated them under their ſufferings. Hunger compelled them to feed on roots and berries, to eat all their dogs and horſes, to devour the moſt loathſome reptiles, and even to gnaw the leather of their ſaddles and ſword belts. Four thouſand Indians, and 210 Spaniards, periſhed in this wild and diſaſtrous expedition, which continued near two years; and as 50 men were aboard the bark with Orellana, only 80 got back to Quito. Theſe were naked like ſavages, and ſo emaciated with famine, or worn out with fatigue, that they had more the appearance of ſpectres than of men.

36 A conſpiracy formed againſt the governor;

But, inſtead of returning to enjoy the repoſe which his condition required, Pizarro, on entering Quito, received accounts of a fatal event that threatened calamities more dreadful to him than thoſe through which he had paſſed. From the time that his brother made that partial diviſion of his conqueſts which has been mentioned, the adherents of Almagro, conſidering themſelves as proſcribed by the party in power, no longer entertained any hope of bettering their condition. Great numbers in deſpair, reſorted to Lima, where the houſe of young Almagro was always open to them: and the ſlender portion of his father's fortune, which the governor allowed him to enjoy, was ſpent in affording them ſubſiſtence. The warm attachment with which every perſon who ſerved under the elder Almagro devoted himſelf to his intereſts, was quickly transferred to his ſon, who was now grown up to the age of manhood, and poſſeſſed all the qualities which captivate the affections of ſoldiers. Of a graceful appearance, dexterous at all martial exerciſes, bold, open, generous, he ſeemed to be formed for command; and as his father, conſcious of his own inferiority from the total want of education, had been extremely attentive to have him inſtructed in every ſcience becoming a gentleman, the accompliſhments which he had acquired heightened the reſpect of his followers, as they gave him diſtinction and eminence among illiterate adventurers. In this young man the Almagrians found a point of union which they wanted; and looking up to him as their head, were ready to undertake any thing for his advancement. Nor was affection for Almagro their only incitement; they were urged on by their own diſtreſſes. Many of them, deſtitute of common neceſſaries, and weary of loitering away life, a burden to their chief, or to ſuch of their aſſociates as had ſaved ſome remnant of their fortune from pillage and confiſcation, longed impatiently for an occaſion to exert their activity and courage, and began to deliberate how they might be avenged on the author of all their miſery. Their frequent cabals did not paſs unobſerved; and the governor was warned to be on his guard againſt men who meditated ſome deſperate deed, and had reſolution to execute it. But, either from the native intrepidity of his mind, or from contempt of perſons whoſe poverty rendered their machinations of little conſequence, he diſregarded the admonitions of his friends. "Be in no pain (ſaid he careleſsly) about my life; it is perfectly ſafe, as long as every man in Peru knows that I can in a moment put him to death who dares to harbour a thought againſt it." This ſecurity gave the Almagrians full leiſure to digeſt and ripen every part of their ſcheme; and Juan de Herrada, an officer of great abilities, who had the charge of Almagro's education, took the lead in their conſultations, with all the zeal which that connection inſpired, and with all the authority which the aſcendant that he was known to have over the mind of his pupil gave him.

37 Who is murdered.

On Sunday, the 26th of June, at mid-day, the ſeaſon of tranquillity and repoſe in all ſultry climates, Herrada, at the head of 18 of the moſt determined conſpirators, ſallied out of Almagro's houſe in complete armour; and drawing their ſwords, as they advanced haſtily towards the governor's palace, cried out, "Long live the king, but let the tyrant die." Their aſſociates, warned of their motions by a ſignal, were in arms at different ſtations ready to ſupport them. Though Pizarro was uſually ſurrounded by ſuch a numerous train of attendants as ſuited the magnificence of the moſt opulent ſubject of the age in which he lived, yet as he was juſt riſen from table, and moſt of his own domeſtics had retired to their own apartments, the conſpirators paſſed through the two outer courts of the palace unobſerved. They were at the bottom of the ſtaircaſe, before a page in waiting could give the alarm to his maſter, who was converſing with a few friends in a large hall. The governor, whoſe ſteady mind no form of danger could appal, ſtarting up, called for arms, and commanded Franciſco de Chaves to make faſt the door. But that officer, who did not retain ſo much preſence of mind as to obey this prudent order, running to the top of the ſtaircaſe, wildly aſked the conſpirators what they meant, and whither they were going? Inſtead of anſwering, they ſtabbed him to the heart, and burſt into the hall. Some of the perſons who were there threw themſelves from the windows; others attempted to fly; and a few drawing their ſwords, followed their leader into an inner apartment. The conſpirators, animated with having the object of their vengeance now in view, ruſhed forward after them. Pizarro, with no other arms than his ſword and buckler, defended the entry, and ſupported by his half-brother Alcantara and his little knot of friends, maintained the unequal conteſt with intrepidity worthy of his paſt exploits, and with the vigour of a youthful combatant. "Courage (cried he), companions, we are yet enow to make thoſe traitors repent of their audacity." But the armour of the conſpirators protected them, while every thruſt they made took effect. Alcantara fell dead at his brother's feet; his other defendants were mortally wounded. The governor, ſo weary that he could hardly wield his ſword, and no longer able to parry the many weapons furiouſly aimed at him, received a deadly thruſt full in his throat, ſunk to the ground, and expired.

As ſoon as he was ſlain, the aſſaſſins ran out into the ſtreets, and waving their bloody ſwords, proclaimed the death of the tyrant. Above 200 of their aſſociates having joined them, they conducted young Almagro in ſolemn proceſſion through the city; and aſſembling the magiſtrates and principal citizens, compelled

38 Young Almagro heads the rebels.

pelled them to acknowledge him as lawful ſucceſſor to his father in his government. The palace of Pizarro, together with the houſes of ſeveral of his adherents, were pillaged by the ſoldiers; who had the ſatisfaction at once of being avenged on their enemies, and of enriching themſelves by the ſpoils of thoſe through whoſe hands all the wealth of Peru had paſſed.

The new governor marched into the heart of the empire, in order to reduce ſuch places as refuſed to acknowledge his authority. A multitude of ruffians joined him on his march. His army breathed nothing but vengeance and plunder: every thing gave way before it. If the military talents of the general had equalled the ardour of his troops, the war had ended here. Unhappily for Almagro, he had loſt his conductor John de Herrada. His inexperience made him fall into the ſnares that were laid for him by Pedro Alvares, who had put himſelf at the head of the oppoſite party. He loſt, in attempting to unravel his plots that time that he ought to have employed in fighting. In theſe circumſtances, an event, which no one could have foreſeen, happened to change the face of affairs.

The licentiate Vaca di Caſtro, who had been ſent from Europe to try the murderers of old Almagro, arrived at Peru. As he was appointed to aſſume the government in caſe Pizarro was no more, all who had not ſold themſelves to the tyrant haſtened to acknowledge him. Uncertainty and jealouſy, which had for too long a time kept them diſperſed, were no longer an obſtacle to their re-union. Caſtro, who was as reſolute as if he had grown old in the ſervice, did not ſuffer their impatience to languiſh, but inſtantly led them againſt the enemy. The two armies engaged at Chapas on the 16th of September 1542, and fought with inexpreſſible obſtinacy. Victory, after having wavered a long time, at the cloſe of the day decided in favour of that party whoſe cauſe was the moſt juſt. Thoſe among the rebels who were moſt guilty dreading to languiſh under diſgraceful tortures, provoked the conquerors to murder them, crying out, like men in deſpair, *It was I who killed Pizarro.* Their chief was taken priſoner, and died on the ſcaffold.

39 He is defeated by Vaca di Caſtro.

While theſe ſcenes of horror were tranſacting in America, the Spaniards in Europe were employed in finding out expedients to terminate them; though no meaſures had been taken to prevent them. Peru had only been made ſubject to the audience of Panama, which was too remote to ſuperintend the maintenance of good order, and had too little influence to make its decrees reſpected. A ſupreme tribunal was then eſtabliſhed at Lima for the diſpenſation of juſtice, which was to be inveſted with authority ſufficient to enforce and to reward a due obedience to the laws. Blaſco Nunez Vela, who preſided in it as viceroy, arrived in 1544, attended by his ſubordinates in office, and found every thing in the moſt dreadful diſorder.

To put an end to theſe tumults which now ſubſiſted, would have required a profound genius, and many other qualities which are ſeldom united. Nunez had none of theſe advantages. Nature had only given him probity, firmneſs, and ardour; and he had taken no pains to improve theſe gifts. With theſe virtues, which were almoſt defects in his ſituation, he began to fulfil his commiſſion, without regard to places, perſons, or circumſtances.

40 Bad conduct of the viceroy Nunez Vela.

Contrary to the opinion of all intelligent perſons who wiſhed that he ſhould wait for freſh inſtructions from Europe, he publiſhed ordinances, which declared that the lands the conquerors had ſeized ſhould not paſs to their deſcendants, and which diſpoſſeſſed thoſe who had taken part in the civil commotions. All the Peruvians who had been enſlaved by monks, biſhops, and perſons belonging to the government, were declared free. Thoſe who belonged to other maſters were to be freed from their ſhackles at the death of their oppreſſors. They could no longer be compelled to bury themſelves in the mines, nor could any kind of labour be exacted from them without payment. Their tribute was fixed. The Spaniards who travelled on foot were deprived of the right of taking three Indians to carry their baggage; and thoſe who travelled on horſeback, of the right of taking five. The caciques were diſcharged from the obligation of furniſhing the traveller and his retinue with proviſions gratis. Other tyrannical eſtabliſhments alſo would ſoon have been proſcribed; and the conquered people were on the eve of being ſheltered under the protection of laws, which would at leaſt have tempered the rigours of the right of conqueſt, if even they had not entirely repaired the injuſtice of them; but it ſhould ſeem that the Spaniſh government was only to be unfortunate in the good it attempted to effect.

A change ſo unexpected filled thoſe with conſternation who ſaw their fortunes wreſted from them, or who loſt the flattering hope of tranſmitting them to their poſterity. Even thoſe who were not affected by theſe intereſted views, being accuſtomed to look upon the Indians as the inſtruments and victims of their avarice, had no conception that any other ideas could prevail concerning them. From aſtoniſhment they proceeded to indignation, murmuring, and ſedition. The viceroy was degraded, put in irons, and baniſhed to a deſert iſland, till he could be conveyed to Spain.

Gonzales Pizarro was then returned from his hazardous expedition, which had employed him long enough to prevent him from taking a part in thoſe revolutions which had ſo rapidly ſucceeded each other. The anarchy he found prevailing at his return, inſpired him with the idea of ſeizing the ſupreme authority. His fame and his forces made it impoſſible that this ſhould be refuſed him; but his uſurpation was marked with ſo many enormities, that Nunez was regretted. He was recalled from exile, and ſoon collected a ſufficient number of forces to enable him to take the field. Civil commotions were then renewed with extreme fury by both parties. No quarter was aſked or given on either ſide. The Indians took part in this as they had done in the preceding wars; ſome ranged themſelves under the ſtandard of the viceroy, others under the banners of Gonzales. From 15,000 to 20,000 of theſe unhappy wretches, who were ſcattered about in each army, dragged up the artillery, levelled the roads, carried the baggage, and deſtroyed one another. Their conquerors had taught them to be ſanguinary. After a variety of advantages for a long time alternately obtained, fortune at length favoured the rebellion under the

41 He is overcome and killed by Gonzales Pizarro.

the walls of Quito in the month of January, in the year 1545; and Nunez with the greateſt part of his men were maſſacred.

Pizarro took the road of Lima, where they were deliberating on the ceremonies with which they ſhould receive him. Some officers wiſhed that a canopy ſhould be carried for him to march under, after the manner of kings. Others, with adulation ſtill more extravagant, pretended that part of the walls of the town, and even ſome houſes, muſt be pulled down; as was the cuſtom at Rome, when a general obtained the honours of a triumph. Gonzales contented himſelf with making his entrance on horſeback, preceded by his lieutenant, who marched on foot. Four biſhops accompanied him, and he was followed by the magiſtrates. The ſtreets were ſtrewn with flowers, and the air reſounded with the noiſe of bells and various muſical inſtruments. This homage totally turned the head of a man naturally haughty, and of confined ideas. He ſpoke and acted in the moſt deſpotic manner.

Had Gonzales poſſeſſed judgment and the appearance of moderation, it would have been poſſible for him to render himſelf independent. The principal perſons of his party wiſhed it. The majority would have beheld this event with indifference, and the reſt would have been obliged to conſent to it. Blind cruelties, inſatiable avarice, and unbounded pride, altered theſe diſpoſitions. Even thoſe, whoſe intereſts were connected with thoſe of the tyrant, wiſhed for a deliverer.

42
An end put to the troubles by Pedro di la Gaſca.

Such a deliverer arrived from Europe in the perſon of the licentiate Pedro di la Gaſca. The ſquadron and the provinces of the mountains immediately declared for a perſon who was inveſted with a lawful authority to govern them. Thoſe who lived concealed in deſerts, caverns, and foreſts, quitted their retreats to join him. Gonzales, who ſaw no reſource left to ſupport him but in ſome great atchievement, took the road of Cuzco, with a reſolution to give battle. At ſome leagues diſtance from this place he met the royal army, and attacked it on the 9th of June 1548. One of his lieutenants, ſeeing him abandoned at the firſt charge by his beſt ſoldiers, adviſed him to throw himſelf into the enemy's battalions, and periſh like a Roman: but this weak man choſe rather to ſurrender, and end his life on a ſcaffold. Carvajal, a more able warrior, and more ferocious than himſelf, was quartered. This man, when he was expiring, boaſted that he had maſſacred with his own hand 1400 Spaniards and 20,000 Indians.

Such was the laſt ſcene of a tragedy, of which every act has been marked with blood. The government was moderate enough not to continue the proſcriptions; and the remembrance of the horrid calamities they had ſuffered kept the Spaniards in the bounds of ſubjection. What ſtill remained of that commotion that had been raiſed in their minds, inſenſibly ſunk into a calm; and the country hath remained in quiet ever ſince.

33
Hard fate of the Peruvians.

With regard to the Peruvians, the moſt cruel meaſures were taken to render it impoſſible for them to rebel. Tupac Amaru, the heir of their laſt king, had taken refuge in ſome remote mountains, where he lived in peace. There he was ſo cloſely ſurrounded by the troops which had been ſent out againſt him, that he was forced to ſurrender. The viceroy Francis de Toledo cauſed him to be accuſed of ſeveral crimes that he had not committed, and for which he was beheaded in 1571. All the other deſcendants of the Incas ſhared the ſame fate, under pretence that they had conſpired againſt their conquerors. The horror of theſe enormities excited ſo univerſal an indignation both in the Old and the New World, that Philip II. thought himſelf obliged to diſavow them; but the infamous policy of this prince was ſo notorious, that no credit was given to this appearance of his juſtice and humanity.

44
Extent of the empire.

The empire of Peru, at the time it was ſubdued, extended along the South Sea, from the river of Emeralds to Chili, and on the land ſide to Popayan, according to ſome geographers. It contained within its extent that famous chain of mountains which riſes in the Terra Magellanica, and is gradually loſt in Mexico, in order to unite, as it ſhould ſeem, the ſouthern parts of America with the northern.

Payne's geography.

It is now divided into three grand diviſions or audiences; Quito, Lima, or Los Reyes, and Los Charcos. As to its climate, mines, ſoil, and produce, they differ greatly in different parts of the country.

45
Province of Quito.

The extenſive province of Quito is bounded on the north by Popayan, and includes a part of that government, alſo by Santa Fe de Bogota; on the ſouth by the governments of Piura and Chachapoyas; on the eaſt it extends over the whole government of Maynas and the river of the Amazons to the meridian, which divides the Spaniſh from the Portugueſe dominions; and on the weſt it is bounded by the South Sea; extending, according to Antonio de Ulloa, 600 leagues in length, and about 200 in its greateſt breadth; but this greatly exceeds the computation of all other geographers. He however obſerves, that it muſt be owned a great part of thoſe vaſt dominions are either inhabited by nations of Indians, or have not hitherto been ſufficiently peopled by the Spaniards, if indeed they have been thoroughly known; and that all the parts that can properly be ſaid to be peopled, and actually ſubject to the Spaniſh government, are thoſe intercepted by the two Cordilleras of the Andes, which, in compariſon to the extent of the country, may be termed a ſtreet or lane, 15 leagues, or ſometimes more, from eaſt to weſt; to this muſt be added ſeveral detached governments, ſeparated by the very extenſive tracts inhabited by free Indians.

46
Climate ſeaſons, &c. of this province.

The climate of Quito differs from all others in the ſame parallel, ſince even in the centre of the torrid zone, or although under the equinoctial, the heat is not only very tolerable, but even in ſome places the cold is painful; while others enjoy all the advantages of a perpetual ſpring, the fields being conſtantly covered with verdure, and ennamelled with flowers of the moſt lively colours. The mildneſs of the climate, free from the extremes of heat and cold, and the conſtant equality of the day and night, render this country, which from its ſituation might be thought to be parched by the conſtant heat of the ſun, and ſcarcely inhabitable, both pleaſant and fertile; for nature has here diſpenſed her bleſſings with ſo liberal a hand, that this country in ſeveral reſpects ſurpaſſes thoſe of the temperate zones, where the viciſſitudes of winter and ſummer, and the

change

Peru.

change from heat to cold, cauſe the extremes of both to be more ſenſibly felt. However, in different parts of the country, the air is very different; in one part are mountains of a ſtupendous height and magnitude, with their ſummits covered with ſnow. The plains are temperate, the valleys hot, and, according to the high or low ſituation of the country, are found all the variety of gradations in temperature poſſible to be conceived between the extremes of heat and cold

Quito, the capital, in 0° 13′ ſouth latitude, and 77° 50′ weſt longitude from Greenwich, is ſo happily ſituated, that neither heat nor cold are troubleſome, though both may be felt in its neighbourhood; and what renders this equality more delightful is that it is conſtant throughout the whole year, the difference between the ſeaſons being ſcarce perceptible. Indeed the mornings are cool, the remainder of the day warm, and the nights of an agreeable temperature. See Quito.

The winds, which are pure and ſalubrious, blow for the moſt part from north to ſouth, but never with any violence, though they ſometimes ſhift their quarters, but without any regard to the ſeaſon of the year. Such ſignal advantages reſulting from the climate, ſoil, and aſpect of this country, would be ſufficient to render it the moſt enviable ſpot upon earth, as it is ſuppoſed to be the moſt elevated, if, whilſt enjoying theſe delights, the inhabitants were not haraſſed by terror, and expoſed to continual danger; for here tremendous tempeſts of thunder and lightning prevail, which are ſufficient to appal the ſtouteſt heart; whilſt earthquakes frequently ſpread univerſal apprehenſions, and ſometimes bury cities in ruins.

The diſtinction of winter and ſummer conſiſts in a very minute difference; the interval between the month of September and thoſe of April, May, or June, is here called the winter ſeaſon, and the other months compoſe the ſummer. In the former ſeaſon the rain chiefly prevails, and in the latter the inhabitants frequently enjoy whole days of fine weather; but whenever the rains are diſcontinued for above fortnight, the inhabitants are in the utmoſt conſternation, and public prayers are offered up for their return. On the other hand, when they continue a ſhort time without intermiſſion, the like fears prevail, and the churches are again crowded with ſupplicants to obtain fine weather; for a long drought produces dangerous diſeaſes, and a continual rain, without intervals of ſunſhine, deſtroys the fruits of the earth. The city of Quito, however, enjoys one peculiar advantage in being free from muſketoes and other troubleſome inſects, ſuch as fleas and venomous reptiles, except the *nigua*, or *pique*, which is a very ſmall inſect ſhaped like a flea, but hardly viſible to the ſight. See Chegoe.

47 Soil, produce, &c.

The fertility of the ſoil here is incredible, for the fruits and beauties of the ſeveral ſeaſons are viſible at the ſame time; and the curious European obſerves with a pleaſing admiration, that while ſome herbs of the field are fading, others of the ſame kind are ſpringing up; while ſome flowers loſe their beauty, others blow to continue the enamelled proſpect: thus, when the fruits of the trees have attained their maturity, and the leaves begin to change their colour, freſh leaves bloſſom, and fruits are ſeen in their proper gradations in ſize and ripeneſs on the ſame tree. The ſame inceſſant fertility is conſpicuous in the corn, both reaping and ſowing being carried on at the ſame time: ſo that the declivities of the neighbouring hills exhibit all the beauties of the four ſeaſons in one aſſemblage. Though all this is generally ſeen, yet there is a ſettled time for the grand harveſt: yet ſometimes the moſt favourable ſeaſon for ſowing in one place is a month or two after that of another, though their diſtance does not exceed three or four leagues. Thus in different ſpots, and ſometimes in one and the ſame, ſowing and reaping are performed throughout the whole year, the forwardneſs or retardment naturally ariſing from the different ſituations, ſuch as mountains, riſing grounds, plains, and valleys; and the temperature being different in each, the beſt times for performing the ſeveral operations of huſbandry muſt alſo differ.

Peru.

The *chirimoya* is conſidered as one of the moſt delicious fruits in the world. Its dimenſions are various, being from one to five inches in diameter. Its figure is imperfectly round, flatted towards the ſtalk, where it forms a kind of navel; but all the other parts are nearly circular. It is covered with a thin ſoft ſhell, which adheres ſo cloſely to the pulp as not to be ſeparated from it without a knife. The outward coat is green, variegated with prominent veins, forming all over it a kind of net-work. The pulp is white, and contains a large quantity of juice reſembling honey, of a ſweet taſte, mixed with a gentle acid of a moſt exquiſite flavour. The ſeeds are formed in ſeveral parts of the pulp, and are ſomewhat flat. The tree is high and tufted, the ſtem large and round, but with ſome inequalities, full of elliptic leaves, terminating in a point. The bloſſom differs little from the colour of the leaves, which is a darkiſh green; and though far from being beautiful, is remarkable for its incomparable fragrance.

The *granadilla* in its ſhape reſembles an hen's egg, but is larger. The outſide of the ſhell is ſmooth, gloſſy, and of a faint carnation colour, and the inſide white and ſoft. The ſhell contains a viſcous liquid ſubſtance full of very ſmall and delicate grains, leſs hard than thoſe of the pomegranate. This medullary ſubſtance is ſeparated from the ſhell by a fine and tranſparent membrane. Its fruit has a delightful ſweetneſs blended with acidity, very cordial and refreſhing, and ſo wholeſome, that there is no danger of eating to exceſs.

The *frutilla*, or Peruvian ſtrawberry, is very different from that of Europe in ſize; for though they are here generally not above an inch in length, they are much larger in other parts of Peru; but their taſte, though juicy, and not unpalatable, is not equal to thoſe in Europe.

48 Inhabitants.

The country is obſerved to abound more in women than in men, which is the more remarkable, as thoſe cauſes which induce men to leave their country, as travelling, commerce, and war, naturally bring over more men from Europe than women. But there are many families in which there are a number of daughters, without one ſon among them. The women enjoy a better ſtate of health than the men, which may be owing in ſome meaſure to the climate, and more particularly to the early intemperance and voluptuouſneſs of the other ſex.

The Creoles are well made, of a proper ſtature and of a lively and agreeable countenance. The Meſtizos are alſo in general well made, often taller than the ordinary ſize, very robuſt, and have an agreeable air. The Indians, both men and women, are commonly low of ſtature, though ſtrong and well proportioned; but more natural defects are to be found among them than in any of the reſt. Some are remarkably ſhort, ſome idiots, dumb or blind. Their hair is generally thick and long, which they wear looſe on their ſhoulders; but the Indian women plait theirs behind with a ribbon, and cut that before a little above the eye-brows, from one ear to the other. The greateſt diſgrace that can be offered to an Indian of either ſex is to cut off their hair; for whatever corporal puniſhment their maſters think proper to inflict on them, they bear with patience; but this affront they never forgive; and accordingly the government has interpoſed, and limited this puniſhment to the moſt enormous crimes. The colour of the hair is generally a deep black: it is lank, harſh, and as courſe as that of a horſe. On the contrary, the male Meſtizos, in order to diſtinguiſh themſelves from the Indians, cut off their hair; but the females do not adopt that cuſtom.

49 Their dreſs.

The Meſtizos in general wear a blue cloth, manufactured in this country; but though they are the loweſt claſs of Spaniards, they are very ambitious of diſtinguiſhing themſelves as ſuch, either by the colour or faſhion of the clothes they wear.

The Meſtizo women affect to dreſs in the ſame manner as the Spaniſh, though they cannot equal the ladies in the richneſs of their ſtuffs. The meaner ſort wear no ſhoes; but, like the men of the ſame rank, go barefooted.

The dreſs of the Indians conſiſts of white cotton drawers, which hang down to the calf of the leg, where they are looſe, and edged with a lace ſuitable to the ſtuff. The uſe of a ſhirt is ſupplyed by a black cotton frock, made in the form of a ſack, with three openings at the bottom, one in the middle for the head, and others at the corners for the arms; thus covering their naked bodies down to the knees. Over this is a ſerge cloak, with a hole in the middle for putting the head through, and a hat made by the natives. This is their general dreſs, which they never lay aſide, even while they ſleep; and they have no additional clothing for their legs or feet. The Indians, who have acquired ſome fortune, particularly the barbers and phlebotomiſts, diſtinguiſh themſelves from their countrymen by the fineneſs of their drawers, and by wearing a ſhirt, which, though without ſleeves, has a lace four or five fingers in breadth, faſtened round like a kind of ruff or band. They are fond of ſilver or gold buckles to their ſhoes, though they wear no ſtockings; and inſtead of a mean ſerge cloak, wear one of fine cloth, which is often adorned with gold or ſilver lace.

There are two kind of dreſſes worn by the Indian women, made in the ſame plain manner with thoſe worn by the men in general, the whole conſiſting of a ſhort petticoat and a veil of American baize. But the dreſs of the loweſt claſs of Indian women is only a bag of the ſame make and ſtuff as that of the men, which they faſten to their ſhoulders with two large pins; it reaches down to the calf of the leg, and is faſtened round the waiſt with a kind of girdle. Inſtead of a veil, they wear about the neck a piece of the ſame coarſe ſtuff, dyed black; but their arms and legs are naked.

50 Food and drink, &c.

The people have diſhes unknown in Europe; but are particularly fond of cheeſe; and have excellent butter in the neighbourhood of Quito. Sweetmeats are very much admired.

Rum is commonly drank here by perſons of all ranks; but their favourite liquor is brandy. The diſorders ariſing from the exceſſive uſe of ſpirituous liquors are chiefly ſeen among the Meſtizos; and the lower claſs of women, both among the Creoles and Meſtizos, are alſo extremely addicted to the ſame ſpecies of debauchery.

Another liquor much uſed in this country is mate, which is made of an herb known in all theſe parts of America by the name of Paraguay, as being the produce of that country. Some of it is put into a calabaſh tipped with ſilver, called here *mate*, with ſugar and ſome cold water. After it has continued there ſome time, the calabaſh is filled with boiling water, and they drink the liquor through a pipe fixed in the calabaſh. It is alſo uſual to ſqueeze into the liquor a ſmall quantity of the juice of lemons or Seville oranges, mixed with ſome perfumes from odoriferous flowers. This is their uſual drink in the morning faſting, and many uſe it alſo at their evening regale. The manner of drinking it appears very indelicate, the whole company taking it ſucceſſively through the ſame pipe, it being carried ſeveral times round the company till all are ſatisfied. This among the Creoles is the higheſt enjoyment: ſo that when they travel, they never fail to carry with them a ſufficient quantity of it, and till they have taken their doſe of mate they never eat.

The vice of gaming is here carried to an extravagant height, to the ruin of many families, ſome loſing their ſtocks in trade, others the very clothes from their backs, and afterward thoſe belonging to their wives, which they hazard, ſtimulated by the hope of recovering their own.

The common people, the Indians, and even the domeſtics, are greatly addicted to ſtealing. The Meſtizos, though arrant cowards, do not want audacity in this way; for though they will not venture to attack any one in the ſtreet, it is a common practice to ſnatch off a perſon's hat, and immediately ſeek their ſafety in flight. This acquiſition is ſometimes of conſiderable value; the hats worn by perſons of rank, and even by the wealthy citizens when dreſſed, being of white beaver, worth fifteen dollars, beſide the hatband of gold or ſilver lace, faſtened with a gold buckle ſet with diamonds or emeralds. Robberies on the highway are ſeldom heard of.

51 Language.

In Quito, and all the towns and villages of its province, different dialects are ſpoken, Spaniſh being no leſs common than the Inga, the language of the country. The Creoles uſe the latter as much as the former, but both are conſiderably adulterated by borrowed words and expreſſions. The firſt language generally ſpoken by children is the Inga; for the nurſes being Indians, many of them do not underſtand a word of Spaniſh, and thus they afterwards learn a jargon compoſed of both languages.

52 Honour paid the dead.

The ſumptuous manner of performing the laſt offices for the dead, demonſtrates how far the power of habit is capable of prevailing over reaſon and prudence, for their oſtentation is ſo great in this particular, that many families of credit are ruined by prepoſterouſly endeavouring to excel others; and the people here may be ſaid to toil and ſcheme to lay up wealth, to enable their ſucceſſors to laviſh honours upon a body inſenſible of all pageantry.

53 Commerce. The commerce of the province of Quito is chiefly carried on by Europeans ſettled here, and others who occaſionally arrive. The manufactures of this province are only cottons, ſome white and ſtriped baize, and cloths, which meet with a good market at Lima, for ſupplying the inward provinces of Peru. The returns are made partly in ſilver, and partly in fringes made of gold and ſilver thread, and wine, brandy, oil, copper, tin, lead, and quickſilver. On the arrival of the galleons at Carthagena, theſe traders reſort thither to purchaſe European goods, which, at their return, they conſign to their correſpondents all over the province. The coaſts of New Spain ſupply this province with indigo, of which there is a very large conſumption at the manufactures, blue being univerſally the colour which this people adopt for their apparel. They alſo import, by way of Guayaquila, iron and ſteel both from Europe and the coaſt of Guatimala.

54 Diſpoſition of the inhabitants. The diſpoſition of the Indians in the province of Quito is extremely remarkable, and they appear to have no reſemblance to the people found there by thoſe who firſt diſcovered the country. They at preſent poſſeſs a tranquillity not to be diſturbed either by fortunate or unfortunate events. In their mean apparel they are as contented as a prince clothed in the moſt ſplendid robes. They ſhow the ſame diſregard to riches; and even the authority and grandeur within their reach is ſo little the object of their ambition, that to all appearance it ſeems to be the ſame to an Indian whether he be created an alcalde or obliged to perform the office of a common executioner.

Their ſloth is ſo great, that ſcarcely any thing can induce them to work. Whatever therefore is neceſſary to be done is left to the Indian women, who are much more active; they ſpin and make the half ſhirts and drawers which form the only apparel of their huſbands; they cook the proviſions, grind barley, and brew the beer called *chicha;* while the huſband ſits ſquatting on his hams, the uſual poſture of the Indians, looking at his buſy wife. The only domeſtic ſervice they do is to plough their little ſpot of land, which is ſowed by the wife. When they are once ſeated on their hams, no reward can induce them to ſtir; ſo that if a traveller has loſt his way, and happens to come to one of their cottages, they charge their wives to ſay that they are not at home. Should the paſſenger alight and enter the cottage, the Indian would ſtill be ſafe; for having no light but what comes through a hole in the door, he could not be diſcovered; and ſhould the ſtranger even ſee the Indian, neither entreaties nor rewards would prevail on him to ſtir a ſtep with him.

They are lively only in parties of pleaſure, rejoicings, entertainments, and eſpecially dancing; but in all theſe the liquor muſt circulate briſkly, and they continue drinking till they are entirely deprived both of ſenſe and motion.

It is remarkable that the Indian women, whether maids or married, and Indian young men before they are of an age to contract matrimony, are never guilty of this vice: it being a maxim among them, that drunkenneſs is the privilege of none but maſters of families, who, when they are unable to take care of themſelves, have others to take care of them.

The women preſent the chicha (A) to their huſbands in calabaſhes, till their ſpirits are raiſed; then one plays on a pipe and tabor, while others dance. Some of the beſt voices among the Indian women ſing ſongs in their own language, and thoſe who do not dance, ſquat down in the uſual poſture till it comes to their turn. When tired with intemperance, they all lie down together, without regarding whether they be near the wife of another or their own ſiſter or daughter. Theſe feſtivities ſometimes continue three or four days, till the prieſt coming among them, throws away all the chicha, and diſperſes the Indians, leſt they ſhould procure more.

Their funerals are likewiſe ſolemnized with exceſſive drinking. The houſe is filled with jugs of chicha, for the ſolace of the mourners and other viſitors; the latter even go out into the ſtreets, and invite all of their nation who happen to paſs by to come in and drink to the honour of the deceaſed. This ceremony laſts four or five days, and ſometimes more, ſtrong liquor being their ſupreme enjoyment.

55 Their manner of contracting marriages. The Indians in the audience of Quito are ſaid to act contrary to all other nations in their marriages; for they never make choice of a woman who has not been firſt enjoyed by others, which they conſider as a certain indication of her perſonal attractions. After a young man has made choice of a woman, he aſks her of her father, and having obtained his conſent, they begin to cohabit together as man and wife, and aſſiſt the father-in-law in cultivating the land. At the end of three or four months, and frequently of a year, the huſband leaves his bride or wife without any ceremony; and perhaps expoſtulates with his father-in-law for endeavouring to deceive him, by impoſing upon him his daughter, whom nobody elſe had thought worthy of making a bedfellow. But if no diſguſt ariſes in the man on this account or any other, after paſſing three or four months in this commerce, which they call *amanarſe*, or to habituate one's ſelf, they then marry. This cuſtom is ſtill very common, though the whole body of the clergy have uſed all their endeavours to put a ſtop to it. Accordingly they always abſolve

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(A) This is a liquor made from maize by the following proceſs. The maize, after being ſoaked in water till it begin to grow, is dried in the ſun, then parched a little, and at laſt ground. The flour, after it has been well kneaded, is put with water into a large veſſel, and left for two or three days to ferment. Its taſte is nearly that of the moſt indifferent kind of cyder. It is a refreſhing, nouriſhing, and aperitive liquor; but it will not keep above eight days without turning ſour.

abſolve them of that ſin before they give them the nuptial benediction.

56 Appearance of the country in this province.

It has been obſerved, that the dependencies of the juriſdictions of Quito are ſeated between the two Cordilleras of the Andes, and that the air is more or leſs cold, and the ground more or leſs ſterile, according to the height of the mountains. Theſe barren tracks are called deſerts; for though all the Cordilleras are dry, ſome are much more ſo than others; and the continual ſnow and froſts render ſome parts of them incapable of producing a ſingle plant, and conſequently they are uninhabited by man or beaſt.

Some of theſe mountains, which appear to have their baſes reſting on other mountains, riſe to a moſt aſtoniſhing height, and, reaching far above the clouds, are here, although in the midſt of the torrid zone, covered with perpetual ſnow. From experiments made with a barometer on the mountain of Cotopaxi, it appeared that its ſummit was elevated 6252 yards above the ſurface of the ſea, ſomething above three geographical miles, which greatly exceeds the height of any other mountain in the known world.

Cotopaxi became a volcano about the time when the Spaniards firſt arrived in this country. A new eruption happened in 1743, which had been for ſome days preceded by a continual interior rumbling noiſe; after which an aperture was made in its ſummit, as alſo three others near the middle of its declivity; theſe parts, when the eruption commenced, were buried under prodigious maſſes of ſnow. The ignited ſubſtances which were ejected being mingled with a conſiderable quantity of ſnow and ice, melting amidſt the flames, were carried down with ſuch amazing rapidity, that the plain from Callo to Latacunga was overflowed, and all the houſes with their wretched inhabitants were ſwept away in one general and inſtantaneous deſtruction. The river of Latacunga was the receptacle of this dreadful flood, till becoming ſwollen above its banks, the torrent rolled over the adjacent country, continuing to ſweep away houſes and cattle, and rendered the land near the town of the ſame name as the river one vaſt lake. Here, however, the inhabitants had ſufficient warning to ſave their lives by flight, and retreated to a more elevated ſpot at ſome diſtance. During three days the volcano ejected cinders, while torrents of lava with melted ice and ſnow poured down the ſides of the mountain. The eruption continued for ſeveral days longer, accompanied with terrible roarings of the wind, ruſhing through the craters which had been opened. At length all was quiet, and neither ſmoke nor fire were to be ſeen; until in May 1744 the flames forced a paſſage through ſeveral other parts on the ſides of the mountain; ſo that in clear nights the flames, being reflected by the tranſparent ice, exhibited a very grand and beautiful illumination. On the 13th of November following, it ejected ſuch prodigious quantities of fire and lava, that an inundation equal to the former ſoon enſued, and the inhabitants of the town of Latacunga for ſome time gave themſelves over for loſt.

The moſt ſouthern mountain of the Cordilleras is that of Mecas or Sangay, which is of a prodigious height, and the far greateſt part of it covered with ſnow; yet from its ſummit iſſues a continual fire, attended with exploſions which are plainly heard at 40 leagues diſtance. The country adjacent to this volcano is entirely barren, being covered with cinders ejected from its mouth. In this mountain riſes the river Sangay, which being joined by the Upano, forms the Payra, a large river which diſcharges itſelf into the Maranon.

Pichincha, though famous for its great height, is 1278 yards lower than the perpendicular height of Cotopaxi, and was formerly a volcano, but the mouth or crater on one of its ſides is now covered with ſand and calcined matter; ſo that at preſent neither ſmoke nor fire iſſue from it. When Don George Juan and Don Antonio de Ulloa were ſtationed on it for the purpoſe of making aſtronomical obſervations, they found the cold on the top of this mountain extremely intenſe, the wind violent, and they were frequently involved in ſo thick a fog, or, in other words, a cloud, that an object at ſix or eight paces diſtance was ſcarcely diſcernible. The air grew clear, by the clouds moving nearer to the earth, and on all ſides ſurrounding the mountain to a vaſt diſtance, repreſenting the ſea with the mountain ſtanding like an iſland in the centre. When this happened, they heard the dreadful noiſe of the tempeſts that diſcharged themſelves on Quito and the neighbouring country. They ſaw the lightning iſſue from the clouds, and heard the thunder roll far beneath them. While the lower parts were involved in tempeſts of thunder and rain, they enjoyed a delightful ſerenity; the wind was abated, the ſky clear, and the enlivening rays of the ſun moderated the ſeverity of the cold. But when the clouds roſe, their thickneſs rendered reſpiration difficult: ſnow and hail fell continually, and the wind returned with all its violence; ſo that it was impoſſible entirely to overcome the fear of being, together with their hut, blown down the precipice on whoſe edge it was built, or of being buried in it by the conſtant accumulations of ice and ſnow. Their fears were likewiſe increaſed by the fall of enormous fragments of rocks. Though the ſmalleſt crevice viſible in their hut was ſtopped, the wind was ſo piercing that it penetrated through; and though the hut was ſmall, crowded with inhabitants, and had ſeveral lamps conſtantly burning, the cold was ſo great, that each individual was obliged to have a chafing-diſh of coals, and ſeveral men were conſtantly employed every morning to remove the ſnow which fell in the night. By the ſeverities of ſuch a climate their feet were ſwelled, and ſo tender that walking was attended with extreme pain, their hands covered with chilblains, and their lips ſo ſwelled and chopt that every motion in ſpeaking drew blood.

57 Province of Lima.

The next diviſion of Peru is the audience of Lima, which is bounded on the north by Quito, on the eaſt by the Cordilleras of the Andes, on the ſouth by the audience of Los Charcos, and on the weſt by the Pacific Ocean, it being about 770 miles in length from north to ſouth, but of an unequal breadth.

58 Climate, ſoil, &c. in this province.

The climate and ſoil of this country is uncommonly various; in ſome places it is exceedingly hot, in others inſupportably cold, and in the city of Lima, where rain never falls, it is always temperate. The ſeaſons vary within the compaſs of a few miles, and in certain parts of the audience all the viciſſitudes of weather are experienced in 24 hours. It is extremely remarkable that no rains fall or rivers flow on the ſea-coaſts, tho' the country is refreſhed by thick fogs, and the heat abated by denſe clouds that never condenſe into ſhowers. This phenomenon, has drawn the attention of many naturaliſts, without their being able ſatisfactorily to account for it.

Spring begins toward the cloſe of the year, that is about the end of November or the beginning of December, when the vapours which fill the atmoſphere during the winter ſubſide, and the ſun, to the great joy of the inhabitants, again appears, and the country then begins to revive, which, during the abſence of his rays, had continued in a ſtate of languor. This is ſucceeded by ſummer, which, though hot from the perpendicular direction of the ſun's rays, is far from being inſupportable; the heat, which indeed would otherwiſe be exceſſive, being moderated by the ſouth winds, which always blow at this ſeaſon, though with no great force. Winter begins at the latter end of June or the beginning of July, and continues till November or December, when the ſouth winds begin to blow ſtronger, and to produce a certain degree of cold, not indeed equal to that in countries where ice and ſnow are known, but ſo keen that the light dreſſes are laid by, and cloth or other warm ſtuffs worn. During the winter the earth is covered with ſo thick a fog, as totally to intercept the rays of the ſun; and the winds, by blowing under the ſhelter of this fog, retain the particles they contracted in the frozen zone. In this ſeaſon only the vapours diſſolve into a very ſmall dew, which every where equally moiſtens the earth; by which means all the hills, which during the other parts of the year offer nothing to the ſight but rocks and waſtes, are clothed with verdure and enamelled with flowers of the moſt beautiful colours. Theſe dews never fall in ſuch quantities as to impair the roads or incommode the traveller; a very thin ſtuff will not ſoon be wet through; but the continuance of the miſts during the whole winter, without being exhaled by the ſun, fertilizes every part of the country.

Lima is as free from tempeſts as from rain; ſo that thoſe of the inhabitants who have neither viſited the mountains nor travelled into other parts, are abſolute ſtrangers to thunder and lightning, and are therefore extremely terrified when they firſt hear the former or ſee the latter. But it is very remarkable, that what is here entirely unknown ſhould be ſo common 30 leagues to the eaſt of Lima; it being no farther to the mountains, where violent rains and tempeſts of thunder and lightning are frequent as at Quito.

But though the capital is freed from the terror of theſe tempeſts, it is ſubject to what is much more dreadful. Earthquakes happen here ſo frequently, that the inhabitants are under continual apprehenſions of being, from their ſuddenneſs and violence, buried in the ruins of their own houſes: yet theſe earthquakes, though ſo ſudden, have their preſages, one of the principal of which is a rumbling noiſe in the bowels of the earth about a minute before the ſhocks are felt, that ſeems to pervade all the adjacent ſubterraneous part; this is followed by diſmal howlings of the dogs, who ſeem to preſage the approaching danger. The beaſts of burden paſſing the ſtreets ſtop, and by a natural inſtinct ſpread open their legs, the better to ſecure themſelves from falling. On theſe portents the terrified inhabitants fly from their houſes into the ſtreets with ſuch precipitation, that if it happens in the night they appear quite naked; the urgency of the danger at once baniſhing all ſenſe of delicacy or ſhame. Thus the ſtreets exhibit ſuch odd and ſingular figures as might afford matter of diverſion, were it poſſible to be diverted in ſo terrible a moment. This ſudden concourſe is accompanied with the cries of children waked out of their ſleep, blended with the lamentations of the women, whoſe agonizing prayers to the ſaints increaſe the common fear and confuſion. The men are alſo too much affected to refrain from giving vent to their terror; ſo that the whole city exhibits a dreadful ſcene of conſternation and horror.

The earthquakes that have happened at the capital are very numerous. The firſt ſince the eſtabliſhment of the Spaniards was in 1582; but the damage was much leſs conſiderable than in ſome of the ſucceeding. Six years after Lima was again viſited by another earthquake, ſo dreadful, that it is ſtill ſolemnly commemorated every year. In 1609 another happened, which overturned many houſes. On the 27th of November 1630, ſuch prodigious damage was done in the city by an earthquake, that, in acknowledgment of its not having been entirely demoliſhed, a feſtival on that day is annually celebrated. Twenty-four years after, on the 3d of November, the moſt ſtately edifices in the city, and a great number of houſes, were deſtroyed by an earthquake; but the inhabitants retiring, few of them periſhed. Another dreadful one happened in 1678; but one of the moſt terrible was on the 28th of October 1687. It began at four in the morning, and deſtroyed many of the fineſt public buildings and houſes, in which a great number of the inhabitants periſhed: but this was little more than a prelude to what followed; for two hours after the ſhock returned with ſuch impetuous concuſſions, that all was laid in ruins, and the inhabitants felt themſelves happy in being only ſpectators of the general devaſtation, by having ſaved their lives, though with the loſs of all their property. During this ſecond ſhock, the ſea retiring conſiderably, and then returning in mountainous waves, entirely overwhelmed Callao, which is at five miles diſtance from Lima, and all the adjacent country, together with the miſerable inhabitants. From that time ſix earthquakes have happened at Lima previous to that of 1746. This laſt was on the 28th of October, at half an hour after ten at night, when the concuſſions began with ſuch violence, that in little more than three minutes the greateſt part, if not all the buildings in the city, were deſtroyed, burying under their ruins thoſe inhabitants who had not made ſufficient haſte into the ſtreets and ſquares, the only places of ſafety. At length the horrible effects of the firſt ſhock ceaſed; but the tranquillity was of ſhort duration, the concuſſions ſwiftly ſucceeding each other. The fort of Callao alſo ſunk into ruins; but what it ſuffered from the earthquake in its building was inconſiderable, when compared to the dreadful cataſtrophe which followed; for the ſea as is uſual on ſuch occaſions, receding to a conſiderable diſtance, returned in mountainous waves, foaming with the violence of the agitation, and ſuddenly buried Callao and the neighbouring country in its flood. This, however, was not entirely effected by the firſt ſwell of the waves; for the ſea retiring farther, returned with ſtill greater impetuoſity, and covered both the

the walls and other buildings of the place; ſo that what even had eſcaped the firſt inundation was totally overwhelmed by thoſe ſucceeding mountainous waves. Twenty-three ſhips and veſſels, great and ſmall were then in the harbour, 19 of which were ſunk, and the other 4, among which was a frigate named St Fermin, were carried by the force of the waves to a conſiderable diſtance up the country. This terrible inundation and earthquake extended to other parts on the coaſt, and ſeveral towns underwent the ſame fate as the city of Lima; where the number of perſons who periſhed within two days after it began, amounted according to the bodies found, to 1300, beſide the maimed and wounded, many of whom lived only a ſhort time in great torture.

The country of Lima enjoys great fertility, producing all kinds of grain and a prodigious variety of fruit. Here induſtry and art ſupply that moiſture which the clouds with-hold. The ancient Incas of Peru cauſed ſmall canals to be formed, in order to conduct the waters of the rivers to every part of the country. The Spaniards, finding theſe uſeful works executed to their hands, had only to keep them in order; and by theſe are watered ſpacious fields of barley, large meadows, plantations, vineyards, and gardens, all yielding uncommon plenty. Lima differs from Quito, where the fruits of the earth have no determined ſeaſon; for here the harveſt is gathered in, and the trees drop their leaves in the proper ſeaſon.

Although the ſummer here is hot, yet venomous creatures are unknown; and the ſame may be ſaid of the territory called *Valles*, though here are ſome ports, as Tumbez and Piura, where the heat is almoſt as great as that of Guayaquil. This ſingularity can therefore proceed from no other cauſe than the natural drought of the climate.

59
Diviſions of the audience of Lima.

The audience of Lima is divided into four biſhoprics, Truxillo, Guamanga, Cuſco, and Arequipa. The dioceſe of Truxillo lies to the north of the archiepiſcopal dioceſe of Lima, and like all the others is divided into ſeveral juriſdictions. The city of Truxillo is ſeated in 8° 6′ ſouth latitude, in a pleaſant ſituation, though in a ſandy ſoil.

In the dioceſe of Guamanga is a rich quickſilver mine, from which the inhabitants of a neighbouring town procure their whole ſubſiſtence: the coldneſs of the air in that place checking the growth of all kinds of grain and fruit, ſo that they are obliged to purchaſe them from their neighbours. The quickſilver mines wrought here ſupply all the ſilver mines in Peru with that neceſſary mineral, and notwithſtanding the prodigious quantities already extracted, no diminution is perceived.

Cuſco, which gives name to another dioceſe, is the moſt ancient city of Peru, being of the ſame date with the empire of the Incas, and was founded by them as the capital of the empire. On the mountain contiguous to the north part of the city are the ruins of a famous fort built by the Incas; whence it appears that their deſign was to incloſe the whole mountain with a prodigious wall, of ſuch conſtruction as to render its aſcent abſolutely impracticable to an enemy, in order to prevent all approach to the city. This wall was entirely of freeſtone, and ſtrongly built, ſome of the ſtones being of a prodigious magnitude. The city of Cuſco is nearly equal to that of Lima. See Cusco.

In this biſhopric are ſeveral mines of gold and ſilver, that are extremely rich.

The fourth dioceſe of the audience of Lima is Arequipa, which contains the city of the ſame name, one of the largeſt in all Peru. It is delightfully ſeated in a plain; the houſes are well built of ſtone, and are generally lofty, commodious, finely decorated on the outſide, and neatly furniſhed within. The temperature of the air is extremely agreeable, the cold being never exceſſive, nor the heat troubleſome; ſo that the fields are always clothed with verdure, and enamelled with flowers, as in a perpetual ſpring. But theſe advantages are allayed by its being frequently expoſed to dreadful earthquakes; for by theſe convulſions of nature it has been four times laid in ruins. The city is, however, very populous, and among its inhabitants are many noble families.

In this biſhopric are ſeveral gold and ſilver mines, and in ſome parts are large vineyards, from which conſiderable quantities of wine and brandy are made. Among the other productions is Guinea pepper, in which the juriſdiction of Africa in this dioceſe carries on a very advantageous trade, the annual produce of theſe plantations bringing in no leſs than 60,000 dollars *per annum*. The pods of this pepper are about a quarter of a yard in length, and when gathered are dried in the ſun and packed up in bags of ruſhes, each bag containing an aroba or a quarter of a hundred weight, and thus they are exported to all parts. Other places of this juriſdiction are famous for vaſt quantities of large and excellent olives, far exceeding the fineſt produced in Europe, they being nearly the ſize of a hen's egg.

62
The audience of Charcas.

The audience of Charcas, the laſt diviſion of Peru is equal in extent to that of Lima; but many of its parts are not ſo well inhabited, ſome being full of vaſt deſerts and impenetrable foreſts, whilſt others have extenſive plains intercepted by the ſtupendous height of the Cordilleras: the country is inhabited only in ſuch parts as are free from thoſe inconveniences. It is bounded on the north by the dioceſe of Cuſco, and reaches ſouthward to Buenos Ayres; on the eaſt it extends to Braſil; and on the weſt it reaches to the Pacific Ocean, particularly at Atacama. The remainder of the province borders on the kingdom of Chili.

61
Diviſions, &c. of this audience.

This audience is divided into the archbiſhopric of Plata, and five biſhoprics. We ſhall begin with the former.

The famous mountain of Potoſi is known all over the commercial world for the immenſe quantity of ſilver it has produced. The diſcovery of this amazing treaſure happened at the commencement of the year 1545, by a mere accident, which we ſhall mention afterwards. At a ſmall diſtance from it are the hot medicinal baths, called *Don Diego*, whether ſome reſort for health and others for diverſion.

62
How the country was at firſt ſettled by the Spaniards.

At the time when the firſt conqueſts were made, when emigrations were moſt frequent, the country of the Incas had a much greater reputation for riches than New Spain; and, in reality, for a long time much more conſiderable treaſures were brought away from it. The deſire of partaking of them muſt neceſſarily draw thither, as was really the caſe, a greater number of Caſtilians. Though almoſt all of them went over thither with the hope of returning to their country to enjoy the fortune they might acquire, yet the majority ſettled in the colony. They were induced to this by the ſoftneſs of the climate, the ſalubrity of the air, and the goodneſs of the proviſions. Mexico preſented not the ſame advantages, and did not give them reaſon to expect ſo much independence as a land infinitely more remote from the mother-country.

Cuſco attracted the conquerors in multitudes. They found this capital built on a ground that was very irregular, and divided into as many quarters as there were provinces in the empire. Each of the inhabitants might follow the uſages of his native country; but every body was obliged to conform to the worſhip eſtabliſhed by the founder of the monarchy. There was no edifice that had any grandeur, elegance, or convenience; becauſe the people were ignorant of the firſt elements of architecture. The magnificence of what they called the *palace of the ſovereign*, *of the princes of the blood*, and *of the great men of his empire*, conſiſted in the profuſion of the metals that were laviſhed in decorating them. The temple of the Sun was diſtinguiſhed above all other edifices; its walls were incruſted or ſheathed with gold and ſilver, ornamented with divers figures, and loaded with the idols of all the nations whom the Incas had enlightened and ſubdued.

As it was not a ſolicitude for their own preſervation which occupied the Spaniards at firſt, they had no ſooner pillaged the immenſe riches which had been amaſſed at Cuſco for four centuries, than they went in great numbers in 1534, under the order of Sebaſtian de Benalcazar, to undertake the deſtruction of Quito. The other towns and boroughs of the empire were over-run with the ſame ſpirit of rapine; and the citizens and the temples were plundered in all parts.

Thoſe of the conquerors, who did not take up their reſidence in the ſettlements which they found already formed, built towns on the ſea-coaſts, where before there were none: for the ſterility of the ſoil had not permited the Peruvians to multiply much there; and they had not been induced to remove thither from the extremity of their country, becauſe they ſailed very little. Paita, Truxillo, Callao, Piſca, and Arica, were the roads which the Spaniards deemed moſt convenient for the communication they intended to eſtabliſh among themſelves and with the mother-country. The different poſitions of theſe new cities determined the degree of their proſperity.

Thoſe which were afterwards built in the inland parts of the country were not erected in regions which preſented a fertile ſoil, copious harveſts, excellent paſtures, a mild and ſalubrious climate, and all the conveniences of life. Theſe places, which had hitherto been ſo well cultivated by a numerous and flouriſhing people, were now totally diſregarded. Very ſoon they exhibited only a deplorable picture of a horrid deſert; and this wildneſs muſt have been more melancholy and hideous than the dreary aſpect of the earth before the origin of ſocieties. The traveller, who was led by accident or curioſity into theſe deſolate plains, could not forbear abhorring the barbarous and bloody authors of ſuch devaſtations, while he reflected that it was not owing even to the cruel illuſions of glory, and to the fanaticiſm of conqueſt, but to the ſtupid and abject deſire of gold, that they had ſacrificed ſo much more real treaſure, and ſo numerous a population.

This inſatiable thirſt of gold, which neither tended to ſubſiſtence, ſafety, nor policy, was the only motive for eſtabliſhing new ſettlements, ſome of which have been kept up, while ſeveral have decayed, and others have been formed in their ſtead. The fate of them all has correſponded with the diſcovery, progreſs, or declenſion, of the mines to which they were ſubordinate.

63 Manner of living of the natives.

Fewer errors have been committed in the means of procuring proviſions. The natives had hitherto lived hardly on any thing elſe but maize, fruits, and pulſe, for which they had uſed no other ſeaſoning except ſalt and pimento. Their liquors, which were made from different roots, were more diverſified: of theſe the chica was the moſt uſual; but the conquerors were not ſatisfied either with the liquors or with the food of the people they had ſubdued. They imported vines from the Old World, which ſoon multiplied ſufficiently in the ſands of the coaſts at Ica, Piſca, Naſca, Moquequa, and Truxillo, to furniſh the colony with the wine and brandy it wanted. Olives ſucceeded ſtill better; and yielded a great abundance of oil, which was much ſuperior to that of the mother-country. Other fruits were tranſplanted with the ſame ſucceſs. Sugar ſucceeds ſo well, that none of any other growth can be compared to that which is cultivated in theſe parts, where it never rains. In the inland country wheat and barley were ſown; and at length all the European quadrupeds were ſoon found grazing at the foot of the mountains.

This was a conſiderable ſtep; but there ſtill remained much more to be done. After they had provided for a better and a greater choice of ſubſiſtence, the next care of the Spaniards was to have a dreſs more commodious and more agreeable than that of the Peruvians. Theſe were, however, better clothed than any other American nation. They owed this ſuperiority to the advantage which they alone poſſeſſed, of having the LAMA and PACOS, domeſtic animals which ſerved them for this uſe. See CAMELUS.

After the conqueſt, all the Indians were obliged to wear clothes. As the oppreſſion under which they groaned did not allow them to exerciſe their former induſtry, they contented themſelves with the coarſer cloths of Europe, for which they were made to pay an exorbitant price. When the gold and ſilver which had eſcaped the rapacity of the conquerors were exhauſted, they thought of re-eſtabliſhing their national manufactures. Theſe were ſome time after prohibited, on account of the deficiency which they occaſioned in the exports of the mother-country. The impoſſibility which the Peruvians found of purchaſing foreign ſtuffs and paying their taxes, occaſioned permiſſion to be given at the end of ten years for their re-eſtabliſhment. They have not been diſcontinued ſince that time; and have been brought to as great a degree of perfection as it was poſſible they could be under a continual tyranny.

64 Manufactures, &c.

With the wool of the vicuna, a ſpecies of wild pacos, they make, at Cuſco and in its territory, ſtockings, handkerchiefs, and ſcarfs. Theſe manufactures would have been multiplied, if the ſpirit of deſtruction had not fallen on animals as well as on men. The ſame wool, mixed with that of the ſheep imported thither from Europe, which have exceedingly degenerated, ſerves for carpets, and makes alſo tolerably fine cloth. Fleeces of inferior quality are employed in ſerges, druggets, and in all kinds of coarſe ſtuffs.

The manufactures ſubſervient to luxury are eſtabliſhed at Arequipa, Cuſco, and Lima. In theſe three towns is made a prodigious number of gold toys and plate, for the uſe of private perſons, and alſo for the churches. All theſe manufactures are but coarſely wrought, and mixed with a great deal of copper. We ſeldom diſcover more taſte in their gold and ſilver laces and embroideries which their manufactures alſo produce. This is not altogether the caſe in regard to their lace, which, when mixed with that of Europe, looks very beautiful. This laſt manufacture is commonly in the hands of the nuns, who employ in it the Peruvian girls, and the young Meſtees of the towns, who for the moſt part before marriage paſs ſome years in the convent.

Other hands are employed in painting and gilding leather for rooms, in making with wood and ivory pieces of inlaid work and ſculpture, and in drawing figures on the marble that is found at Cucuca, or on linen imported from Europe. Theſe different works, which are almoſt all manufactured at Cuſco, ſerve for ornaments for houſes, palaces, and temples: the drawing of them is not bad, but the colours are neither exact nor permanent. If the Indians, who invent nothing, but are excellent imitators, had able maſters and excellent models, they would at leaſt make good copyiſts. At the cloſe of the laſt century, ſome works of a Peruvian painter, named *Michael de St Jacques*, were brought to Rome; and the connoiſſeurs diſcovered marks of genius in them.

65
Of the mines of gold and ſilver.

Though the Peruvians were unacquainted with coin, they knew the uſe of gold and ſilver; for they employed them in different kinds of ornaments. Independent of what the torrents and accident procured them of theſe metals, ſome mines had been opened of little depth. The Spaniards have not tranſmitted to us the manner in which theſe rich productions were drawn from the boſom of the earth. Their pride, which has deprived us of ſo much uſeful knowledge, undoubtedly made them think, that, in the inventions of a people whom they called *barbarous*, there was nothing worthy to be recorded.

The difference as to the manner in which the Peruvians worked their mines, did not extend to the mines themſelves. The conquerors opened them on all ſides. At firſt the gold mines tempted the avarice of the greater number. Fatal experience diſcouraged thoſe whom paſſion had not blinded. They clearly ſaw, that, for ſome enormous fortunes raiſed in this manner, great numbers, who had only moderate fortunes, were totally ruined. Theſe mines ſunk into ſuch diſcredit, that, in order to prevent them from being abandoned, the government was obliged to take the 20th part of their produce, inſtead of the fifth which it at firſt received.

The mines of ſilver were more common, more equal, and richer. They even produced ſilver of a ſingular ſpecies, rarely found elſewhere. Towards the ſea-coaſt, great lumps of this metal are found in the ſands.

There are a great number of other mines which are infinitely more important, and are found in the rocks and on the mountains. Several of them gave falſe hopes. Such, in particular, was that of Ucuntaya, diſcovered in 1713. This was only an incruſtation of almoſt maſſive ſilver, which at firſt yielded ſeveral millions, but was ſoon exhauſted.

Others which were deeper have been alike deſerted. Their produce, though equal to what it was originally, was not ſufficient to ſupport the expence of working them, which augmented every day. The mines of Quito, Cuſco, and Arequipa, have experienced that revolution which awaits many of the reſt.

There are greater numbers of very rich mines which the waters have invaded. The diſpoſition of the ground, which from the ſummit of the Cordilleras goes continually ſhelving to the South Sea, muſt neceſſarily render theſe events more common at Peru than in other places. This inconvenience, which with greater care and ſkill might often have been prevented or diminiſhed, has been in ſome inſtances remedied.

Joſeph Salcedo, about the year 1660, had diſcovered, not far from the town of Puna, the mine of Laycacota. It was ſo rich, that they often cut the ſilver with a chiſel. Proſperity had ſo elevated the mind of the proprietor, that he permitted all the Spaniards who came to ſeek their fortune in this part of the New World, to work ſome days on their own account, without weighing or taking any account of the preſents he made them. This generoſity drew around him an infinite number of people, whoſe avidity made them quarrel with each other, and the love of money made them take up arms and fall upon one another; and their benefactor, who had neglected no expedient to prevent and extinguiſh their ſanguinary contentions, was hanged as being the author of them. Whilſt he was in priſon, the water got poſſeſſion of his mine. Superſtition ſoon made it imagined that this was a puniſhment for the horrid act they had perpetrated againſt him. This idea of divine vengeance was revered for a long time; but at laſt, in 1740, Diego de Bacna aſſociated with other opulent people to avert the ſprings which had deluged ſo much treaſure. The labours which this difficult undertaking required, were not finiſhed till 1754. The mine yields as much now as it did at firſt. But mines ſtill richer than this have been diſcovered. Such, for example, is that of Potoſi, which was found in the ſame country where the Incas worked that of Porco.

An Indian, named *Hualpa*, in 1545, purſuing ſome deer, in order to climb certain ſteep rocks laid hold of a buſh, the roots of which looſened from the earth, and brought to view an ingot of ſilver. The Indian had recourſe to it for his own uſe; and never failed to return to his treaſure every time that his wants or his deſires ſolicited him to it. The change that had happened in his fortune was remarked by one of his countrymen, and he diſcovered to him the ſecret. The two friends could not keep their counſel and enjoy their good fortune. They quarrelled; on which the indiſcreet confident diſcovered the whole to his maſter, Villaroell, a Spaniard who was ſettled in the neighbourhood. Upon this the mine became known, and was worked; and a great number of them were found in its vicinity; the principal of which are in the northern part of the mountain, and their direction is from north to ſouth. The moſt intelligent people of Peru have obſerved, that this is in general the direction of the richeſt mines.

The fame of what was paſſing at Potoſi ſoon ſpread abroad; and there was quickly built at the foot of the mountain a town, conſiſting of 60,000 Indians and 10.000 Spaniards. The ſterility of the ſoil did not prevent its being immediately peopled. Corn, fruit, flocks, American ſtuffs, European luxuries, arrived there from every quarter. Induſtry, which every where follows the current of money, could not ſearch for it with ſo much ſucceſs as at its ſource. It evidently appeared that in 1738 theſe mines produced annually near 978,000l. ſterling, without reckoning the ſilver which was not regiſtered, and what had been carried off by fraud. From that time the produce has been ſo much diminiſhed, that no more than one-eighth part of the coin which was formerly ſtruck is now made.

At the mines of Potoſi, and all the mines of South America, the Spaniards, in purifying their gold and ſilver, uſe mercury, with which they are ſupplied from Guança Velica. The common opinion is, that this mine was diſcovered in 1564. The trade of mercury was then ſtill free: it became an excluſive trade in 1571. At this period all the mines of mercury were ſhut; and that of Guança Velica alone was worked, the property of which the king reſerved to himſelf. It is not found to diminiſh. This mine is dug in a prodigiouſly large mountain, 60 leagues from Lima. In its profound abyſs are ſeen ſtreets, ſquares, and a chapel, where the myſteries of religion on all feſtivals are celebrated. Millions of flambeaus are continually kept to enlighten it.

Private people at their own expence work the mine of Guança Velica. They are obliged to deliver to government at a ſtipulated price, all the mercury they extract from it. As ſoon as they have procured the quantity which the demands of one year require, the work is ſuſpended. Part of the mercury is ſold on the ſpot, and the reſt is ſent to the royal magazines throughout all Peru; from whence it is delivered out at the ſame price it is ſold for in Mexico. This arrangement, which has occaſioned many of the mines to drop, and prevented others from being opened, is inexcuſable in the Spaniſh ſyſtem. The court of Madrid, in this reſpect, merits the ſame reproaches as a miniſtry in other countries would incur, that would be blind enough to lay a duty on the implements of agriculture.

The mine of Guança Velica generally affects thoſe who work in it with convulſions: this and the other mines, which are not leſs unhealthy, are all worked by the Peruvians. Theſe unfortunate victims of an inſatiable avarice are crowded all together and plunged naked into theſe abyſſes, the greateſt part of which are deep, and all exceſſively cold. Tyranny has invented this refinement in cruelty, to render it impoſſible for any thing to eſcape its reſtleſs vigilance. If there are any wretches who long ſurvive ſuch barbarity, it is the uſe of cocoa that preſerves them.

In the Cordilleras, near the city of Paz, is a mountain of remarkable height, called *Illimani*, which doubtleſs contains immenſe riches; for a crag of it being ſome years ago ſevered by a flaſh of lightning, and falling on a neighbouring mountain, ſuch a quantity of gold was found in the fragments, that for ſome time that metal was ſold at Paz for eight pieces of eight *per* ounce; but its ſummit being perpetually covered with ice and ſnow, no mine has been opened in the mountain.

The city of La Paz is of a middling ſize, and from its ſituation among the breaches of the Cordilleras, the ground on which it ſtands is unequal, and it is alſo ſurrounded by mountains. When the river Titicaca is increaſed, either by the rains, or the melting of the ſnow on the mountains, its current forces along large maſſes of rocks with ſome grains of gold, which are found after the flood has ſubſided. Hence ſome idea may be formed of the riches incloſed in the bowels of theſe mountains; a remarkable proof of which appeared in the year 1730, when an Indian, waſhing his feet in the river, diſcovered ſo large a lump of gold, that the marquis de Caſtle Fuerte gave twelve thouſand pieces of eight for it, and ſent it as a preſent to the king of Spain.

Balſam of PERU. See MYROXILON.

PERUGIA, a town of Italy, in the pope's territories, and capitol of Perugino. It is an ancient, handſome, populous, and large city, with a ſtrong citadel, an univerſity and a biſhop's ſee. The churches, and many other buildings as well public as private, are very handſome. It is ſeated on a hill, in E. Long. 12. 30. N. Lat. 43. 6.

PERUGINO, a province of Italy, in the territory of the church, bounded on the weſt by Tuſcany, on the ſouth by Orvietano, on the eaſt by the duchies of Spoleto and Urdino, and on the north by the county of Citta Caſtellana. It is one of the ſmalleſt provinces in the territory of the church. The air is very pure, and the ſoil fertile in corn and good wine; beſides, the lake Perugia ſupplies them with plenty of fiſh. The capital town is Perugia. The lake is eight miles from the city, and is almoſt round, being about five miles in diameter; in it there are three iſlands. This province is about 25 miles in length, and near as much in breadth.

PERUGINO. See MONTANINI.

PERUKE. See PERRUKE.

PERUVIAN BARK. See CINCHONA, and *JESUITS Bark*.

PERUVIANA, a general name given to that vaſt peninſula, extending itſelf from the iſthmus of Darien to Cape Horn, in the form of a triangle, of which the *Terra Magellanica* and the Cape form the vertex. It includes the whole of South America, although, as is well known, all the countries included within theſe limits do not acknowledge the dominion of the crown of Spain. See *TERRA Firma*.

PESARO, a town of Italy, in the territory of the pope, and duchy of Urbina, with a biſhop's ſee. It is a large place, whoſe ſtreets are paved with bricks. The caſtle is very well fortified, the harbour excellent, and the cathedral church magnificent. The environs are remarkable for producing good figs, of which they ſend large quantities to Venice. It is ſeated on an eminence at the mouth of the river Fogha, on the Gulph of Venice. E. Long. 13. 0. N. Lat. 43. 56.

PESCARA, a very ſtrong town in the kingdom of Naples, and in the Hither Abruzzo; ſeated at the mouth of a river of the ſame name, which falls into the Gulph of Venice. E. Long. 15, 2. N. Lat. 42. 27.

PESCENIUS NIGER. See NIGER.

PESCHIERA, a ſmall but ſtrong town of Italy, in the Veroneſe, with a caſtle, and a ſtrong fort; ſeated on the river Mincio, or Menzo, which proceeds from the lake Garda. E. Long. 11. 4. N. Lat. 15. 27.

PESENAS, an ancient town of France, in Languedoc, and in the dioceſe of Agde; delightfully ſeated on the river Pein, 12 miles north-eaſt of Beſeirs, and eight north of Agde. E. Long. 3. 34. N. Lat. 43. 28.

PESSARY, in medicine, a ſolid ſubſtance compoſed of wool, lint, or linen, mixed with powder, oil, wax, &c. made round and long like a finger, in order to be introduced into the exterior neck of the matrix, for the cure of ſeveral uterine diſorders.

PEST, a town of Upper Hungary, and capital of a county of the ſame name, ſeated on the Danube, in a fine plain, over againſt Buda, 85 miles ſouth-eaſt of Preſburg. E. Long. 18. 25. N. Lat. 47. 24.

PESTILENCE, in medicine, the ſame with the PLAGUE.

PETAGUEL, a territory of South America, in Braſil, bounded on the north by Dele; on the eaſt by the ſea; on the ſouth by the captainſhip of Rio-Grande; and on the weſt by Tupuys. It contains mines of ſilver.

PETAL, in botany, one of the coloured leaves which compoſe the flower.

PETALISM, a mode of deciding on the guilt of citizens ſimilar to the Athenian OSTRACISM. It was introduced in Syracuſe about the year before Chriſt 460, in order to prevent the tyranny of the richer citizens, who had often about that time aimed at the diadem. To prevent, therefore, the evils daily ariſing from thence, and to bring down the aſpiring minds of the wealthy citizens, the Syracuſans were forced to make a law not unlike that of the Athenian oſtraciſm; for as at Athens every citizen was to write on a ſhell the name of the perſon whom they conceived to be the moſt likely, on account of his wealth and adherents, to aſpire to the crown; ſo at Syracuſe they were to write on a leaf the names of ſuch as they apprehended powerful enough to uſurp the ſovereignty. When the leaves were counted, he who had the moſt ſuffrages againſt him was, without any farther inquiry, baniſhed for five years. This new-contrived method of imparing the eſtates, and weakening the intereſt of the overgrown citizens, was called *petaliſm*, from the Greek word *petalon*, which ſignifies "a leaf." This law was attended with many evil conſequences; for thoſe who were moſt capable of governing the commonwealth were driven out, and the adminiſtration of public affairs committed to the meaneſt of the people; nay, many of the chief citizens, who were able to render their country great ſervice, fearing to fall under penalties of this law, withdrew from the city, and lived private in the country, not concerning themſelves with public affairs: whence all the employments being filled with men of no merit or experience, the republic was on the brink of ruin, and ready to fall into a ſtate of anarchy and confuſion. The law therefore of petaliſm, upon more mature deliberation, was repealed ſoon after it had been firſt enacted, and the reins of government were again put into the hands of men who knew how to manage them.

PETARD, in the art of war. See GUNNERY, n° 56, and Plate CCXXIV.

PETAU (Denis), or *Dionyſius* PETAVIUS, a French Jeſuit of great erudition, born at Orleans in 1583. His father was a man of literature, and obſerving ſtrong parts and an excellent genius for letters in his ſon, he took every means in his power to improve them. He uſed to tell his ſon, that he ought to qualify himſelf ſo, as to be able to attack and confound "the giant of the Allophylæ;" meaning that moſt eminent ſcholar Joſeph Scaliger, whoſe abilities and learning were allowed to have done great honour and much ſervice to the reformed. Young Petavius ſeems to have entered readily into his father's views; for he ſtudied moſt intenſely, and afterwards levelled much of his erudition againſt Scaliger. He joined the ſtudy of the mathematics to that of the belles letters; and afterwards applied himſelf to a courſe of philoſophy, which he began in the college of Orleans, and finiſhed at Paris. He afterwards maintained theſes in Greek, which was as familiar to him as Latin; and the Latin, it is ſaid, he underſtood better than he did his own native language. When he was pretty well advanced, he had free acceſs to the king's liberary, which he often viſited on account of the Latin and Greek manuſcripts. Among other advantages which accompanied his literary purſuits, was the friendſhip of Iſaac Caſaubon, whom Henry IV. called to Paris in 1600. It was at Caſaubon's inſtigation, that Petavius, though then but very young, undertook an edition of The Works of Syneſius. In this edition he corrected the Greek from the manuſcripts, tranſlated that part which yet remained to be tranſlated into Latin, and wrote notes upon the whole. He was but 19 years of age when he was made profeſſor of philoſophy in the univerſity of Bourges; and he ſpent the two following years in ſtudying the ancient philoſophers and mathematicians. In 1604, when Morel, profeſſor of Greek at Paris, publiſhed The Works of Chryſoſtom, ſome part of Petavius's labours on Syneſius were added to them: from the title of which we learn, that he then took the name of *Pætus*, which he afterwards changed into *Petavius*. His own edition of The Works of Syneſius did not appear till 1612.

He entered into the ſociety of the Jeſuits in 1605, and did great credit to it by his vaſt and profound erudition. He became a zealous advocate for the church of Rome; and there was no way of ſerving it more agreeable to him than that of criticiſing and abuſing its adverſaries. He was moſt bitter againſt Scaliger; nor did he even ſpare his friend Caſaubon whenever he came in his way.—Petavius excelled particularly in the dark ſcience of chronology; the learned world in general being obliged to him for ſome exact and nice diſquiſitions on this ſubject. His chief work, which is in great repute to this day, he intitled, *Rationarium Temporum.* It is an abridgement of univerſal hiſtory, from the earlieſt times to 1632, in chronological order, with references to proper authorities. It was improved and ſeveral additions made to it, by Perizonius, and others after his death. This eminent father, after a very laborious life, died at Paris in the end of the year 1652, aged 69. Gaſſendus, in his life of Pereſchius, ſays he was the moſt conſummate ſcholar the Jeſuits ever had; an opinion very likely to be true, when we conſider that he often contended ſucceſsfully with Scaliger, Salmaſius, and others, whoſe abilities have been univerſally acknowledged. His judgment, however, was not equal to his erudition, and his controverſial writings are full of ſourneſs and ſpleen. We have the following character of a great work of Petavius by an author of much celebrity, but who perhaps is as much biaſſed on the ſide of infidelity as he thinks this learned Jeſuit was in favour of the church of Rome. The *Dogmata Theologica* of Petavius are a work of incredible labour and compaſs: the volumes which relate ſolely to the incarnation (two folios, 5th and 6th, of 837 pages) are divided into 16 books—the firſt of his hiſtory, the remainder of controverſy and doctrine. The Jeſuit's learning is copious and correct; his Latinity is pure, his method clear, his argument profound and well connected: but he is the ſlave of the fathers, the ſcourge of heretics, and the enemy of truth and candour, as often as they are inimical to the Catholic cauſe.

PETAW, an ancient town of Germany, in the circle of Auſtria, and in Stiria. It is a handſome place, and is ſeated on the river Drave, 35 miles north-eaſt of Cilley, and 109 ſouth of Vienna. E. Long. 15. 36. N. Lat. 46. 40.

PETCHELI, a province of Aſia, in China, and the chief in the whole empire; bounded on the eaſt by the ſea, on the north by the great wall, on the weſt by Chanſi, and on the ſouth by Chantong and Honan. "This province contains nine cities of the firſt claſs, which have ſeveral others under their juriſdiction; theſe are about 40 in number, leſs conſiderable indeed, but all ſurrounded with walls and ditches. Petcheli has few mountains. Its ſoil is ſandy, and produces very little rice; but all other kinds of grain abound there, as well as the greater part of the fruit-trees we have in Europe. It pays an annual tribute to the emperor, which, according to Father Martini, conſiſts of 601,153 bags of rice, wheat, and millet; 224 pounds of linſeed; 45,135 of ſpun ſilk; 13,748 of cotton; 8,737,248 truſſes of ſtraw for the horſes belonging to the court, and 180,870 meaſures of ſalt, each containing 124 pounds; which is proportionably much inferior to that paid by other provinces.

"It is remarked that the people of this province have not the ſame aptitude for acquiring the ſciences as thoſe who inhabit the ſouthern provinces of the empire; but they are more robuſt and warlike, and better calculated to endure the hardſhips and fatigue of war. This is the caſe with the Chineſe of all the other northern countries.

"The face of the country here being flat and level, permits the uſe of a kind of carriage, the conſtruction of which appears to be rather ſingular. Father Martini, one of the firſt miſſionaries in China, thus deſcribes it: "They uſe, in the province of Petcheli, a kind of chariot with one wheel, and conſtructed in ſuch a manner, that there is room in the middle for only one perſon, who ſits as if on horſeback; the driver puſhes behind, and, by means of wooden levers, makes the chariot advance with ſafety and expedition. This has perhaps given riſe to the report of chariots driven in that country by the wind, which the Chineſe direct over land with ſails, as they do ſhips at ſea." A French miſſionary, who traverſed this province in 1768, ſeems to have made uſe of the ſame kind of carriage. "We quitted the canal (ſays he) to travel in carts, which is cuſtomary in this part of China; but it is diſagreeable beyond deſcription. The cart is amazingly clumſy, and has a great reſemblance to the carriage of a gun: there is room in it for only one perſon, who is frequently obliged to ſit croſs legged, as our taylors do in Europe; it jolts prodigiouſly; and, while the traveller is expoſed to the ſcorching rays of the ſun, ſuch clouds of duſt ſometimes ariſe as almoſt ſuffocate him.

"The temperature of the air of this province does not ſeem to agree with its latitude. Although Petcheli extends no farther than to 42d degree of north latitude, yet all the rivers there are ſo much frozen during four months in the year, that horſes and waggons with the heavieſt loads may ſafely paſs them. It deſerves to be remarked, that the whole body of ice is formed in one day, and that ſeveral are neceſſary to thaw only the ſurface. What may appear no leſs extraordinary is, that during theſe ſevere froſts one does not feel that ſharp and pinching cold which accompanies the production of ice in Europe. Theſe phenomena cannot be accounted for, but by attributing them to the great quantity of nitre which is found diſperſed throughout this province, and to the ſerenity of the ſky, which, even during winter, is ſeldom obſcured by a cloud. The phyſical explanation, which we have given of this ſingular temperature, is fully confirmed by experiments lately made by Father Amiot at Peking, which convinced him, that in this capital and neighbourhood, as far as ſeven or eight leagues around, the water, air, and earth, equally abound with nitre.

"With regard to the water, the facility with which it freezes, the ſolidity of the ice and its duration, evidently announce the preſence of nitre. A tub filled with water, placed near one of Rheamur's thermometers, had its ſurface immediately frozen, when the mercury ſtood only one degree above the freezing point; and when it ſtood three degrees below freezing, the water became a ſolid maſs of ice, if the diameter of the veſſel did not exceed a foot and a half, and the depth of the water four or five inches. This water, when the weather was fine, continued in the ſame ſtate of congelation as long as the mercury in the thermometer did not riſe higher than three degrees above 0; when the mercury roſe higher, it then began to diſſolve, but ſo ſlowly, that two or three days were ſcarcely ſufficient to reſtore it to its former fluidity." Groſier goes on to relate other experiments of Father Amiot which were made with a view to diſcover the cauſe of the water's freezing ſo in this temperate climate; and he then proceeds to tell us, that "if the waters of the province of Petcheli contain much nitre, it is no leſs certain, that the air which one breathes there is abundantly impregnated with it. The following are undubitable proofs of it: 1ſt, Notwithſtanding unwholeſome food, ſuch as the fleſh of the greater part of domeſtic animals that have died of old age or diſeaſe, which the people of this province greedily devour, notwithſtanding filth and all the inconveniences reſulting from low, damp, and confined lodgings, where all the individuals of the ſame family are, as it were, heaped one upon another, the plague never makes its appearance in Petcheli; and the people are ſeldom attacked by any of thoſe epidemical diſtempers which are ſo common in Europe. 2dly, Proviſions of every kind may be kept at Peking a long while, without being ſubject to corruption. Raiſins are eaten there freſh even in May, apples and pears till midſummer; wild boars, ſtags, deer, roebucks, rabbits, hares, pheaſants, ducks, geeſe, and all kinds of game brought from Tartary to Peking after the commencement of winter; fiſh of every ſpecies, tranſported from the rivers of Leaotong—will keep without the aſſiſtance of ſalt, in their ſtate of congelation, for two or three months, although they are expoſed every day in the markets, carried from the markets to private houſes, and from private houſes brought back to the markets until they are all ſold, which does not happen before the end of March. It is certain, that theſe facts announce an antiſeptic quality in the air, which muſt undoubtedly proceed from the great quantity of nitre contained in it.

“ 3dly, The earth which forms the ſoil of Petcheli abounds no leſs with nitre; whole fields may be ſeen in the neighbourhood of Peking which are covered with it. Every morning at ſunriſe the country in certain cantons appears as white as if ſprinkled by a gentle fall of ſnow. If a quantity of this ſubſtance be ſwept together, a great deal of kien, nitre, and ſalt, may be extracted from it. The chineſe pretend, that this ſalt may be ſubſtituted for common ſalt; however this may be, it is certain, that, in the extremity of the province towards Siuen-hoa-fou, poor people and the greater part of the peaſants make uſe of no other. With regard to the kien procured from the earth, they uſe it for waſhing linen, as we do ſoap. Although the land of Petcheli is replete with nitrous particles, it does not, however, form dry deſerts; it is cultivated with care, and becomes fruitful by inceſſant labour. The earth is frozen in winter to the depth of two or three feet, and does not become ſoft before the end of March. This may ſufficiently explain why the froſt kills plants in the neighbourhood of Peking, which Mr Linnæus raiſed in Sweden, although it is 20 degrees farther north than the capital of the Chineſe empire.”

PETECHIÆ, in medicine, a name given to thoſe ſpots, whether red or of any other colour, which appear in the malignant fevers.

PETELIA. See STRONGOLI.

PETER (St), the apoſtle, born at Bethſaida, was ſon of John, Jono, or Joanna, and brother of St Andrew (John i. 42, 43.) His firſt name was Simon or Simeon: but when our Savour called him to the apoſtleſhip, he changed his name into Cephas, that is, in Syriac, a *ſtone* or a *rock*; in Latin, *petra*, whence *Peter*. He was a married man; and had his houſe, his mother in-law, and his wife, at Capernaum, upon the lake of Genneſareth (Mark i. 29. Mat. viii. 14. Luke iv. 38.) St Andrew, having been firſt called by Jeſus Chriſt, met his brother Simon, and told him (John i. 41,) we have found the Meſſiah, and then brought him to Jeſus. Jeſus beholding him, ſaid to him, thou art Simon ſon of Jona; henceforth thou ſhalt be called *Cephas*, that is, *ſtone* or *rock*. After having paſſed one day with our Saviour, they returned to their ordinary occupation, which was fiſhing. Yet it is thought they were preſent with him at the marriage of Cana in Galilee. This happened in the 30th year of the vulgar Chriſtian era.

Towards the end of the ſame year, Jeſus Chriſt being on the ſhore of the lake of Genneſareth, ſaw Peter and Andrew buſy about their fiſhery, and waſhing their nets (Luke v. 1, 2. 3.) He entered into their boat, and bid Peter throw out his nets into the ſea, in order to fiſh. Peter obeyed him, though he had already fiſhed the whole night without catching any thing. They took ſo many fiſhes at this draught, that their own veſſel, and that of James and John ſons of Zebedee, were filled with them. Then Peter threw himſelf at the feet of Jeſus, and ſaid to him, Depart from me, Lord, for I am a ſinner. Then Jeſus ſaid to them, Follow me, and I will make you fiſhers of men. He ſaid the ſame thing to James and John; and immediately they quitted their boats and nets, and followed our Saviour.

Some time after, Jeſus coming to Capernaum entered into the houſe of St Peter, where his mother-in law lay ſick of a fever. He immediately healed her, and ſhe began to miniſter to him (Luke iv. 38. and Mat. viii. 14.) A little while before the feaſt of the paſſover of the following year, being the 32d of the vulgar era, after Jeſus returned into Galilee, he made choice of twelve apoſtles, among which St Peter has always the firſt place (Mat. x. 2. Luke vi. 13.) One night that Jeſus Chriſt walked upon the waters of the lake of Genneſareth, St Peter aſked him leave to come and meet him (Mat. xiv. 28, 29.) Jeſus gave him leave; but he ſeeing a great wave coming, was afraid, and therefore began to ſink. Then Jeſus held him up, and ſaid, O man of little faith why waſt thou afraid? Afterwards landing on the other ſide of the lake, and the multitude that he had fed the day before beyond the lake being come to him at Capernaum, he ſpoke to them of his body and of his blood which he was to give to his diſciples to eat and drink. This ſo offended the multitude, that ſeveral of them quitted him thereupon. He therefore aſked his apoſtles if they alſo would leave him; to which Peter replied, To whom ſhall we go, Lord; for thou haſt the words of eternal life (John vi. 53, 54, &c.) One day, as our Saviour was near Cæſarea Philippi, he aſked his apoſtles whom the world took him for? they anſwered, that ſome ſaid he was John the Baptiſt; others, Elias; and others Jeremiah, or one of the prophets. But whom do ye ſay I am? ſays Jeſus Chriſt. Simon Peter anſwered, Thou art Chriſt, the ſon of the living God. Jeſus then ſaid unto Peter, Bleſſed art thou, Simon Barjona; for fleſh and blood hath not revealed it unto thee, but my Father which is in heaven (Mat. xvi. 13, 14, &c.) And I ſay unto thee, that, as thou art Peter, ſo upon this rock will I build my church, and the gates of hell ſhall not prevail againſt it; and I will give unto thee the keys of the kingdom of heaven, and whatſoever thou ſhalt bind on earth ſhall be bound in heaven, and whatſoever thou ſhalt looſe upon earth ſhall be looſed in heaven. About ſix or eight days after this, our Saviour taking Peter, James, and John, up a high mountain, apart from the other diſciples, ſhowed them a glimpſe of his glory, and was transfigured before them (Mat. xvii. 1, 2, &c. and Luke ix. 28.) Whereupon Peter, ſeeing Moſes and Elias, together with Jeſus, cried out to them in an eſtacy, Lord, it is good for us to be here! if you pleaſe, we will make three tents; one for you, one for Moſes, and one for Elias.

Jeſus returning from thence to Capernaum, thoſe that gathered the tribute-money came to Peter, and ſaid, Does not your maſter pay tribute? Whereupon Jeſus ordered Peter to throw his line into the ſea, and that he ſhould find wherewith to pay the toll for them two in the mouth of the firſt fiſh he ſhould take. Peter obeyed; and finding a piece of money in the mouth of the fiſh, he gave it to the tribute-gatherers, as he was directed. One day, as Jeſus was diſcourſing concerning the forgiveneſs of injuries (Mat. xviii. 21, 22.), St Peter aſked him how often they muſt forgive, and whether it was ſufficient to pardon an offender ſeven times? Jeſus told him, I ſay, you muſt pardon not only as far as ſeven times, but even ſeventy times ſeven. Upon another occaſion (Mat. xix. 27, 29.), as our Saviour was ſpeaking of the danger of riches, Peter ſaid to him, Lord, we have left all things to follow thee; what reward ſhall we have for it? Jeſus anſwered him, I tell you in truth, that you who have left all things to follow me ſhall receive an hundred fold even in this world, and in the other eternal life; and at the laſt day when the ſon of man ſhall come to judge the world, you ſhall ſit upon twelve thrones to judge the twelve tribes of Iſrael.

On the Tueſday before our Saviour's paſſion, Peter ſhowed him the fig-tree he had curſed the evening before, which was now dried up and withered (Mark xi. 12—21.); and the day following, as they ſat upon the mountain of Olives, he, with the other apoſtles, aſked Jeſus when the temple was to be deſtroyed (Mat. xxiv 1, 2, &c. Mark xiii. 1, 2, &c. Luke xxii.) On Thurſday he was ſent with St John to prepare all things for the paſſover; and at evening, when Jeſus was come into the city with his apoſtles, and, being ſet down at table, began to ſpeak of him that ſhould betray him, Peter made ſigns to John to aſk him who this ſhould be (John xiii. 24). After ſupper, the diſciples entered into a diſpute which ſhould be the greateſt among them: whereupon Jeſus Chriſt, laying aſide his garments betook himſelf to waſh their feet, to give them an example of humility in his own perſon. St Peter at firſt made ſome difficulty, and would not ſuffer his maſter to waſh his feet: but Jeſus telling him, that if he did not waſh his feet, he could have no part in him; St Peter replied, Lord, waſh not only my feet, but my hands and head alſo (John xiii. 6—10.)

Some time after, Jeſus ſaid to him (Luke xxii. 31, 32, &c.), Peter, Satan has deſired to ſift you as men ſift wheat; but I have prayed for you, that your faith may not fail: and when you are converted, confirm your brethren. By this he warned St Peter of his fall, that was juſt at hand, and of his renouncing him; from which, by the aſſiſtance of God, he was afterwards to recover. St Peter then aſked him, where he was going? and ſaid, he was ready to follow him everywhere, not only to priſon, but to death itſelf. But Chriſt declared to him, that he would be ſo far from following him to death that he would abjure him three times that very night before the cock ſhould crow, or before break of day. When ſupper was ended, he went to the garden of olives, where, taking Peter, James, and John, he went with them apart, that they might be witneſſes of his agony. Peter, though before he had ſhowed ſo much reſolution, yet fell aſleep with the reſt; which occaſioned Jeſus to ſay to him, Do you ſleep, Simon? Could not you watch with me one hour? (Mark xiv. 37. Mat. xxvi. 40, &c.)

Judas being come with the ſoldiers to ſeize Jeſus, Peter drew his ſword, and cut off the right ear of one called Malchus, who was ſervant to the high prieſt: but Jeſus bid him put up his ſword into the ſcabbard; and told him, that all thoſe that fought with the ſword ſhould periſh by the ſword: and at the ſame time healed Malchus's ear (John xviii. 10, &c.). Peter followed Jeſus afar off, as far as the houſe of Caiaphas, and was let in by means of another diſciple who was known in the family. The ſoldiers and ſervants that had brought Jeſus, having lighted a fire in the middle of the hall, Peter mingled among them to warm himſelf alſo; when a maid-ſervant, having looked earneſtly upon him, ſaid, Surely this man was with Jeſus of Nazareth. But Peter made anſwer, I know not what you ſay, for I do not ſo much as know the man. Preſently after he went out into the porch, when immediately the cock crew. A little while after another maid ſaid to thoſe that were preſent, This man was with Jeſus of Nazareth. But Peter denied it with an oath. About an hour after one of the company affirmed that Peter was a diſciple of Jeſus. Others inſiſted upon the ſame thing; and ſaid, that ſurely he was one of them, for his very ſpeech betrayed him to be a Galilean. Laſtly, one of them, being a kinſman of Malchus whoſe ear Peter had cut off, affirmed the ſame thing; and aſked him, Did not I ſee you with him in the garden? Peter again denied it with an oath, proteſting that he did not know the man. And at the ſame time the cock crowed the ſecond time. Then Jeſus, being in the ſame hall, and not far from Peter, looked upon him; and Peter then remembering what Jeſus had ſaid to him, that before cock-crow he ſhould deny him thrice, he went out of Caiaphas's houſe, and wept bitterly (Mat xxvi. 73, 75. Mark xiv. 34, 72.)

Very probably he remained in ſecret, and in tears, all the time of our Saviour's paſſion, that is, all Friday and Saturday following; but on Sunday morning, Jeſus being riſen, and Mary having been at the tomb, and not finding the body of Jeſus, ſhe came in haſte into the city, to tell Peter and John that they had taken away their maſter, and that ſhe could not find where they had put him. Peter and John made haſte thither, and John coming firſt, did not go into the ſepulchre. Peter then coming up to him, preſently ſtooped down, and ſaw the linen clothes wherein the body had been wrapt. He went then into the ſepulchre, and John with him; after which they returned to Jeruſalem, not knowing what had come to paſs. But ſoon after Jeſus appeared to the holy women who had come firſt to the ſepulchre, and bid them give his apoſtles notice of his reſurection. And the ſame day our Saviour alſo appeared to Peter, to comfort him, and aſſure him that his repentance had been acceptable to him.

Some days after St Peter being returned into Galilee as Jeſus had commanded him, and going to fiſh in the ſea of Galilee, or in the lake of Genneſareth, with ſome other of the apoſtles, Jeſus appeared to them on the ſhore, and bid them throw out their nets on the right ſide of the veſſel. They threw them out, and took ſuch a multitude of fiſhes that they could not draw up their nets again. Then St John ſaid to Peter, It is the Lord, Peter immediately girded up himſelf, for he was naked, and ſwimming to ſhore he came to Jeſus: then drawing their nets to ſhore, Jeſus dined with them. After dinner, Jeſus ſaid to Peter, Simon, ſon of Jona, do you love me more than theſe? He anſwered, Yea, Lord, you know that I love you. Jeſus ſays to him, Then feed my lambs. He put the ſame queſtion to him again; and Peter making the ſame anſwer, our Lord ſaid to him again, Feed my ſheep. This he repeated a third time; at which St Peter was troubled, and ſaid, You know, Lord, that I love you. Jeſus replied to him, "Feed my ſheep. I tell you for a truth, that when you were young, you girded yourſelf and went where you pleaſed; but now you are old, another ſhall gird you, and lead you where you would not go." This he ſaid to let him know what death he was to die. At the ſame time, Peter ſeeing St John the Evangeliſt, ſaid to our Saviour, Lord, what muſt become of him? Jeſus anſwered, "If I will that he tarry till I come, what does that concern you; Do you follow me.' Thus he refuſed to declare in what manner St John ſhould end his life.

After that Jeſus Chriſt had aſcended into heaven, and that the apoſtles had been witneſs of his aſcenſion they returned to Jeruſalem, to wait there for the Holy Ghoſt, whom our Saviour had promiſed to ſend them; and being aſſembled together in a houſe, they continued there in prayer, and in the union of charity, till the time that the Holy Ghoſt deſcended upon them, in the form of tongues of fire. During this interval, St Peter propoſed to the apoſtles, and to the reſt of the aſſembly to fill up the place that the traitor Judas had left vacant in the apoſtleſhip. The propoſal was agreed to by all; and two perſons were propoſed, Joſeph Barſabas and Matthias: upon this laſt the lot fell: and from that time he was admitted one of the apoſtles. The tenth day after the aſcenſion of our Saviour, being the day of Pentecoſt, the Holy Ghoſt having deſcended upon the apoſtles, and upon all the faithful that were aſſembled with them, and having repleniſhed them with ſupernatural gifts, and eſpecially with the gift of tongues, all thoſe who were witneſſes of this miracle expreſſed their admiration at it; and there being upon that day in Jeruſalem a great many Jews from ſeveral provinces of the eaſt, they could not comprehend by what means theſe men, who were Galileans, ſhould ſpeak the languages of all theſe pagan nations (Acts ii. 1, 2, &c.). Some of them ſaid, that the apoſtles were full of new wine. But St Peter ſtanding up, told them, that what they heard and ſaw was not the effect of drunkenneſs, but was the completion of the promiſe that the holy Ghoſt had made by the prophet Joel (ii. 28.), to ſend his ſpirit upon all fleſh, and to give the ſpirit of prophecy to young and old, to men and women. He afterwards ſpoke to them of Jeſus Chriſt, and told them that he was the true Meſſiah, that he was riſen from the dead as the ſcripture had foretold he ſhould; declaring that himſelf and the other apoſtles were witneſſes of his reſurrection; of his aſcenſion into heaven, and of the miſſion of the Holy Ghoſt, the viſible effects of which they ſaw with their own eyes in the gifts of languages wherewith they had been repleniſhed.

Then thoſe that heard him were touched with compunction, and aſked the apoſtles, Brethren, what ſhall we do? Peter anſwered them, Repent and be baptized, and you ſhall receive the Holy Ghoſt. Then he inſtructed them, baptized them, and that very day three thouſand perſons were added to the church (Act iii. 1, 2, &c.). Some days after, St Peter and John, going to the temple at the hour of prayers, met at a gate of the temple a man who had been lame from his birth, ſo that he was carried about. This man ſeeing Peter and John, aſked alms of them: upon which Peter ſaid to him, Silver or gold I have not; but ſuch as I have I give thee; In the name of Jeſus of Nazareth, riſe up and walk. Preſently the man got up, and went into the temple along with them; lifting up his voice and glorifying God. He held St Peter, telling the people then aſſembled all that happened unto him. Then Peter, taking this occaſion, told the people, that it was not by his own power that he had performed the miracle they ſo much wondered at, but that it was by the power of Jeſus Chriſt that this man was healed. He then laid before them the great crime they had committed, in putting Jeſus Chriſt to death, who was the Saviour of the world, and the Meſſiah; and after he had ſhown them by all the prophecies that Chriſt was to die thus, he exhorted them to repentance, and to make a proper uſe of the death of Chriſt.

He was thus ſpeaking to the people, when the prieſts and Sadduces coming upon them, laid hold on Peter and John, and put them in priſon, until the day following, it being now late (Acts iv. 1, 2, &c.) But the number of thoſe that were converted this day at the ſecond preaching of St Peter was about five thouſand. The day following, the rulers, magiſtrates, and chief prieſts being aſſembled on this occaſion, ordered the apoſtles to be brought before them: and then aſked them, by whoſe authority they performed the miracle of healing the lame man? St Peter anſwered, that it was in the name of Jeſus of Nazareth, whom they had crucified, and whom God raiſed again from the dead. The aſſembly were ſurpriſed at the boldneſs of the apoſtles upon this occaſion: but came to a reſolution to diſmiſs them, charging them at the ſame time to teach no more in the name of Jeſus; and threatening them if they ſhould perſiſt in diſobedience to theſe orders. The two apoſtles returned to their brethren, and related to them all that had paſſed; which having heard, the brethren raiſed their voices to heaven, begging God to give them ſtrength and courage to declare his word with perfect liberty: and having finiſhed their prayers, the place ſhook wherein they were aſſembled, and they were again filled with the Holy Ghoſt.

At this time many of the faithful ſold their eſtates, and brought the money to the apoſtles (*id.* v. 1, 2, &c.) Of this number was a man called Ananias, with his wife Sapphira, who by a private agreement between themſelves, concealed a part of the money for which they had ſold their land, and brought the reſt, to St Peter, as if it were the whole ſum. Ananias came firſt; and St Peter ſaid to him, Ananias, how came Satan to ſeduce you, and to prevail with you to lie to the Holy Ghoſt, by concealing part of the price of your land? It is not men that you thought to impoſe on, but God. Immediately Ananias fell down dead, and they carried him out and buried him. About three hours after his wife Sapphira came in, and St Peter ſaid to her almoſt the ſame things he had before ſaid to her huſband, and immediately ſhe fell down alſo, and gave up the ghoſt. This affair infuſed a great awe into the whole church, and amongſt all thoſe that heard of it. (See Acts v.)

The number of believers conſiderably increaſed every day; ſo that they even brought out the ſick into the ſtreets, and laid them where Peter was to paſs, that at leaſt his ſhadow might cover ſome of them, by which means they were healed of their diſtempers. Then the high-prieſt and his aſſociates, that is, the Phariſees, cauſed the apoſtles to be apprehended and put into priſon. But an angel brought them forth, and bid them go into the temple, and there boldly declare all the words of life which God had taught them. This they performed: upon which the princes and prieſts cauſed them to be brought before them; and having demanded why they had diſobeyed their orders, in continuing to ſpeak ſtill in the name of Jeſus Chriſt, Peter and the apoſtles anſwered, that it was more neceſſary to obey God than man. This anſwer provoked them very much, and they were going to condemn them to death, when Gamaliel prevailed with them to change their reſolution, by repreſenting to them, that if this matter proceeded from God, it was in vain for them to oppoſe it; but if otherwiſe, then it ſhould ſoon vaniſh of itſelf. So they diſmiſſed the apoſtles, after giving them thirty-nine ſtripes a-piece, and charged them to ſpeak no more in the name of Jeſus Chriſt.

After the martyrdom of St Stephen, a perſecution was carried on againſt the faithful at Jeruſalem, and they were obliged to take ſhelter in ſeveral places. The apoſtles alone continued at Jeruſalem (Act viii. 1, 2, 3, &c.) St Philip the deacon going to Samaria, the Samaritans received the word of the Lord, and ſeveral of them were baptized. Then St Peter and St John repaired thither alſo, to give them the Holy Ghoſt; which St Philip, being only a deacon, had not power to do. Simon the magician was alſo baptized among others; and admiring the power that the apoſtles had, of conferring the Holy Ghoſt, would have bought the ſame power of the apoſtles, and accordingly offered money to St Peter. But Peter with indignation replied to him, Thy money and thou periſh together, who thinkeſt the gifts of God can be bought with money! Thou haſt no part with us, nor haſt any pretenſions to this miniſtry, for thy heart is not right before God. Repent therefore of this wickedneſs, and pray to God if perhaps he will pardon the wicked thoughts of thy heart. After this Peter and John returned again to Jeruſalem. See Acts viii.

The fire of perſecution being now pretty well extinguiſhed, St Peter departed from Jeruſalem (Acts. ix. 32, &c.), and viſiting the diſciples from city to city, he came alſo to ſee the ſaints that dwelt at Lydda. Here he found a man called Æneas, who had been paralytic for eight years. St Peter ſaid to him, Æneas, riſe up; Jeſus Chriſt the Lord cures you. He preſently got up; and all that dwelt at Lydda that ſaw the miracle were converted to the Lord. There was alſo at Joppa a certain holy woman, named Tabitha, who happening to die while St Peter was at Lydda, the diſciples ſent to deſire him to come to them. Whereupon St Peter came, and entering into the chamber where Tabitha lay dead, he cauſed every body to go out, and betook himſelf to prayers. Then turning himſelf towards the corpſe, he ſaid, Tabitha, ariſe. At which inſtant ſhe opened her eyes, and ſeeing St Peter, ſhe ſat up. This miracle was much famed at Joppa, and was the occaſion that many were converted. St Peter ſtayed there a good while, taking up his lodging with one Simon a tanner.

Now there was at Cæſarea of Paleſtine a centurion called Cornelius, a man that feared God (Acts x. 1, 2, 3,), and to whom it was revealed by an angel, that he ſhould ſend to Joppa to Peter, who ſhould tell him what he had to do. Cornelius immediately ſent two of his ſervants; and while they were upon the road, the Lord ſent a viſion to Peter, to prepare him to go to this man without any ſcruple, although he was not a Jew; for as yet the door of the goſpel had not been opened to the Gentiles. St Peter then being at the top of the houſe, fell into a trance, and ſaw, as it were, a great ſheet of linen let down from heaven, which was full of all kinds of animals and reptiles, both clean and unclean. He had this viſion three times, and heard a voice, ſaying, Ariſe Peter, kill and eat. But Peter anſwered, Lord, I have never eaten any thing unclean. The voice replied, Call not that unclean which God has purified. After which the ſheet was again taken up into heaven. At the ſame time, the men came in that had been ſent by Cornelius. They acquainted him with what had happened to their maſter, and deſired him to go along with them to Cæſarea. The day following St Peter ſet out thither, and was accompanied by ſome of the brethren of Joppa. (See Acts. x.)

When Peter was returned to Jeruſalem, the faithful of the circumciſion ſaid to him, why have you gone unto the uncircumciſed, and why did you eat with them? But Peter having related to them all that paſſed, they were ſatiſfied, and glorified God who had given the gift of repentance leading to life as well to the Gentiles as to the Jews. It is thought, that a little after this Peter went to Antioch, where he founded the Chriſtian church of which he was biſhop (Gal. ii. 11.) It is believed that he continued here ſeven years, though not conſtantly: for during this time, he went to Jeruſalem, and to the provinces of Aſia Minor, to Bythynia, Cappadocia, and Pontus, as is concluded from the epiſtle that he afterwards addreſſed to the faithful of theſe provinces. From thence he went to Rome, in the 42d year of the Chriſtian era; and it is thought that at his leaving Antioch he there fixed St Ignatius in his place. Euſebius thinks, that the chief occaſion of his going to Rome was to oppoſe Simon Magus, who by his deceits had perverted a great number of perſons. However, the preſence of St Peter, and the true miracles that he oppoſed to the tricks of Simon, ruined, or much diminiſhed, the reputation of this impoſtor.

St Peter, leaving Rome, came to Jeruſalem at the paſſover, in the 44th year of the Chriſtian era, when Herod Agrippa, began to perſecute the church. That prince put St James the Greater, brother of John, to the ſword (Acts xii. 1, &c.); and perceiving that his death was agreeable to the Jews, he moreover cauſed Peter to be apprehended and put in priſon, with a deſign of executing him publicly after the paſſover. But the very night that Herod thought of putting him to death, as Peter, loaded with chains, was aſleep between two ſoldiers, the angel of the lord awakened him, broke of his chains, opened the priſon door and brought him out the length of a ſtreet. Then the angel leaving him, he came to the houſe of Mary the mother of John, where many of the faithful were aſſembled at prayers; and having knocked at the door, a damſel named Rhodo came to open it: but when ſhe heard Peter's voice, inſtead of opening the door, ſhe ran in a tranſport of joy to acquaint the family that Peter was at the door. Thoſe that heard her could not believe it, and ſaid, it was his angel, and not himſelf: but continuing to knock, and being let in, he informed them of what had happened to him.

He then left Jeruſalem; but we are not told what became of him till the time of the council held at Jeruſalem in the year 51. It is thought that before this time he made his ſecond journey to Rome, from whence he wrote his firſt epiſtle.

St Peter was obliged to leave Rome in the year 51 by order of the emperor Claudius, who had baniſhed all Jews from thence becauſe of the tumults they continually raiſed there, excited by one Chreſtus, as Suetonius ſays, meaning probably by this name Jeſus Chriſt. The apoſtle then returned to Judea, where was held the counſel of Jeruſalem; in which, after a ſtrict examination of the matter propoſed to Peter and the apoſtles, he ſpoke to them with much wiſdom, ſaying (Acts xv. 7, 8, &c,), that God having given his Holy Ghoſt and the gift of faith to the Gentiles as well as to the Jews, they ought not to impoſe the yoke of the legal obſervances on the new converts, which (as he ſays) neither we nor our fathers have been able to bear. But we believe, that it is through the grace of Jeſus Chriſt that both we and they ſhall be ſaved. St James the Leſs, biſhop of Jeruſalem, ſeconded this opinion of St Peter; and the council came to this concluſion, that no new obligation ſhould be impoſed on the Gentiles, but only that they ſhould be required to abſtain from fornication, from the uſe of blood, and from meats offered to idols. The reſolution of this council was written to the faithful of Antioch, becauſe it was there this queſtion was firſt ſtarted.

Some time after, St Peter coming to Antioch (Gal. ii. 11, &c.), he eat and drank with the Gentiles, without regarding that diſtinction of meats enjoined by the law. But after that, when ſome of the faithful of Jeruſalem came to Antioch, being converted Jews, St Peter, out of fear to offend them, ſeparated himſelf from the converted Gentiles, and would no longer eat with them as before. St Paul, fearing that what St Peter did might be interpreted as if he had a deſire to oblige the Gentiles to judaize, and to ſubmit themſelves to the yoke of the law, and ſo to revoke and annul what he himſelf had determined in the council of Jeruſalem, he withſtood Peter to his face, and openly expoſtulated with him, telling him, he was much in the wrong to endeavour to oblige the Gentiles, at leaſt tacitly by his own manner of acting, to live as the Jews do; and St Peter received this reprehenſion with ſilence and humility.

The particulars of St Peter's life are little known from the 51ſt year of the vulgar era, in which the counſel of Jeruſalem was held, till his laſt journey to Rome, which was ſome time before his death. Then being acquainted by revelation that the time of his death was not far off (2 Pet. i. 14.), he had a mind to write to the faithful that had been converted by him, to put them in mind of the truths he had before taught them. He ſent them therefore his ſecond epiſtle.

St Peter and St Paul came to Rome about the ſame time, in the year of Chriſt 65, where they performed many miracles, and made many converts. Simon Magus by his tricks continued here to deceive the people, pretending himſelf to be the Meſſiah, and even attempting to aſcend into heaven: for having cauſed himſelf to be carried up into the air by his dæmons, in a fiery chariot, St Peter and St Paul betook themſelves to their prayers; and then the impoſtor, being forſaken by his dæmons, fell down upon the ground, which fall ſome time afterwards occaſioned his death. See Simon Magus.

Soon after this, St Peter was taken up and thrown into priſon, where it is ſaid he continued for nine months; at laſt he was crucified at Rome in the Via Oſtia; with his head downwards, as he himſelf had deſired of his executioners. This he did out of a ſenſe of humility, for fear it ſhould be thought, as St Ambroſe ſays, that he affected the glory of Jeſus Chriſt, and the more to augment the pain of his execution.

It is ſaid, that the body of St Peter was at firſt buried in the catacombs, two miles from Rome, from whence it was afterwards tranſported to the Vatican, where it has lain ever ſince. His feſtival is celebrated with that of St Paul on the 29th of June. St Peter died in the 66th year of the vulgar era, after having been biſhop of Rome for about 24 or 25 years. His age might be about 74 or 75 years. It is generally agreed, that St Linus was his ſucceſſor. The following is the portraiture that Nicephorus gives us of St Peter, which he has probably taken from the ancient pictures that were preſerved of this apoſtle. He was not fat, but pretty tall and upright, having a fair and paliſh countenance. The hair of his head and beard was thick, frizzled, and not long. His eyes were black, and blood-ſhot; his eye-brows protuberant and lofty; his noſe ſomething long, and rather flat than ſharp.

The two epiſtles of St Peter are addreſſed to thoſe Jewiſh converts who were ſcattered throughout Pontus, Galatia, &c. not only upon the perſecution raiſed at Jeruſalem, but upon former diſperſions of the Jews, into thoſe places on ſeveral other occaſions. The firſt epiſtle is principally deſigned to comfort and confirm them under thoſe fiery trials and manifold temptations they were then ſubject to, and to direct and inſtruct them how to behave in the ſeveral ſtates and relations both of the civil and the chriſtian life, that they might not be engaged in thoſe rebellions againſt Cæſar and his officers, then fomented among the Jews; and that they might ſtop the mouths of thoſe who ſpoke againſt them as evil doers. In the ſecond epiſtle, he proſecutes the ſame ſubject, to prevent their apoſtacy from the faith, on account of any perſecutions they were liable to. He likewiſe guards them againſt the corrupt principles of the gnoſtics, and thoſe who ſcoffed at the promiſe of Chriſt's coming, as if it would never be verified.

Blackwall's Sacred Claſſics defended.

St Peter's ſtyle, ſays a modern author expreſſes the noble vehemence and fervour of his ſpirit, the full knowledge he had of Chriſtianity, and the ſtrong aſſurance he had of the truth and certainty of his doctrine: and he writes with the authority of the firſt man in the college of the apoſtles. He writes with that quickneſs and rapidity of ſtyle, with that noble neglect of ſome of the formal conſequences and niceties of grammar, ſtill preſerving its true reaſon, and natural analogy (which are always marks of a ſublime genius), that you can ſcarce perceive the pauſes of his diſcourſe and diſtinction of his periods. The great Joſeph Scaliger calls St Peter's firſt epiſtle majeſtic; and we hope he was more judicious than to exclude the ſecond, though he did not name it.

A noble majeſty, and becoming freedom, is what diſtinguiſhes St Peter; a devout and judicious perſon cannot read him without ſolemn attention and awful concern. The conflagration of this lower world, and future judgment of angels and men, in the third chapter of the ſecond, is deſcribed in ſuch ſtrong and terrible terms, ſuch awful circumſtances, that in the deſcription we ſee the planetary heavens and this our earth wrapped up with devouring flames, hear the groans of an expiring world, and the cruſhes of nature tumbling into univerſal ruin.

The authority of the ſecond epiſtle of St Peter was for ſome time doubted of, as Origen, Euſebius, St Jerom, and others have obſerved. What made the ancients call it in queſtion, is the difference of its ſtyle from the firſt. The third chapter, which deſcribes the cataſtrophe of the viſible world, made Grotius think this epiſtle was wrote after the taking of Jeruſalem; becauſe that was not to happen till after the deſtruction of that city; upon which he conjectures, that Simeon biſhop of Jeruſalem is the author of this epiſtle, and that the inſcription which carries St Peter's name is corrupted. But the beſt critics admit this epiſtle to be the genuine work of St Peter, who diſcovers himſelf, where he ſays that he was preſent at our Lord's transfiguration; and where he tells the Jews, this was the ſecond letter he had written to them. The reader may ſee this queſtion fully diſcuſſed, and the authority of this epiſtle eſtabliſhed beyond all doubt, by the learned Dr Sherlock, in his *Diſſertation* on the authority of the Second Epiſtle of St Peter.

St Peter has been made the author of ſeveral books; ſuch were his Acts, his Goſpel, his Revelation, his work about preaching, and another about judgment. There is extant a large hiſtory of St Peter, called the *Recognitions*, aſcribed to St Clement.

Peter *of Blois*, a learned man of the 12th century, was born about the year 1120, at the city of Blois in France, from whence he derived his name. His parents being opulent gave him a learned education. In his youth, when he ſtudied in the univerſity of Paris, he was exceſſively fond of poetry; and when he was a little further advanced in life, he became no leſs fond of rhetoric, to the ſtudy of which he applied with the greateſt ardour. From Paris he removed to Bononia in Italy, to acquire the civil and canon law: in the knowledge of both which he very much excelled. He appears from his writings to have cultivated medicine, and ſeveral branches of the mathematics, with no little care and ſucceſs. The ſtudy of theology was the chief delight and buſineſs of his life, in which he ſpent the greateſt part of his time, and made the greateſt progreſs. But unfortunately it was that ſcholaſtic theology, which conſiſted in vain attempts to prove and explain the many abſurd opinions which then prevailed in the church, by the ſubtleties of Ariſtotelian logic. In attempting to explain in this manner the moſt abſurd of all opinions that ever exiſted amongſt mankind, he was ſaid to be the firſt perſon who employed the famous word *tranſubſtantiation*, which was ſoon after adopted by the church of Rome, and hath ever ſince made ſo great a noiſe, though others contend that it was uſed in the fourth and fifth centuries. Being appointed preceptor to William II. king of Sicily in 1167, he obtained the cuſtody of the privy ſeal; and, next to the archbiſhop of Palermo, the prime miniſter, had the greateſt influence in all affairs. But his power was not of long duration; for the archbiſhop being baniſhed in 1168, our author ſoon after left the court of Sicily, and returned into France. He was not long, however, without a royal patron, being invited into England by Henry II. who employed him as his private ſecretary, made him archdeacon of Bath, and gave him ſome other benefices. When he had ſpent a few years at court, he conceived a diſguſt at that way of life (of which he hath drawn a very unpleaſing picture in one of his letters), and retired into the family of Richard archbiſhop of Canterbury, who had made him his chancellor about the year 1176. In this ſtation he continued to the death of the archbiſhop in 1183, enjoying the higheſt degree of favour with that prelate. Our author remained in the ſame ſtation in the family of archbiſhop Baldwin, who ſucceeded Richard, acting both as his ſecretary and chancellor. He was alſo ſent by that prelate on an embaſſy to Rome in 1187, to plead his cauſe before Pope Urban III. in the famous controverſy between him and the monks of Canterbury about the church of Hackington. After the departure of his friend and patron Baldwin for the Holy Land in 1190, our author was involved in various troubles in his old age, the cauſes of which are not diſtinctly known; and died about the end of the 12th century. He appears from his works, which may be juſtly reckoned among the moſt valuable monuments of the age in which he flouriſhed, to have been a man of great integrity and ſincere piety, as well as of a lively inventive genius and uncommon erudition. His printed works conſiſt of 134 letters, which he collected together at the deſire of Henry II.; of 65 ſermons, delivered on various occaſions; and of 17 tracts on different ſubjects.

Peter *the Hermit*. See Croisade and Hermit.

Peter I. juſtly ſtyled *Peter the Great*, czar, and afterwards emperor, of Ruſſia, founder of the Ruſſian empire; for though the country was well known, and of great antiquity, yet it had no extent of power, of political influence, or of general commerce, in Europe, till his time. He was born in 1672; and was proclaimed czar when but ten years of age, in excluſion of John his elder brother, who, being of a ſickly conſtitution, was at the ſame time very weak in his underſtanding. The princeſs Sophia, his half-ſiſter, made an inſurrection in favour of John: and to put an end to the civil war, it was at laſt agreed that the two brothers ſhould jointly ſhare the imperial dignity, Peter had been very ill brought up, not only through the general defects of the Ruſſian education, but likewiſe through the arts of the princeſs Sophia, who ſurrounded him with every thing that might ſtifle his natural deſire of knowledge, deprave his mind, and enervate it with pleaſure. Notwithſtanding this, his inclination for military exerciſe diſcovered itſelf in his tendereſt years. He formed a company of 50 men, commanded by foreign officers, clothed and exerciſed after the German manner. He entered himſelf into the loweſt poſt, that of a drummer; and never roſe otherwiſe than as a ſoldier of fortune. Herein his deſign was to teach his nobility, that merit, not birth was the only title to military employments. He reinforced his company with ſeveral others, till at laſt he had got together a conſiderable body of ſoldiers. As he then had no war on his hands, he exerciſed them in all ſorts of mock-engagements, and by this means ſecured to himſelf a body of well-diſciplined troops. The ſight of a Dutch veſſel, whith he had met with on a lake belonging to one of his pleaſure-houſes, made ſuch an impreſſion on his mind, that he conceived the almoſt impracticable deſign of forming a navy. His firſt care was to get ſome Hollanders to build ſome ſmall veſſels at Moſcow; and he paſſed two ſucceſſive ſummers on board Engliſh or Dutch ſhips, which ſet out from Archangel, that he might inſtruct himſelf in every branch of naval affairs (A). In 1696 czar John died, and Peter was now ſole maſter of the empire. In 1698 he ſent an embaſſy to Holland; and went *incognito* in the retinue, and viſited England as well as Holland in order to inform himſelf fully in the art of ſhip-building. At Amſterdam he worked in the yard as a private ſhip-carpenter, under the name of *Peter Michaeloſ*; but he has been often heard to ſay, that if he had never gone to England, he had ſtill remained ignorant of that art. In 1700 he had got together a body of ſtanding forces, conſiſting of 30,000 foot; and now the vaſt project he had formed diſplayed itſelf in all its parts. He opened his dominions, which till then had been ſhut up, firſt having ſent the chief nobility of his empire into foreign countries to improve themſelves in knowledge and learning. He invited into Ruſſia all the foreigners he could meet with, who were capable of inſtructing his ſubjects in any manner, and offered them great encouragement to ſettle in his dominions. This raiſed many diſcontents; and the deſpotic authority he exerted on that occaſion was ſcarcely powerful enough to ſuppreſs them. In 1700, being ſtrengthened by the alliance of Auguſtus king of Poland, he made war on Charles XII. king of Sweden. His firſt ill ſucceſs did not deter him; for he uſed to ſay, I know that my armies muſt be overcome for a great while; but even this will at laſt teach them to conquer. He afterwards gained conſiderable advantages; and founded Peterſburg in 1703. In 1709 he gained a compleat victory over the Swedes at Pultowa. In 1712 he was incloſed by the Turks on the banks of the Pruth; and ſeemed inevitably loſt, had not the czarina Catharine bribed the grand viſir, and the czar's prudence completed his deliverance. In 1716 he made a tour through Germany and Holland, and viſited the royal academy of ſciences at Paris. It would be endleſs to enumerate all the various eſtabliſhments for which the Ruſſians are obliged to him. He formed an army according to the manner of the politeſt and moſt experienced nations: he fitted out fleets in all the four ſeas which border upon Ruſſia; he cauſed many ſtrong fortreſſes to be raiſed after the beſt plans; and made convenient harbours: he introduced arts and ſciences into his dominions, and freed religion from many ſuperſtious abuſes: he made laws, built cities, cut canals, &c.; was generous in rewarding, impartial in puniſhing; faithful, laborious, and humble; yet was not free from a certain roughneſs of temper natural to his nation. He had indeed cured himſelf of exceſs in drinking; but he has been branded with ſeveral other vices, particularly cruelty. He publiſhed the unfortunate hiſtory of his ſon prince Alexis (B); towards whom ſome blame his ſeverity, while others think

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(A) The following circumſtance, it is ſaid, in ſome meaſure determined Peter to attempt theſe reformations which he afterwards accompliſhed. Great events have been ſometimes the effect of little cauſes; and it is at leaſt poſſible that without the occurrence we are going to relate, Ruſſia might ſtill have been in a ſtate of barbariſm A young Geneveſe, called *Le Fort*, about 1695, went to Moſcow with the Daniſh ambaſſador. The czar Peter who was then 19 years old, fell into company with this Geneveſe, who had ſoon learnt the Ruſſian tongue, and ſpoke almoſt all the tongues of Europe. Le Fort ingratiated himſelf with the prince, entered into his ſervice, and ſoon afterwards into his familiarity. He made him comprehend that there was a different manner of living and reigning from what had unhappily obtained throughout his vaſt and miſerable empire. A prince muſt be born with an uncommon greatneſs of ſoul to liſten readily to a ſtranger, and to be able to diveſt himſelf of the prejudices of a throne and of his country. The czar was ſenſible that neither himſelf nor his people were yet to be reckoned among men; and that he had an empire to form, but could have no aſſiſtance at home. From that time he took a reſolution to leave his dominions; and ſet out, like another Prometheus, to borrow celeſtial fire for animating his countrymen.

(B) Alexis, like his father, is ſaid to have married a ſlave, and, like him, quitted Moſcovy ſecretly, but had not the ſame ſucceſs in his undertakings; and the being but a bad imitator of his father, coſt him his life, He became an example of the moſt terrible ſeverity that ever was given from the tribunal of the throne: but, what is think it no more then was neceſſary. He perfectly knew the honours due to perſons of merit; and not only heaped honours upon them during their life, but gave them marks of eſteem even after their death. He died of the ſtranguary in 1725, and left the world with the magnanimity of a hero and the piety of a Chriſtian.

Peter was tall of ſtature, and of a bold and majeſtic aſpect, though ſometimes disfigured by convulſions, which altered his features. This deformity was aſcribed to poiſon, given him, as it is ſaid, by his ſiſter Sophia; but it was indeed no other than wine and brandy, which he often drank to exceſs, relying too much on the ſtrength of his conſtitution. He converſed with perſons in all ſtations, from the mechanic to the general of an army; and his converſation was neither like that of a barbarian who makes no diſtinction between men, nor of a popular prince who ſeeks to pleaſe all the world, but that of a perſon who aims at inſtruction. He loved women as much as the king of Sweden, his rival, dreaded them, and all were equally agreeable to him as well in bed as at board; he valued himſelf on drinking large draughts, rather than ſipping delicious wines. We are told that kings and legiſlators ſhould never ſuffer themſelves to be tranſported by paſſion; but never was any man more paſſionate than Peter the Great, nor more mercileſs. In a king this is more than an infirmity for which we make amends by confeſſing it; but it was generally remarked of Peter, and he himſelf ſaid to a magiſtrate of Holland, at his ſecond voyage, "I have reformed my nation, and have not been able to reform myſelf." It is true, the cruelties with which he is reproached were not novelties at the court of Moſcow, any more than at that of Morocco; it was not uncommon to ſee a czar, with his own royal hand inflict 100 laſhes of a bull's pizzle on the naked ſhoulders of a prime officer of the crown, or of a lady of the palace, for failing in their duty, by getting drunk; or to try the goodneſs of his ſabre, by ſtriking off the head of a criminal. Peter had himſelf performed ſome of thoſe ceremonies of his country;

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is much to the honour of the empreſs Catherine, ſhe had no hand in the misfortunes of that prince, who was born of another woman, and loved nothing that his father loved. Catherine was not in the leaſt ſuſpected of acting the cruel ſtepmother. The great crime of the unfortunate Alexis was his being too much a Ruſſian, and his diſapproving every thing that was grand and immortal, and projected by his father for the glory of the nation. One day, hearing ſome Moſcovites lamenting the inſupportable fatigues they were to undergo in the building of Peterſburg, he ſaid, "Take courage, this city will not ſtand long." When he was called to attend his father in a journey of 600, or 700 leagues, which the czar often made, he feigned ſickneſs. He took violent purges for a diſtemper which he had not; and ſuch quantities of medicines, with exceſſive drinking of brandy, impaired his health and his wits. At firſt he had an inclination to learning, was acquainted with geometry and hiſtory, and had learnt the German tongue: but he hated war, and would never learn it; for which he was moſt reproached by his father. They had married him in 1711 to the princeſs of Wolfenbuttle, ſiſter of the empreſs conſort to Charles VI. This marriage was unfortunate; the princeſs was often abandoned for a debauch in brandy, and for Afroſina, a Finland wench, of a large ſtature, well made, and very agreeable. It is reported that the princeſs died of chagrin, if it be poſſible for chagrin to prove mortal; and that afterwards the czarowitz ſecretly eſpouſed Afroſina in 1713, when the empreſs Catherine had juſt brought him a brother, at which he had no reaſon to be uneaſy.

The miſunderſtandings between the father and the ſon became every day more ſerious; till at length the father, about the year 1716, threatened the prince to diſinherit him; and the prince told him that he intended to go into a monaſtery.

The czar, in 1717, renewed his journeys, as well with a view to politics as curioſity. He came at laſt into France. If the ſon had entertained an inclination to revolt, if he had actually had a party formed in his favour, now was the time to declare himſelf; but inſtead of remaining in Ruſſia, making himſelf popular, and creating dependents, he took a journey in his turn, having with much difficulty ſcraped together ſome thouſands of ducats, which he had ſecretly borrowed. He threw himſelf under the protection of the emperor Charles VI. brother of his deceaſed wife. They kept him for ſome time *incognito* at Venice, from whence he paſſed to Naples, where he reſided almoſt a year, while neither his father nor any perſon in Ruſſia knew the place of his retreat.

While the ſon kept himſelf thus concealed, the father was at Paris, where he was received with all the reſpect paid him in other places, but with a gallantry nowhere to be found but in France. If he went to viſit a manufactory, and one piece of work attracted his ſight more than another, he was preſented with it the next day. He went to dine at the Duke d'Antin's at Petitbourg, where the firſt thing he ſaw was his own picture at full length, in the ſame habit that he wore. When he was at the royal mint of medals, they ſtruck all kinds before him, and preſented him with them; at laſt they ſtruck one which they let drop on purpoſe at his feet, and left him to take it up. He there ſaw himſelf perfectly engraven with theſe words, *Peter the Great.* The reverſe was a Fame, and round her in letters *Vires acquirit eundo;* an alluſion no leſs juſt than flattering to a prince who really acquired new merit by travelling.

After he had ſeen this country, where every thing diſpoſes men to gentleneſs and indulgence, he returned to his own, and reſumed his ſeverity. He had engaged his ſon to return from Naples to Peterſburg, from whence that young prince was conducted to Moſcow before the czar his father; who began with depriving him of his ſucceſſion to the throne, by making him ſign a ſolemn act of renunciation at the end of January 1718, in conſideration of which act the father promiſed the ſon to ſpare his life.

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Le Fort, however (ſee note A), had authority enough over him at times to ſtay his hand even when liſted up to ſtrike, but he had not Le Fort always near him.

The Czar's firſt marriage is thus related in the memoirs of Peter Henry Bruce, Eſq. "it took place in 1690, when he was only 18. He was married to Ottokeſſa Lapuchin, a boyar's daughter, by whom he had prince Alexis; ſome time after he turned her away, and ſhut her up in a monaſtery, on ſuſpicion of diſloyalty to his bed. It was ſaid, that in one of her jealous fits ſhe charged prince Menzikoff with carrying the czar to drabs of his former acquaintance, who had been his cuſtomers for cakes; upbraiding him with his firſt occupation: and that Menzikoff ever after bore an irreconcileable enmity to both her and her ſon. After the divorce, one Miſs Mons, a very beautiful young lady, born at Moſcow, of foreign parents, was much in favour with the czar: but when he was abroad, Mr Keyſerling, then reſiding at Moſcow as envoy from the king of Pruſſia, paid his addreſſes to, and married her. When the czar returned, he was ſo much offended at Keyſerling, that he ordered him to leave Moſcow, which occaſioned his immediate recal by the king his maſter, who ſent another in his room. It was believed, if his public character had not protected him he would have ſeverely felt his majeſty's diſpleaſure.

"The czar was ſome time after ſmitten with the charms of another beautiful young lady, the daughter of a foreign merchant in this city: he firſt ſaw her in her father's houſe, where he dined one day. He was ſo much taken with her appearance, that he offered her any terms ſhe pleaſed, if ſhe would live with him; which this virtuous young woman modeſtly refuſed: but dreading the effects of his authority, ſhe put on a reſolution, and left Moſcow in the night without communicating her deſign even to her parents. Having provided a little money for her ſupport, ſhe travelled on foot ſeveral miles into the country, till ſhe arrived at a ſmall village where her nurſe lived with her huſband and their daughter, the young lady's foſter-ſiſter, to whom ſhe diſcovered her intention of concealing herſelf in the wood near that village: and to prevent any diſcovery, ſhe ſet out the ſame night, accompanied by the huſband and daughter. The huſband being a timber-man by trade, and well acquainted with the wood, conducted her to a little dry ſpot in the middle of a moraſs, and there he built a hut for her habitation. She had depoſited her money with her nurſe to procure little neceſſaries for her ſupport, which were faithfully conveyed to her at night by the nurſe or her daughter, by one of whom ſhe was conſtantly attended in the night-time.

"The next day after her flight, the czar called at her father's to ſee her, and finding the parents in anxious concern for their daughter, and himſelf diſappointed, fancied it a plan of their own concerting. He became angry, and began to threaten them with the effects of his diſpleaſure if ſhe was not produced; nothing was left to the parents, but the moſt ſolemn proteſtations, with tears of real ſorrow running down their

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It was not altogether improbable that ſuch an act would have been ſome time or other annulled. The czar, therefore, in order to give it more force, forgetting that he was a father, and only remembering that he was the founder of an empire, which his ſon might overturn, and involve in its ancient barbarity, ordered a public proceſs to be drawn up againſt that unfortunate prince, for ſome concealment, with which he was charged, in the confeſſion that they had exacted of him.

An aſſembly was held of the biſhops, inferior eccleſiaſtics, and profeſſors; who found in the Old Teſtament that thoſe who curſe their father or their mother ſhould be put to death; that David indeed had pardoned Abſalom who rebelled againſt him, but that Abſalom was never pardoned by God. Such was their opinion, without drawing any concluſion; but is was in effect ſigning a warrant for his death. Alexis had not infact curſed his father, either had he ever revolted like Abſalom; he had never lain publickly with the king's concubines, but he had left the kingdom without his father's permiſſion, and had written letters to his friends, in which he only ſignified that he hoped they would one day be mindful of him in Ruſſia. But whatever might be his caſe, of 124 lay judges, who were appointed to ſit on him, there was not one that judged his offences leſs than capital; and thoſe who could not write, made others ſign for them. It is reported in Europe that the czar had got tranſlated from Spaniſh into Ruſſian the criminal proceſs againſt Don Carlos, that unfortunate prince whom his father Philip II. had confined in a priſon, where the heir of that great monarchy ended his days. But there was nothing like a proceſs carried on againſt Don Carlos, nor was it ever known whether that prince died a natural or a violent death. Peter, the moſt deſpotic of princes, wanted not an example. Certain it is that the prince died the day after the ſentence, and that the czar had at Moſcow one of the beſt apothecary ſhops in Europe. It is probable, however, that the prince Alexis, the heir of the moſt extenſive empire in the world, being condemned unanimouſly by his father's ſubjects, which were one day to be his own, might die of the ſudden ſhock and change given to the body at the apprehenſion of ſo ſtrange and diſmal a ſentence. The father went to ſee his ſon in his laſt agonies; and it is ſaid he ſhed tears, *Infelix utcunque ferent ea fata nepotes.* Theſe tears however, did not prevent the wheels from being covered with the broken limbs of his ſon's friends. He beheaded his own brother-in law Count Lapuchin, brother to his wife Ottokeſſa Lapuchin whom he had divorced, and uncle to prince Alexis. The prince's confeſſor had alſo his head cut off. If Moſcovy has been civilized, ſhe has, it muſt be confeſſed, paid dear for her politeneſs.

The remainder of the czar's life was nothing but a ſeries of grand projects, labours, and exploits, that ſeemed to efface the memory, of his exceſſive ſeverities, which were perhaps neceſſary. He made frequent ſpeeches to his court and to his council. In one he told them that he had ſacrificed his ſon to the welfare of his dominions.

their cheeks, to convince him of their innocence, and ignorance of what was become of her; aſſuring him of their fears that ſome fatal diſaſter muſt have befallen her, as nothing belonging to her was miſſing, except what ſhe had on at the time. The czar, ſatisfied of their ſincerity, ordered great ſearch to be made for her, with the offer of a conſiderable reward to the perſon who ſhould diſcover what was become of her, but to no purpoſe: the parents and relations, apprehending ſhe was no more, went into mourning for her.

"Above a year after this ſhe was diſcovered by an accident. A colonel who had come from the army to ſee his friends, going a hunting into that wood, and following his game through the moraſs, he came to the hut, and looking into it ſaw a pretty young woman in a mean dreſs. After inquiring of her who ſhe was, and how ſhe came to live in ſo ſolitary a place, he found out at laſt that ſhe was the lady whoſe diſappearance had made ſo great a noiſe: in the utmoſt confuſion, and with the moſt fervent intreaties, ſhe prayed him on her knees that he would not betray her; to which he replied, that he thought her danger was now paſt, as the czar was then otherwiſe engaged, and that ſhe might with ſafety diſcover herſelf, at leaſt to her parents, with whom he would conſult how matters ſhould be managed. The lady agreed to this propoſal; and he ſet out immediately, and overjoyed her parents with the happy diſcovery: the iſſue of their deliberations was to conſult Madame Catherine (as ſhe was then called) in what manner the affair ſhould be opened to the czar. The colonel went alſo upon this buſineſs, and was adviſed by Madame to come next morning and ſhe would introduce him to his majeſty, when he might make the diſcovery and claim the promiſed reward. He went according to appointment; and being introduced, told the accident by which he had diſcovered the lady, and repreſented the miſerable ſituation in which he found her, and what ſhe muſt have ſuffered by being ſo long ſhut up in ſuch a diſmal place, from the delicacy of her ſex. The czar ſhowed a great deal of concern that he ſhould have been the cauſe of all her ſufferings, declaring that he would endeavour to make her amends. Here Madame Catherine ſuggeſted, that ſhe thought the beſt amends his majeſty could make, was to give her a handſome fortune and the colonel for a huſband, who had the beſt right, having caught her in purſuit of his game. The czar, agreeing perfectly with Madame Catherine's ſentiments, ordered one of his favourites to go with the colonel, and bring the young lady home; where ſhe arrived to the inexpreſſible joy of her family and relations, who had all been in mourning for her. The marriage was under the direction and at the expence of the czar, who himſelf gave the bride to the bridegroom; ſaying, that he preſented him with one of the moſt virtuous of women; and accompanied his declaration with very valuable preſents, beſides ſettling on her and her heirs three thouſand rubles a-year. This lady lived highly eſteemed by the czar, and every one who knew her. Beſides the concurring reports of other people, I had the ſtory from her own mouth."

On the whole, that Peter I. was a great man, few will deny who know what real greatneſs is. A minute account of the life of this diſtinguiſhed emperor would make a large volume; we have been able to give but the mere outlines of it: the anecdotes, however, at the end, ſhow in ſome degree the nature of the man; at all events they ſhow one important truth, that it is a more difficult thing to reform one's ſelf than to reform a kingdom; to conquer one's paſſions, than to conquer the world. The Ruſſians, however, if there is any good in civilization, owe to him every thing: and they ſeem to be ſenſible of it; for a very pompous oration was delivered to his memory by Michael Lomonoſſoff, before the Academy of Sciences at St Peterſburgh, on the 26th of April 1755. For a minuter account of his improvements, &c. ſee RUSSIA, PETERSBURG, and CATHERINE I.

PETER the Wild Boy. This extraordinary creature occaſioned great ſpeculation among the learned; but we do not know that any ſatisfactory cauſes have been aſſigned for the ſtriking difference betwixt him and other human beings.

The following account of him is extracted from the pariſh-regiſter of North-church, in the county of Hertford. "Peter, commonly known by the name of *Peter the Wild Boy*, lies buried in this church-yard, oppoſite to the porch. In the year 1725 he was found in the woods near Hamelen, a fortified town in the electorate of Hanover, when his Majeſty George I. with his attendants, was hunting in the foreſt of Hertſwold. He was ſuppoſed to be then about 12 years of age, and had ſubſiſted in thoſe woods upon the bark of trees, leaves, berries, &c. for ſome conſiderable length of time. How long he had continued in that wild ſtate is altogether uncertain; but that he had formerly been under the care of ſome perſon, was evident from the remains of a ſhirt collar about his neck at the time when he was found. As Hamelen was a town where criminals were confined to work upon the fortifications, it was then conjectured at Hanover that Peter might be the iſſue of one of thoſe criminals, who had either wandered into the woods and could not find his way back again, or being diſcovered to be an idiot was inhumanly turned out by his parents, and left to periſh or ſhift for himſelf. In the following year, 1726, he was brought over to England by the order of Queen Caroline then princeſs of Wales, and put under the care of Dr Arbuthnot with proper maſters to attend him. But notwithſtanding there appeared to be no natural defect in his organs of ſpeech, after all the pains that had been taken with him he could never be brought diſtinctly to articulate a ſingle ſyllable, and proved totally incapable of receiving any inſtruction. He was afterwards intruſted to the care of Mrs Titchbourn, one of the queen's bed-chamber women, with a handſome penſion annexed to the charge. Mrs Titchbourn uſually ſpending a few weeks every ſummer at the houſe of Mr James Fenn, a yeoman farmer at Axter's End in this pariſh, Peter was left to the care of the ſaid Mr Fenn, who was allowed 35l. a-year for his ſupport and maintenance. After the death of James Fenn he was transferred to the care of his brother Thomas Fenn, at another farm houſe in this pariſh called Broadway, where he lived with the ſeveral ſucceſſive tenants of that farm, and with the ſame proviſion allowed by government to the time of his death, Feb. 22. 1785, when he was ſuppoſed to be about 72 years of age.

“ Peter was well made, and of the middle ſize. His countenance had not the appearance of an idiot, nor was there any thing particular in his form, except that two of the fingers of his left hand were united by a web up to the middle joint. He had a natural ear for muſic, and was ſo delighted with it, that if he heard any muſical inſtrument played upon, he would immediately dance and caper about till he was almoſt quite exhauſted with fatigue: and though he could never be taught the diſtinct utterance of any word, yet he could eaſily learn to hum a tune. All thoſe idle tales which have been publiſhed to the world about his climbing up trees like a ſquirrel, running upon all fours like a wild beaſt, &c. are entirely without foundation; for he was ſo exceedingly timid and gentle in his nature, that he would ſuffer himſelf to be governed by a child. There have been alſo many falſe ſtories propagated of his incontinence; but, from the minuteſt inquiries among thoſe who conſtantly lived with him, it does not appear that he ever diſcovered any natural paſſion for women, though he was ſubject to the other paſſions of human nature, ſuch as anger, joy, &c. Upon the approach of bad weather he always appeared ſullen and uneaſy. At particular ſeaſons of the year he ſhowed a ſtrange fondneſs for ſtealing away into the woods, where he would feed eagerly upon leaves, beech-maſt, acorns, and the green bark of trees, which proves evidently that he had ſubſiſted in that manner for a conſiderable length of time before he was firſt taken. His keeper therefore at ſuch ſeaſons generally kept a ſtrict eye over him, and ſometimes even confined him, becauſe if he ever rambled to any diſtance from his home he could not find his way back again: and once in particular, having gone beyond his knowledge, he wandered as far as Norfolk, where he was taken up, and being carried before a magiſtrate, was committed to the houſe of correction in Norwich, and puniſhed as a ſturdy and obſtinate vagrant, who would not (for indeed he could not) give any account of himſelf: but Mr Fenn having advertiſed him in the public papers, he was releaſed from his confinement and brought back to his uſual place of abode.

“ Notwithſtanding the extraordinary and ſavage ſtate in which Peter was firſt found greatly excited the attention and curioſity of the public; yet, after all that has been ſaid of him, he was certainly nothing more than a common idiot without the appearance of one. But as men of ſome eminence in the literary world have in their works publiſhed ſtrange opinions and ill-founded conjectures about him, which may ſeem to ſtamp a credit upon what they have advanced; that poſterity may not through their authority be hereafter miſled upon the ſubject, this ſhort and true account of Peter is recorded in the pariſh-regiſter by one who conſtantly reſided above 30 years in his neighbourhood, and had daily opportunities of ſeeing and obſerving him.”

Perhaps it may not be diſagreeable to our readers if we preſent them with Lord Monboddo’s account of this extraordinary creature (A). “ It was in the beginning of June 1782 (ſays his Lordſhip) that I ſaw him in a farm-houſe called Broadway, within about a mile of Berkhamſted, kept there upon a penſion which the king pays. He is but low of ſtature, not exceeding five feet three inches; and although he muſt now be about 70 years of age, has a freſh healthy look. He wears his beard; his face is not at all ugly or diſagreeable; and he has a look that may be called ſenſible and ſagacious for a ſavage. About 20 years ago he was in uſe to elope, and to be miſſing for ſeveral days; and once, I was told, he wandered as far as Norfolk; but of late he has been quite tame, and either keeps in the houſe or ſaunters about the farm. He has been the 13 laſt years where he lives at preſent; and before that he was 12 years with another farmer, whom I ſaw and converſed with. This farmer told me, that he had been put to ſchool ſomewhere in Hertfordſhire, but had only learned to articulate his own name Peter, and the name of King George, both which I heard him pronounce very diſtinctly. But the woman of the houſe where he now is (for the man happened not to be at home) told me, that he underſtood every thing that was ſaid to him concerning the common affairs of life; and I ſaw that he readily underſtood ſeveral things that ſhe ſaid to him while I was preſent. Among other things, ſhe deſired him to ſing Nancy Dawſon; which he did, and another tune which ſhe named. He never was miſchievous, but had always that gentleneſs of nature which I hold to be characteriſtical of our nature, at leaſt till we became carnivorous, and hunters or warriors. He feeds at preſent as the farmer and his wife do; but, as I was told by an old woman (one Mrs Collop, living at a village in the neighbourhood called Hempſtead, who remembered to have ſeen him when he firſt came to Hertfordſhire, which ſhe computed to be 55 years before the time I ſaw her), he then fed very much upon leaves, and particularly upon the leaves of cabbage, which he eat raw. He was then, as ſhe thought, about 15 years of age, walked upright, but could climb trees like a ſquirrel. At preſent he not only eats fleſh, but has alſo got the taſte of beer, and even of ſpirits, of which he inclines to drink more than he can get. And the old farmer abovementioned, with whom he lived 12 years before he came to this laſt farmer, told me, that he had acquired that taſte before he came to him, which is about 25 years ago. He has alſo become very fond of fire, but has not yet acquired a liking for money; for though he takes it, he does not keep it, but gives it to his landlord or landlady, which I ſuppoſe is a leſſon that they have taught him.

(A) This eccentric writer, in ſupport of his hypotheſis, that man in a ſtate of nature is a mere animal, without clothes, houſes, the uſe of fire, or even ſpeech, adduces the oran-outang, or man in the woods, and this Peter the wild man and others, as examples. He denies the want of the organs of ſpeech as an objection, and inſiſts they only want the artificial uſe of them.

him. He retains ſo much of his natural inſtinct, that he has a fore-feeling of bad weather, growling and howling, and ſhowing great diſorder, before it comes.

"Theſe are the particulars concerning him which I obſerved myſelf, or could learn by information from the neighbourhood." From all theſe facts put together his lordſhip makes the following obſervations:

"1ſt, Whatever doubts there may be concerning the humanity of the oran-outang, it was never made a queſtion but that Peter was a man.

"2dly, That he was, as the Dean [Swift] ſays, of a father and mother like one of us. This, as I have ſaid, was the caſe of two ſavages found in the diſmal ſwamps in Virginia, of the one found in the iſland of Diego Garcia, and of him that was diſcovered by M. le Roy in the Pyrenees, and in general of all the ſavages that have been found in Europe within theſe laſt 300 years; for I do not believe, that for theſe 2000 years paſt there has been a race of ſuch ſavages in Europe.

"3dly, I think there can be no reaſon to doubt of what was written from Hanover, and publiſhed in the newſpapers, that he was found going upon all fours, as well as other ſolitary ſavages that have been found in Europe. It is true that others have been found erect; which was the caſe of the two found in the diſmal ſwamp of Virginia, likewiſe of the man of the Pyrenees, and of him in the iſland of Diego Garcia: but theſe I ſuppoſe were not expoſed till they had learned to walk upright; whereas Peter appears to have been abandoned by his parents before he had learned that leſſon, but walked as we know children do at firſt.

"4thly, I think it is evident that he is not an idiot, not only from his appearance, as I have deſcribed it, and from his actions, but from all the accounts that we have of him, both thoſe printed and thoſe atteſted by perſons yet living; for as to the printed accounts, there is not the leaſt information of that kind in any of them, except in one, viz. Wye's letter, n° 8. wherein is ſaid, that ſome imputed his not learning to ſpeak to want of underſtanding; which I ſhould think ſhowed rather want of underſtanding in thoſe who thought ſo, when it is conſidered that at this time he had not been a year out of the woods, and I ſuppoſe but a month or two under the care of Dr Arbuthnot, who had taken the charge of his education. The Dean indeed tells us, that he ſuſpected he was a pretender, and no genuine wild man, but not a word of his being an idiot. And as to the perſons living, not one with whom I have converſed appeared to have the leaſt ſuſpicion of that kind; though it is natural that men who were not philoſophers, and knew nothing of the progreſs of man from the mere animal to the intellectual creature, nor of the improvement of our underſtanding by ſocial intercourſe and the arts of life, but believed that man when he came to a certain age has from nature all the faculties which we ſee him exert, and particularly the faculty of ſpeech, ſhould think him an idiot, and wanting even the capacity of acquiring underſtanding. I knew an officer of dragoons, a man of very good ſenſe, who was quartered where Peter then lived for ſome months, and ſaw him almoſt every day, and who aſſured me that he was not an idiot, but ſhowed common underſtanding, which was all that could be expected from one no better educated than he.

"Laſtly, thoſe who have conſidered what I have ſaid (B) of the difficulty of articulation, will not be ſurpriſed that a man who had lived a ſavage for the firſt 14 or 15 years of his life, ſhould have made ſo little progreſs in that art. I cannot, however, have the leaſt doubt, that if he had been under the care of Mr Braidwood of Edinburgh, he would have learned to ſpeak, though with much more difficulty than a man who had been brought up tame among people who had the uſe of ſpeech, and who conſequently muſt know the advantage of it. And I can have as little doubt that Mr Braidwood could have taught the oran-outang in Sir Aſhton Lever's collection, who learned to articulate a few words, ſo as to ſpeak plainly enough."

St Peter, *Le Port*, a market-town of England, in the ſouth-eaſt part of Guernſey, in Hampſhire, in the Britiſh channel, conſiſting of only one long and narrow ſtreet. The mouth of the harbour is well ſet with rocks, and is on each ſide defended by a caſtle, one called the *old caſtle*, and the other *caſtle-corner*. The governor of the iſland generally reſides here, who has the command of the garriſon in this and all the other caſtles. The harbour has a good road, from whence ſhips may ſail with any wind, and from the road paſs under the guns of the caſtle to the pier, cloſe up to the town. The pier is a noble work, formed of vaſt ſtones, joined together with great art and regularity; it is not only a ſecurity to the ſhips, but, being contiguous to the town, is handſomely paved at the top with large ſmooth flag-ſtone, guarded with parapets, and being of a great length and breadth, forms a pleaſant walk, affording a free proſpect of the ſea and the neighbouring iſlands. Cornet-caſtle, which commands both the town and the harbour, ſtands on a rock, ſeparated from the land by an arm of the ſea, no leſs than 600 yards wide, and not fordable but at low water in great ſpring-tides.

St Peter's Iſland, in the lake of Bienne in Switzerland, remarkable for being one of the retreats of Rouſſeau; whence it has alſo got the name of *Rouſſeau's Iſland*. It lies towards the ſouth ſide of the lake, and produces a great variety of ſhrubs and trees, particularly large oaks, beech, and Spaniſh cheſnut. The ſouthern ſhore ſlopes gradually to the lake, and is covered with herbage; the remaining borders are ſteep and rocky; their ſummits in a few places thinly covered with ſhrubs; in others their perpendicular ſides are clothed to the water's edge with hanging woods. The views from the different parts of the iſland are beau-

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(B) Lord Monboddo, far from thinking ſpeech or articulation natural to man, rather wonders how he can by any teaching or imitation attain to the ready performance of ſuch various and complicated operations. Add to this, when the organs are completely formed to one language, how hard it is to make them anſwer another.

beautiful and diverſified; that to the north being the moſt extenſive and pleaſing. It commands the proſpect of the lake, which is of an oval form; its cultivated borders, interſperſed with villages and caſtles, with the towns of Nidau and Bienne ſtanding upon the farther extremity. Agreeable walks are carried through the woods, and terminate in a circular pavilion placed in the centre of the iſland. Before the troubles in France, on Sunday, and particularly the vintage-time, this iſland was filled with parties who amuſed themſelves with wandering about the woods or dancing in the circular pavillion. How they employ themſelves now it is not eaſy to ſay, as it was overrun and ſubjected by the forces of that unhappy nation, and of courſe tainted with their deſtructive principles. It was retaken by the Spaniards, and properly belongs to the king of Sardinia. There is only one farm-houſe on the iſland, in an apartment of which Rouſſeau was lodged.

Peter-Pence, was an annual tribute of one penny, paid at Rome out of every family at the feaſt of St Peter. And this Ina the Saxon king, when he went in pilgrimage to Rome about the year 740, gave to the pope partly as alms and partly in recompence of a houſe erected in Rome for Engliſh pilgrims. And this continued to be paid generally until the time of King Henry VIII. when it was enacted, that from henceforth no perſon ſhall pay any penſions, Peterpence, or other impoſitions, to the uſe of the biſhop or ſee of Rome.

PETERBOROUGH, a city of Northamptonſhire, about 82 miles from London. It is the leaſt city except perhaps Ely, and unqueſtionably the pooreſt biſhopric, though one of the oldeſt towns in England. It had a monaſtery dedicated to St Peter, and founded as early as the year 655, to which the abbot of Croyland and his monks flying for protection in the year 870, they were overtaken and murdered in a court of this monaſtery called the *monks churchyard*, becauſe they were all buried here; and to this day is to be ſeen the tombſtone with their effigies which had been erected over their common grave. Soon after this the Danes deſtroyed both the monaſtery and friars, ſo that it lay deſtitute for above 100 years. The monks were, however, reſtored, and lived very ſumptuouſly, with a mitred abbot at their head till the reformation, when Henry VIII. converted it into a biſhop's ſee. The cathedral, which is ſaid to be more than 1000 years old, though apparently more modern, is a moſt noble Gothic fabric, and was much more ſo before it was defaced in the civil wars. The weſt front, which is 156 feet broad, is very ſtately; and beſides columns curiouſly adorned, is ſupported by three of the talleſt arches in Britain. The windows of the cloiſters are finely ſtained with ſcripture-hiſtory and the ſucceſſion of its abbots. There are in the church monuments of Queen Catharine, wife of Henry VIII. and of Mary queen of Scots; and the figure of one Mr Scarlet the ſexton, who buried them, and lived to 95, after he had buried all the houſekeepers of the town twice over. There is but one pariſh-church beſides the cathedral. The city is governed by a mayor, recorder, and aldermen, by a charter of Henry VIII. All its offices are elected by the dean and chapter, conſiſting of ſix prebendaries, who are all lords of the manor. Beſide the dean and chapter, who are an eccleſiaſtical corporation diſtinct from the biſhop, there are eight petty canons, four ſtudents in divinity, one epiſtler, one goſpeller, a ſubdean, ſubtreaſurer, and chanter, eight choriſters, eight ſinging men, two chancellors, beſides a ſteward, organiſt, &c. a grammar ſchool, and two charity-ſchools. The river Nen, over which there is here a wooden bridge, is navigable by barges to Northampton, 50 miles further, which bring coal, corn, &c. and by which they export in ſome years 6000 quarters of malt, beſides other goods, eſpecially the woollen manufactures either of cloth or ſtockings, in which the poor are employed. The air of Peterborough is ſaid not to be very wholeſome, by reaſon of the neighbouring fens; but the water of the river is freſh and good, the higheſt ſpring-tide never coming up within five miles of the town; and there is plenty of excellent water in their wells. The ſtreets are very poor, and the houſes but mean; there is, however, a handſome market-houſe, over which are kept the aſſizes and ſeſſions. Its juriſdiction extends over 32 towns and hamlets, wherein the civil magiſtrates appointed by the royal commiſſion are veſted with the ſame power as judges of aſſize, and hold their quarterly ſeſſions in this city.

PETERHEAD, a town in Scotland, in the county of Aberdeen, lies about 30 miles north-eaſt of that city. It ſtands on the moſt eaſterly point in Scotland, and from thence due weſt that kingdom is broadeſt.

Peterhead is the neareſt land to the northern continent of Europe, and lies within 300 miles of the *cape*, which is called the *Naze of Norway*. Through this channel the grand body of the herrings paſs in their annual migrations from Shetland and the north ſeas to the more ſouthern latitudes, attended with the all-devouring cod and ling; on which account Peterhead, or, as it is ſometimes called, *Buchanneſs*, hath always been the ſecond ſtation of the Dutch buſſes after leaving the Shetland iſlands. Tradition ſays, that ſome hundred years ago the Dutch offered Lord Mareſchal, then the proprietor of the coaſt, to cover a ſmall iſland called *Inch-Keith* with ſilver for the property of it to carry on their fiſheries, which for obvious reaſons could not be accepted. Be that as it may, the Dutch ſtill frequent the coaſt in July and Auguſt, and ſometimes 100 ſail are ſeen within ſight of land, buſily employed in the herring and white fiſheries. The natives, to whom this treaſure properly belongs, have lately made ſome attempts towards the white fiſhery, of which they cure and vend chiefly at the London market 4000 barrels of delicate ſmall cod and ling annually. They alſo fit out ſome veſſels for the Hebride fiſhery off Barrahead for the Barcelona market; and they claim the merit of having taught the iſlanders how to take and cure the large fiſh which abound on their coaſts. They have often gained the higheſt premiums allowed by government for curing white fiſhes.

Few harbours in Great Britain are of more importance to navigation than this of Peterhead, as, in caſe of violent ſtorms from the eaſterly points, large veſſels embayed betwixt this and the mouth of the Forth have not a port that they can ſafely take at every time of the tide, that of Aberdeen excepted. If therefore they cannot make their way to ſea in the teeth of a ſtrong eaſterly wind, or double this headland that they may gain the Murray frith, they muſt inevitably come on ſhore. This harbour lies on a ſpacious bay, where veſſels of any burden may ride in all other winds, and is therefore the general rendezvous of the ſhipping which frequent the northern ſeas, where they caſt anchor on clean ground, and ride ſafely till the ſtorms have abated. But though nature hath done ſo much for the benefit of navigation, ſomething is left for the exerciſe of human aid. The harbour can at preſent contain in perfect ſafety 40 or 50 ſail of veſſels drawing 12 feet water, and is capable of being extended ſo as to admit a greater number of ſhips drawing 20 feet; by which means not only caſual merchantmen but ſmall ſhips of war with their convoys, would find this a moſt deſirable refuge when purſued by ſuperior force. The harbour is defended by a good battery. A conſiderable trade is carried on from this place directly to the Baltic for deals, iron, hemp, tar, and other articles. There is alſo a manufacture of ſewing thread, which employs many young girls. A mineral well in the ſummer-months gives great gaiety to the place; its ſalutary virtues have long, and we believe very juſtly, been celebrated. The waters of this ſpring are powerfully diuretic, and are thought to be efficacious in removing complaints in the bowels. There are here many elegant houſes for the accommodation of ſtrangers. There is alſo a ball-room, under which there are two ſalt-water baths. Theſe baths are much frequented in nervous diſorders: their effect in ſtrengthening the conſtitution is often ſurpriſing. Owing to the open peninſulated ſituation, the air of this place is eſteemed peculiarly pure and healthful; even the fogs riſing from the ſea are thought to be medicinal: the town is therefore much enlivened by the concourſe of company who frequent it on theſe accounts. Upon the whole, the town is neat and well built, the houſes are handſome, and the ſtreets tolerably ſpacious and very clean; and it has every appearance of a thriving, plentiful, and happy place.

PETERHOFF, in Ruſſia, is ſituated about 20 miles from Peterſburg, and is diſtinguiſhed for its palace and gardens. The palace was begun by Peter I. and finiſhed by Elizabeth As it is placed upon an eminence, it commands a moſt ſuperb view of Cronſtadt, Peterſburg, the intervening gulf, and the oppoſite coaſt of Carelia. The palace is moſt magnificently furniſhed, and the ſuit of apartments are truly princely. The preſence-chamber is richly ornamented with portraits of the ſovereigns of the houſe of Romanof, who have reigned in Ruſſia ſince 1613.

Coxe's Travels, vol i. p. 485.

"The gardens of Peterhoff (ſays an intelligent traveller) have been celebrated for their taſte and elegance; and from the number of jet d'eaus, fountains, baſons, caſcades, parterres, &c. they have been compared to thoſe of Verſailles: and indeed in one reſpect they are far ſuperior; for the water-works of the latter only play upon particular occaſions, while thoſe of Peterhoff are perennial. Theſe gardens, which at the time of their formation were greatly admired in this country, though not congenial to the taſte of the empreſs, are ſuffered to remain in their preſent ſtate; as during ſummer her majeſty principally reſides at Tzarſkoe-Selo, where the grounds are diſpoſed in a more modern and pleaſing manner." A vaſt number of ſilver dolphins and gilded ſtatues are ſcattered through them; but the moſt remarkable figures are thoſe of two gladiators placed in a baſon of water. Theſe are repreſented, not with the ſword and buckler, the ancient implements of war, but with a brace of piſtols. Theſe they point to each other in a threatening poſture, while the water guſhes impetuouſly from the barrels. In that part of the garden which lies between the palace and the gulf, cloſe to the water, is a building which was the favourite retreat of Peter I. It is preſerved, together with its furniture, entirely in its original ſtate with a kind of religious veneration. Its plainneſs ſhows the frugal ſimplicity in which that monarch was accuſtomed to live. In the ſame celebrated gardens there is a remarkable building called the *mountain for ſledges*, and often by travellers the *flying mountain*. "It ſtands (ſays Mr Coxe) in the middle of an oblong area, incloſed by an open colonnade, with a flat roof, which is railed for the convenience of holding ſpectators. The circumference of this colonnade is at leaſt half a mile. In the middle of the area ſtands the flying mountain, ſtretching nearly from one end to the other. It is a wooden building, ſupported upon pillars, repreſenting an uneven ſurface of ground, or a mountain compoſed of three principal aſcents, gradually diminiſhing in height, with an intermediate ſpace to reſemble valleys: from top to bottom is a floored way, in which three parallel grooves are formed. It is thus uſed: a ſmall carriage containing one perſon being placed in the centre groove upon the higheſt point, goes with great rapidity down one hill; the velocity which it acquires in its deſcent carries it up a ſecond; and it continues to move in a ſimilar manner until it arrives at the bottom of the area, where it rolls for a conſiderable way on the level ſurface, and ſtops before it attains the boundary: it is then placed in one of the ſide grooves, and drawn up by means of a cord fixed to a windlaſs. To a perſon unacquainted with the mechaniſm, this entertainment would appear tremendous; but as the grooves always keep the carriage in its right direction, there is not the leaſt danger of being overturned. At the top of the mountain is an handſome apartment for the accommodation of the court and principal nobility; there is alſo room for many thouſand ſpectators within the colonnade and upon its roof. Near the flying mountain is a ſpacious amphitheatre, in which tournaments are uſually exhibited."

PETERS (Father), a Jeſuit, was confeſſor and counſellor to James II. king of England. This prince diſmiſſed him in 1688, becauſe he was conſidered as the author of thoſe troubles in which the kingdom was then involved. "He was (ſays Biſhop Burnet) the moſt violent of the king's adviſers, and the perſon moſt liſtened to. Though he had the honour of being nobly deſcended, he was a man of extenſive erudition, and was eminent only for his bigotry and forwardneſs." Though Burnet is not always to be believed, yet certain it is, from the teſtimony of other hiſtorians, that Father Peters was by no means a perſon properly qualified to direct King James in the critical ſituation in which he then ſtood.

PETERSBURG (St), a city of the province of Ingria in Ruſſia, and capital of the whole empire. It is ſituated in N. Lat. 59. 26. 23. and E. Long. 30. 25. from the firſt meridian of Greenwich. It was founded in the year 1703 by Czar Peter the Great, whoſe ambition it was to have a fleet on the Baltic; for which reaſon he determined to found a city which might become the centre of trade throughout all his dominions. The ſpot he pitched upon was a low, fenny, uncultivated iſland, formed by the branches of the river Neva, before they fall into the gulph of Finland. In the ſummer this iſland was covered with mud; and in winter became a frozen pool, rendered almoſt inacceſſible by dreary foreſts and deep moraſſes, the haunts of bears, wolves, and other ſavage animals. Having taken the fort of Nattebourg, and the town of Neiſchantz, in the year 1703, this mighty conqueror aſſembled in Ingria above 300,000 men, Ruſſians, Tartars, Coſſacks, Livonians, and others, even from the moſt diſtant parts of his empire, and laid the foundation of the citadel and fortifications, which were finiſhed in four months, almoſt in deſpite of nature. He was obliged to open ways through foreſts, drain bogs, raiſe dykes, and lay cauſeways, before he could pretend to found the new city. The workmen were ill provided with neceſſary tools and implements, ſuch as ſpades, pick-axes, ſhovels, planks, and wheel-barrows: they were even obliged to fetch the earth from a great diſtance in the ſkirts of their garments, or in little bags made of old mats and rags ſewed together. They had neither huts nor houſes to ſhelter them from the ſeverity of the weather: the country, which had been deſolated by war, could not accommodate ſuch a multitude with proviſions; and the ſupplies by the lake Ladoga were often retarded by contrary winds. In conſequence of theſe hardſhips, above 100,000 men are ſaid to have periſhed: nevertheleſs the work proceeded with incredible vigour and expedition; while Peter, for the ſecurity of his workmen, formed a great camp, in ſuch a manner, that his infantry continued in Finland, and his cavalry were quartered in Ingria. Some Swediſh cruizers being deſcried in the neighbourhood, the Czar poſted a body of troops in the iſle of Rutzari, by whom the Swedes were repulſed, and the work met with no farther interruption. The buildings of the city kept pace with the fortreſs, which is the centre of the town, ſurrounded on all ſides by the Neva; and in little more than a year, above 30,000 houſes were erected. At preſent there may be about double that number in Peterſburg, though many of them are paltry and inconſiderable. In order to people this city, Peter invited hither merchants, artificers, mechanics, and ſeamen, from all the different countries of Europe: he demoliſhed the town of Nieuſchants, and brought hither not only the materials of the houſes, but the inhabitants themſelves. A thouſand families were drawn from Moſcow; he obliged his nobility to quit their palaces and their villas in and about Moſcow, and take up their reſidence at Peterſburg, in a much more cold and comfortleſs climate. Finally, reſolving to remove hither the trade of Archangel, he iſſued an ordnance, importing, that all ſuch merchandiſe as had been conveyed to Archangel, in order to be ſold to foreigners, ſhould now be ſent to Peterſburg, where they ſhould pay no more than the uſual duties. Theſe endeavours and regulations have rendered this one of the greateſt and moſt flouriſhing cities in Europe. The Ruſſian boyars and nobility have built magnificent palaces, and are now reconciled to their ſituation. At firſt many houſes were built of timber; but theſe being ſubject to ſudden conflagrations in ſpite of all the precautions that could be taken, the Czar, in the year 1714, iſſued an order, that all new houſes ſhould be walled with brick and covered with tiles. The fort is an irregular hexagon, with oppoſite baſtions. This, together with all the reſt of the fortifications, was in the beginning formed of earth only; but in the ſequel they were faced with ſtrong walls, and provided with caſemates, which are bomb-proof. In the curtain of the fort, on the right hand ſide, is a noble diſpenſary, well ſupplied with excellent medicines, and enriched with a great number of porcelain vaſes from China and Japan. From one of the gates of the fort a draw-bridge is thrown over an arm of the river, in which the Czar's galleys and other ſmall veſſels are ſheltered in the winter. The moſt remarkable building within the fort is the cathedral, built by the direction of an Italian architect. Peterſburg is partly built on little iſlands, ſome of which are connected by draw-bridges; and partly on the continent. In the higheſt part, on the bank of the Neva, the Czar fixed his habitation, or ordinary reſidence, built of freeſtone, and ſituated ſo as to command a proſpect of the greater part of the city. Here likewiſe is a royal foundery; together with the ſuperb houſes of many noblemen. The marſhy ground on which the city is built, being found extremely ſlippery, dirty, and incommodious, the Czar ordered every inhabitant to pave a certain ſpace before his own door. In the year 1716, Peter taking a fancy to the iſland Waſili-Oſterno, which he had given as a preſent to prince Menzikoff, reſumed the grant and ordered the city to be extended into this quarter. He even obliged the boyars, or nobles, to build ſtone-houſes on this ſpot, though they were already in poſſeſſion of others on the ſide of Ingria: accordingly this is now the moſt magnificent part of the city. On the other ſide of a branch of the Neva ſtands the Czar's country or ſummer palace, provided with a fine garden and orangery. On the bank of the ſame river is the ſlaboda, or ſuburbs, in which the Germans generally chooſe their habitation. Peterſburg is very much ſubject to dangerous inundations. In the year 1715, all the baſtions and draw-bridges were either overwhelmed or carried away. The breadth, depth and rapidity of the Neva, have rendered it extremely difficult, if not impracticable, to join the iſlands and the continent by bridges. Beſides, Peter was averſe to this expedient for another reaſon; reſolved to accuſtom his ſubjects to navigation, he not only rejected the project of a bridge, but alſo ordered that no boat ſhould paſs between the iſlands and continent, except by the help of ſails only. In conſequence of this ſtrange regulation, many lives were loſt; but at length he gained his point; and by habituating his ſluggiſh Muſcovites to the dangers of the ſea, in a little time produced a breed of hardy ſailors. The adjacent country is ſo barren, that the town muſt be ſupplied with proviſions from a great diſtance; conſequently they are extremely dear. Here are woods in plenty, conſiſting of pine, fir, alder, birch, poplar, and elm; but the oak and the beech are generally brought from Caſan. In winter the weather is extremely cold, and hot in the ſummer. In June the length of the night does not exceed three hours, during which the natives enjoy a continual twilight: but in December the ſun is not viſible more than three hours above the horizon.

The Czar Peter, who was indefatigable in his endeavours to improve and civilize his ſubjects, neglected nothing which he thought could contribute to theſe purpoſes. He condeſcended even to inſtitute and regulate aſſemblies at Peterſburg: theſe were opened at five in the afternoon, and the houſe was ſhut at ten: between theſe hours the faſhionable people of both ſexes met without ceremony, danced, converſed, or played either at cards or at cheſs, this laſt being a favourite diverſion among the Ruſſians. There was likewiſe an apartment appointed for drinking brandy and ſmoking tobacco. Plays and operas were likewiſe introduced for the ſame purpoſes; but as Peter had little reliſh, and leſs taſte, for thoſe entertainments, they were performed in a very aukward manner in his lifetime: however, ſince his death theſe performances have been brought to a greater degree of art and decorum.

This great northern legiſlator eſtabliſhed, in the neighbourhood of Peterſburg, manufactures of linen, paper, ſaltpetre, ſulphur, gunpowder, and bricks, together with water-mills for ſawing timber. He inſtituted a marine academy, and obliged every conſiderable family in Ruſſia to ſend at leaſt one ſon or kinſman, between the ages of ten and eighteen, to this ſeminary, where he was inſtructed in navigation, learned the languages, was taught to perform his exerciſes, and to live under the ſevereſt diſcipline. To crown his other plans of reformation, he granted letters patent for founding an academy, upon a very liberal endowment; and though he did not live to execute this ſcheme, his empreſs, who ſurvived him, brought it to perfection. It was modelled on the plans of the royal ſociety in London, and the academy of France. Mr Bullfinger opened it in the year 1726, with an eloquent ſpeech on the deſign and utility of an academy of ſciences; and the profeſſors, who have always diſtinguiſhed themſelves by their merit and erudition, publiſhed an annual collection of their tranſactions; a taſk the more eaſy, as they have the benefit of printing preſſes, well managed, at Peterſburg.

Peter the Great has been much cenſured for transferring the ſeat of the empire from Moſcow to St Peterſburg; the former of which lay nearer to the centre of his dominions. But theſe objections will have but little weight with thoſe who conſider the conſequences of the removal. The new city is nearer than Moſcow was to the more civilized parts of Europe; and from an intercourſe with them the manners of the Ruſſians have been improved, and the nobility in particular have loſt much of their feudal importance. Above all, the grand object of Peter, that of having a formidable navy in the Baltic, has certainly been obtained, and the Empreſs of Ruſſia is now the arbitreſs of the north, and in ſome degree the mediatrix of all Europe. In ſhort, the erection of St Peterſburg was perhaps one of the beſt acts of Peter's reign, and has in its conſequences been the moſt beneficial. Indeed it is at leaſt probable, that if through any revolution the ſeat of government ſhould be again transferred to Moſcow, we ſhould nowhere ſee the traces of thoſe memorable improvements, which the paſſing century has given birth to, but in the annals of hiſtory; and Ruſſia would again, in all probability, relapſe into her original barbariſm.

The erection of ſuch a city as Peterſburg in ſo ſhort a time is truly wonderful. Mr Coxe ſays his mind was filled with aſtoniſhment, when he reflected that ſo late as the beginning of this century the ground on which it ſtands was one vaſt moraſs, occupied by a very few fiſhermens huts. The preſent diviſions of the town, ſome of which we have already mentioned, are called, 1. The Admiralty quarter; 2. The Vaſſili Oſtrof or Iſland; 3. The Fortreſs; 4. The Iſland of St Peterſburg; and, 5. The various ſuburbs of Livonia, of Moſcow, of Alexander Nevſki, and Wiburgh.

The preſent Empreſs has done ſo much for this city, that ſhe may not improperly be called its ſecond foundreſs. It is, nevertheleſs, ſtill an infant place, and, as Mr Wraxall obſerves, "only an immenſe outline, which will require future empreſſes, and almoſt future ages, to complete."

Coxe's Travels.

"The ſtreets in general, ſays a late traveller, are broad and ſpacious; and three of the principal ones, which meet in a point at the Admiralty, and reach to the extremities of the ſuburbs, are at leaſt two miles in length. Moſt of them are paved; but a few are ſtill ſuffered to remain floored with planks. In ſeveral parts of the metropolis, particularly in the Vaſſili Oſtrof, wooden houſes and habitations, ſcarcely ſuperior to common cottages, are blended with the public buildings; but this motly mixture is far leſs common than at Moſcow, where alone can be formed any idea of an ancient Ruſſian city. The brick houſes are ornamented with a white ſtucco, which has led ſeveral travellers to ſay that they are built with ſtone; whereas, unleſs I am greatly miſtaken, there are only two ſtone ſtructures in all Peterſburg. The one is a palace, building by the empreſs upon the banks of the Neva, called *the marble palace*; it is of hewn granite, with marble columns and ornaments; the other is the church of St Iſaac, conſtructed with the ſame materials, but not yet finiſhed.

"The manſions of the nobility are many of them vaſt piles of building, but are not in general upon ſo large and magnificent a ſcale as ſeveral I obſerved at Moſcow: they are furniſhed with great coſt, and in the ſame elegant ſtyle as at Paris or London. They are ſituated chiefly on the ſouth ſide of the Neva, either in the Admiralty quarter, or in the ſuburbs of Livonia and Moſcow, which are the fineſt parts of the city." See NEVA.

"Peterſburgh, although it is more compact than the other Ruſſian cities, and has the houſes in many ſtreets contiguous to each other, yet ſtill bears a reſemblance to the towns of this country, and is built in a very ſtraggling manner. By an order lately iſſued from government, the city has been incloſed within a rampart, the circumference whereof is 21 verſts, or 14 Engliſh miles."

The ſame accurate obſerver calculates the number of inhabitants at Peterſburg, and makes the medium number 130,000.

We have already ſaid that Peterſburg is very liable to be inundated. An inundation of a very alarming nature took place when Mr Coxe was there in September 1777, of which the following account was given in St Peterſburg Journal, September 1777: "In the evening of the 9th, a violent ſtorm of wind blowing at firſt S. W. and afterwards W. raiſed the Neva and its various branches to ſo great an height, that at five in the morning the waters poured over their banks, and ſuddenly overflowed the town, but more particularly the Vaſſili Oſtrof and the iſland of St Peterſburg. The torrent roſe in ſeveral ſtreets to the depth of four feet and an half, and overturned by its rapidity, various buildings and bridges. About ſeven, the wind ſhifting to N. W. the flood fell as ſuddenly; and at mid-day moſt of the ſtreets, which in the morning could only be paſſed in boats, became dry. For a ſhort time the river roſe 10 feet 7 inches above its ordinary level."

Mr Kraft, profeſſor of experimental philoſophy to the Imperial Academy of Sciences, has written a judicious treatiſe upon the inundation of the Neva, from which the following obſervations were extracted by Mr Coxe. "Theſe floods are leſs alarming than formerly, as the ſwelling of the river to about ſix feet above its uſual level, which uſed to overflow the whole town, have no longer any effect, excepting upon the lower parts of Peterſburg; a circumſtance owing to the gradual raiſing of the ground by buildings and other cauſes.

"Upon tracing the principal inundation, the profeſſor informs us, that the moſt ancient, of which there is any tradition, happened in 1691, and is mentioned by Weber, from the account of ſome fiſhermen inhabiting near Nieſchants, a Swediſh redoubt upon the Neva, about three miles from the preſent fortreſs of Peterſburg. At that period the waters uſually roſe every five years; and the inhabitants of that diſtrict no ſooner perceived the particular ſtorms which they had been taught from fatal experience to conſider as forerunners of a flood, than they took their hovels to pieces, and, joining the timbers together in the form of rafts, faſtened them to the ſummits of the higheſt trees, and repaired to the mountain of Duderof, which is diſtant ſix miles from their place of abode, where they waited until the waters ſubſided.

"The higheſt inundations, excepting the laſt of 1777, were thoſe of the 1ſt of November 1726, when the waters roſe 8 feet 2 inches; and on the 2d of October 1752, when they roſe 8 feet 5 inches.

"From a long courſe of obſervations the profeſſor draws the following concluſion. The higheſt floods, namely, thoſe which riſe about ſix feet, have generally happened in one of the four laſt months of the year: no ſenſible effect is ever produced by rain or ſnow; a ſwell is ſometimes occaſioned by the accumulation of maſſes of ice at the mouth of the Neva; but the principal cauſes of the overflowing of that river are derived from violent ſtorms and winds blowing ſouth weſt or north weſt, which uſually prevail at the autumnal equinox; and the height of the waters is always in proportion to the violence and duration of thoſe winds. In a word, the circumſtances moſt liable to promote the overflowings of the Neva, are when, at the autumnal equinox, three or four days before or after the full or new moon, that luminary being near her perigæum, a violent north-weſt wind drives the waters of the northern ocean, during the influx of the tide, into the Baltic, and is accompanied, or inſtantaneouſly ſucceeded, by a ſouth-weſt wind in that ſea and the gulf of Finland. All theſe circumſtances concurred at the inundation of 1777; it happened two days before the autumnal equinox, four before the full moon, two after her paſſing through the perigæum, and by a ſtorm at ſouth-weſt, which was preceded by ſtrong weſt winds in the northern ocean, and ſtrong north winds at the mouth of the Baltic."

See *Notices et Remarques ſur les debordemens de la Neva à St Peterbourg, accompagnées d'une carte repreſentant la crue et la diminution des eaux*, &c. in Nov. Ac. Pet. for 1777, P. II. p. 47. to which excellent treatiſe we would refer the curious reader for farther information.

All our readers have unqueſtionably heard of the equeſtrian ſtatue of Peter I. in bronze. We ſhall give an account of that extraordinary monument in Mr Coxe's own words. "It is (ſays he) of a coloſſal ſize, and is the work of Monſieur Falconet, the celebrated French ſtatuary, caſt at the expence of Catharine II. in honour of her great predeceſſor, whom ſhe reveres and imitates. It repreſents that monarch in the attitude of mounting a precipice, the ſummit of which he has nearly attained. He appears crowned with laurel, in a looſe Aſiatic veſt, and ſitting on a houſing of bear-ſkin: his right hand is ſtretched out as in the act of giving benediction to his people; and his left holds the reins. The deſign is maſterly, and the attitude is bold and ſpirited. If there be any defect in the figure, it conſiſts in the flat poſition of the right hand; and, for this reaſon, the view of the left ſide is the moſt ſtriking, where the whole appearance is graceful and animated. The horſe is rearing upon its hind legs; and its tail, which is full and flowing, ſlightly touches a bronze ſerpent, artfully contrived to aſſiſt in ſupporting the vaſt weight of the ſtatue in due equilibrium. The artiſt has, in this noble eſſay of his genius, repreſented Peter as the legiſlator of his country, without any alluſion to conqueſt and bloodſhed; wiſely preferring his civil qualities to his military exploits. The contraſt between the compoſed tranquility of Peter (though perhaps not abſolutely characteriſtic) and the fire of the horſe, eager to preſs forwards, is very ſtriking. The ſimplicity of the inſcription correſponds to the ſublimity of the deſign, and is far preferable to a pompous detail of exalted virtues, which the voice of flattery applies to every ſovereign without diſtinction. It is elegantly finiſhed in braſs characters, on one ſide in Latin, and on the oppoſite in Ruſſian. *Petro primo Catharina ſecunda*, 1782, i. e. Catharine II. to Peter I.

"The ſtatue, when I was at Peterſburgh, was not erected, but ſtood under a large wooden ſhed near the Neva, within a few yards of its enormous pedeſtal. When Falconet had conceived the deſign of his ſtatue, the baſe of which was to be formed by an huge rock, he carefully examined the environs of Peterſburg, if, among the detached pieces of granite which are ſcattered about theſe parts, one could be found of magnitude correſpondent to the dimenſions of the equeſtrian figure. After a conſiderable reſearch, he diſcovered a ſtupendous maſs half buried in the midſt of a moraſs. The expence and difficulty of tranſporting it were no obſtacles to Catherine II. By her order the moraſs was immediately drained, a road was cut through a foreſt, and carried over the marſhy ground; and the ſtone, which after it had been ſomewhat reduced weighed at leaſt 1500 tons, was removed to Peterſburg. This more than Roman work was, in leſs than ſix months from the time of its firſt diſcovery, accompliſhed by a windlaſs, and by means of large friction-balls alternately placed and removed in grooves fixed on each ſide of the road. In this manner it was drawn, with forty men ſeated upon its top, about four miles to the banks of the Neva; there it was embarked in a veſſel conſtructed on purpoſe to receive it, and thus conveyed about the ſame diſtance by water to the ſpot where it now ſtands. When landed at Peterſburg, it was 42 feet long at the baſe, 39 at the top, 21 thick, and 17 high; a bulk greatly ſurpaſſing in weight the moſt boaſted monuments of Roman grandeur, which, according to the fond admirers of antiquity, would have baffled the ſkill of modern mechanics, and were alone ſufficient to render conſpicuous the reign of the moſt degenerate emperors.

“ The pedeſtal, however, though ſtill of prodigious magnitude, is far from retaining its original dimenſions, as, in order to form a proper ſtation for the ſtatue, and to repreſent an aſcent, the ſummit whereof the horſe is endeavouring to attain, its bulk has been neceſſarily diminiſhed. But I could not obſerve, without regret, that the artiſt has been deſirous to improve upon nature; and in order to produce a reſemblance of an abrupt broken precipice, has been too laviſh of the chiſſel. Near it was a model in plaſter, to the ſhape of which the workmen were faſhioning the pedeſtal. It appeared to me, that in this model the art was too conſpicuous; and that the effect would have been far more ſublime, if the ſtone had been left as much as poſſible in its rude ſtate, a vaſt unwieldy ſtupendous maſs. And indeed, unleſs I am greatly miſtaken, the pedeſtal, when finiſhed according to this plan, will have ſcarcely breadth ſufficient to afford a proper baſe for a ſtatue of ſuch Coloſſal ſize.

“ The ſtatue was erected on the pedeſtal on the 27th of Auguſt 1782. The ceremony was performed with great ſolemnity, and was accompanied with a ſolemn inauguration. At the ſame time the empreſs iſſued a proclamation, in which, among other inſtances of her clemency, ſhe pardons all criminals under ſentence of death; all deſerters, who would return to their reſpective corps within a limited time: and releaſes all criminals condemned to hard labour, provided they had not been guilty of murder.”

Mr Coxe informs us, that the weather is extremely changeable in this capital, and the cold is at times extreme; againſt which the inhabitants take care to provide (See Peasant), though ſome of them nevertheleſs unfortunately fall victims to it. As I traverſed the city, ſays Mr Coxe, on the morning of 12th January, I obſerved ſeveral perſons, whoſe faces had been bitten by the froſt: their cheeks had large ſcars, and appeared as if they had been ſinged with an hot iron. As I was walking with an Engliſh gentleman, who, inſtead of a fur cap, had put on a common hat, his ears were ſuddenly frozen: he felt no pain, and would not have perceived it for ſome time, if a Ruſſian, in paſſing by, had not informed him of it, and aſſiſted him in rubbing the part affected with ſnow, by which means it was inſtantly recovered. This, or friction with flannel, is the uſual remedy; but ſhould the perſon in that ſtate approach the fire, or dip the part in warm water, it immediately mortifies and drops off.—The common people continued at their work as uſual, and the drivers plied in the ſtreets with their ſledges ſeemingly unaffected by the froſt; their beards were incruſted with clotted ice, and the horſes were covered with iſicles.

“ It ſometimes happens that coachmen or ſervants, while they are waiting for their maſters, are frozen to death. In order to prevent as much as poſſible theſe dreadful accidents, great fires of whole trees, piled one upon another, are kindled in the court-yard of the palace and the moſt frequented parts of the town. As the flames blazed above the tops of the houſes, and caſt a glare to a conſiderable diſtance, I was frequently much amuſed by contemplating the pictureſque groups of Ruſſians, with their Aſiatic dreſs and long beards aſſembled round the fire. The centinels upon duty, having no beards, which are of great uſe to protect the glands of the throat, generally tie handkerchiefs under their chins, and cover their ears with ſmall caſes of flannel.”

Petersburg, in America, is a ſea-port town in Virginia, 25 miles ſouthward of Richmond, ſeated on the ſouth ſide of the Appamatox river, about 12 miles above its junction with James River, and contained nearly 300 houſes in 1787, in two diviſions; one is upon a clay, cold ſoil, and is very dirty; the other upon a plain of ſand or loam. There is no regularity, and very little elegance in Peterſburg. It is merely a place of buſineſs. The Free Maſons have a hall tolerably elegant; and the ſeat of the Bowling family is pleaſant and well built. It is very unhealthy. About 2200 hogſheads of tobacco are inſpected here annually. Like Richmond, Williamſburg, Alexandria, and Norfolk, it is a corporation; and what is ſingular, Peterſburg city comprehends part of three counties. The celebrated Indian queen, Pocahonta, from whom deſcended the Randolph and Bowling families, formerly reſided at this place.

PETERSFIELD, is a handſome town of Hampſhire in England, and ſends two members to parliament. It is ſeated in W. Long. 1. 5. N. Lat. 51. 5.

PETERWARADIN, a fortified town in Sclavonia, and one of the ſtrongeſt frontier places the houſe of Auſtria has againſt the Turks, ſeated on the Danube between the Drave and the Save. E. Long. 20. 0. N. Lat. 45. 20.

PETIOLE, in botany, the ſlender ſtalks that ſupport the leaves of a plant.

PETIT, or Petite, a French word ſignifying *little* or *ſmall*.

Petite Guerre, denotes the operations of detached parties and the war of poſts. See War, Part III.

Petit Sergeanty. See Sergeanty.

Petit Treaſon. See Treason.

Petit (John), a doctor of the Sorbonne, very early gained to himſelf a character by his knowledge, and thoſe eloquent orations which he pronounced before the univerſity of Paris. He was employed in the famous embaſſy which was ſent from France to Rome, for the purpoſe of healing the ſchiſm in 1407; but he ſoon loſt all the honour which he had acquired. John

Sans Peur, duke of Burgundy, having treacherouſly contrived to aſſaſſinate Louis of France, duke of Orleans, only brother to Charles VI. John Petit, entirely devoted to the views of the murderer, maintained in a public diſputation, at Paris, the 8th of March 1408, that the murder was lawful. He had the effrontery to aſſert, that it is allowable to employ fraud, treaſon, and every other method, however baſe, in order to get rid of a tyrant; and that no faith ought to be kept with him." He dared to add further, that "the man who ſhould commit ſuch an action, not only deſerved to be exempted from puniſhment, but to receive a reward." This ſanguinary doctrine was loudly exclaimed againſt; but the duke of Burgundy's powerful influence ſheltered Petit for ſome time. Some eminent writers, however, of that period, with Gerſon at their head, denounced the doctrine to John de Montaigu, biſhop of Paris, who condemned it as heretical the 23d November 1414. It was likewiſe condemned by the council of Conſtance the year following at the inſtigation of Gerſon; but no notice was taken either of Petit's name or his writings. In fine, the king, on the 16th of September 1416, ordered the parliament of Paris to pronounce a ſevere decree againſt this dangerous performance; and it was alſo cenſured by the univerſity. But the duke of Burgundy, in 1418, had intereſt enough to compel the grand vicars of the biſhop of Paris, who then lay ſick at St Omer's, to retract the ſentence which that prelate had paſt in 1414. Petit died three years before, *i. e.* in 1411, at Heſdin; and his apology in favour of the duke of Burgundy, with all the particulars of that infamous tranſaction, may be ſeen in the fifth volume of the laſt edition of Gerſon's works. Father Pinchinat, of the order of St Francis, and author of the Dictionary of Hereſies, in 4to, has endeavoured to vindicate his order from a charge brought by ſome writers who have called Petit a *Cordelier* or *Franciſcan friar*. "He proves very clearly (ſays Abbé Prevot) that he was a ſecular prieſt; and adds, that upon the ſame evidence, Father Mercier, a Cordelier, had a warm diſpute in 1717 with M. Dupin, who had given this title to Petit in his Collection of Cenſures. He repreſented to him (ſays he), before a meeting of the Faculty, the falſity of ſuch a claim, and the injury which he offered to the order of St Francis. Dupin, convinced of his error, candidly owned that he was led into it by following ſome infidel writers, and promiſed to retract it in the new edition of the Cenſures, which was publiſhed in 1720. M. Fleury, who had committed the ſame miſtake, promiſed alſo to make amends for it by a ſolemn recantation; but dying before he had an opportunity of doing that piece of juſtice to the Cordeliers, the continuator of his Eccleſiaſtical Hiſtory, who had not ſuch opportunities of information, fell into the ſame fault." (*Pour & contre*, tom. x. p. 23.). If we take the opinion of L'Avocal's Dictionary, it would appear no fault was committed; for it gives a liſt of the penſioners of the dukes of Burgundy, in order to prove that John Petit was a Cordelier. Indeed, it is highly probable that if Dupin, Fleury, and Father Fabré, did not alter their opinion, it was owing to a firm perſuaſion that they had committed no error.

Petit (John Lewis), an eminent ſurgeon, born at Paris in 1674. He had ſo early an inclination to ſurgery, that Mr Littre, a celebrated anatomiſt, being in his Father's houſe, he regularly attended that gentleman's lectures, from his being ſeven years of age. He was received maſter in ſurgery in the year 1700; and acquired ſuch reputation in the practice of that art, that in 1726 the king of Poland ſent for him to his court, and in 1734 the king of Spain prevailed on him to go into that kingom. He reſtored the health of thoſe princes; and they endeavoured to detain him by offering him great advantages, but he choſe rather to return to France. He was received into the academy of ſciences in 1715; became director of the royal academy of ſurgery; made ſeveral important diſcoveries; and invented new inſtruments for the improvement of ſurgery. He died at Paris in 1750. He wrote an excellent Treatiſe on the Diſeaſe of the Bones, the beſt edition of which is that of 1723; and many learned Diſſertations in the Memoirs of the Academy of Sciences, and in the firſt volume of the Memoirs of Surgery.

PETITIO principii, in logic, the taking a thing for true, and drawing concluſions from it as ſuch, when it is really falſe; or at leaſt wants to be proved before any inferences can be drawn from it.

PETITION, a ſupplication made by an inferior to a ſuperior, and eſpecially to one having juriſdiction. It is uſed for that remedy which the ſubject hath to help a wrong done by the king, who hath a prerogative not to be ſued by writ: In which ſenſe it is either general, That the king do him right; whereupon follows a general endorſement upon the ſame, *Let right be done the party:* Or it is ſpecial, when the concluſion and indorſement are ſpecial, for this or that to be done, &c.

By ſtatute, the ſoliciting, labouring, or procuring the putting the hands or conſent of above twenty perſons to any petition to the king or either houſe of parliament, for alterations in church or ſtate, unleſs by aſſent of three or more juſtices of the peace of the county, or a majority of the grand jury at the aſſizes or ſeſſions &c. and repairing to the king or parliament to deliver ſuch petition with above the number of ten perſons, is ſubject to a fine of 100l. and three months impriſonment, being proved by two witneſſes within ſix months, in the court of *B. R.* or at the aſſizes, &c. And if what is required by this ſtatute be obſerved, care muſt be taken that petitions to the king contain nothing which may be interpreted to reflect on the adminiſtration; for, if they do, it may come under the denomination of a libel: and it is remarkable, that the petition of the city of London for the ſitting of a parliament was deemed libellous, becauſe it ſuggeſted that the king's diſſolving a late parliament was an obſtruction of juſtice; alſo the petition of the ſeven biſhops, ſent to the tower by James II. was called a libel, &c. To ſubſcribe a petition to the king, *to frighten him into a change of his meaſures, intimating that if it be denied many thouſands of his ſubjects will be diſcontented*, &c. is included among the contempts againſt the king's perſon and government, tending to weaken the ſame, and is puniſhable by fine and impriſonment.

PETITORY action, in Scots law. See Law, N°clxxxiii. 18. 20.

PETITOT (John), a curious painter in enamel, was born at Geneva in 1607, He ſtudied the art with ſuch application, that he arrived at a degree of perfection that may almoſt be accounted inimitable. He was wonderfully patient in finiſhing his works, though he had the addreſs to conceal his labour; however, he only painted the heads and hands of the figures; the hair, grounds, and drapery being executed by Bordier his brother-in-law. Theſe two artiſts had the credit of aſſociating and labouring together for fifty years, without the leaſt miſunderſtanding happening between them. It is aſſerted by an ingenious French writer, that Petitot and Bordier derived the knowledge of the moſt curious and durable colours proper for enamelling, from Sir Theodore Mayerne at London, who recommended Petitot to Charles I. He had the honour to paint the portraits of that monarch and the whole royal family, and continued in England until Charles's unhappy end: he then went to Paris, where he was highly favoured by Louis XIV. and acquired an ample fortune. Being a Proteſtant, the revocation of the edict of Nantz obliged him to retire to Geneva; but ſettling ſoon after at Veray in the canton of Bern, he paſſed the remainder of his life in eaſe and affluence. He died in 1691; and had 17 children: of whom one took to painting, and ſettled at London, where he gained good reputation; but was much inferior to his father.

Petitot may be called the inventor of painting portraits in enamel. Though his friend Bordier made ſeveral attempts before him, and Sir Theodore Mayerne had facilitated the means of employing the moſt beautiful colours; yet Petitot completed the works, which under his hand acquired a ſoftneſs and livelineſs of colouring that will never change, and will ever render his works valuable. He made uſe of gold and ſilver plates, and ſeldom enamelled on copper. When he firſt came in vogue, his price was 20 louis a head, which he ſoon raiſed to 40. It was his cuſtom to take a painter with him, who painted the picture in oil; after which Petitot ſketched out his work, which he always finiſhed after the life. When he painted the king of France, he took thoſe pictures for his copies that moſt reſembled him; and the king afterwards gave him a ſitting or two to finiſh his work.

PETIVERIA, in botany: A genus of the tetragynia order, belonging to the hexandria claſs of plants; and in the natural method ranking under the 12th order, *Holoraceæ*. The calyx is tetraphyllous; there is no corolla; and but one ſeed, with reflexed awns at the top.

PETRA (Cæſar, Lucian), a town of Greece, on the coaſt of Illyricum, near Dyrrhachium, and not far from the mouth of the river Panyaſus.—Another Petra, (Livy); a town of Mædica, a diſtrict of Thrace, lying towards Macedonia; but in what part of Macedonia he does not ſay.

Petra (Ptolemy), *Petræa*, (Silius Italicus), *Petrina* (Italicus); in both which laſt *urbs* is underſtood; an inland town of Sicily, to the ſouth-weſt of Engyum, Now *Petraglia* (Cluverius).

Petra Jecktael (2 Kings xiv.), a town of the Amalekites; near the Adſcenſus Scorpionis (Judges i.) and the valley of Salt in the ſouth of Judæa: afterwards in the poſſeſſion of the Edomites, after the deſtroying the Amalekites.

Petra Recem or *Rekim*, ſo called from Rekem king of the Midianites, ſlain by the Iſraelites (Num. xxxi.) Formerly called *Arce*, now *Petra;* the capital of Arabia Petræa (Joſephus). Ptolemy places it in Long. 66, 45. from the Fortunate Iſlands, and Lat. 30. 20. It declines therefore 80 miles to the ſouth of the parallel of Jeruſalem, and 36 miles, more or leſs, from its meridian to the eaſt. Joſephus ſays, that the mountain on which Aaron died ſtood near Petra; which Strabo calls the capital of the Nabatæi; at the diſtance of three or four days journey from Jericho. This Petra ſeems to be the Sela of Iſaiah xvi. 1. and xlii. 11. the Hebrew name of *Petra* "a rock;" Though ſome imagine Petra to be no older than the time of the Macedonians.

PETRARCH (Francis), a celebrated Italian poet, was born at Arezzo in 1304, and was the ſon of Petrarco di Parenzo. He ſtudied grammar, rhetoric, and philoſophy, for four years at Carpentras; from whence he went to Montpelier, where he ſtudied the law under John Andreas and Cino of Piſtoia, and probably from the latter received a taſte for Italian poetry. As Petrarch only ſtudied the law out of complaiſance to his father, who on his viſiting him at Bologna had thrown into the fire all the Latin poets and orators except Virgil and Cicero; he, at 22 years of age, hearing that his father and mother were dead of the plague at Avignon, returned to that city to ſettle his domeſtic affairs, and purchaſed a country-houſe in a very ſolitary but agreeable ſituation, called *Vaucluſe;* where he firſt knew the beautiful Laura, with whom he fell in love, and whom he has immortaliſed in his poems. He at length travelled into France, the Netherlands, and Germany; and at his return to Avignon entered into the ſervice of Pope John XXII. who employed him in ſeveral important affairs. Petrarch was in hopes of being raiſed to ſome conſiderable poſts; but being diſappointed, he applied himſelf entirely to poetry; in which he met with ſuch applauſe, that in one and the ſame day he received letters from Rome and the chancellor of the univerſity of Paris, by which they invited him to receive the poetic crown. By the advice of his friends, he preferred Rome to Paris, and received that crown from the ſenate and people on the 8th of April 1341. "The ceremony of his coronation (ſays Gibbon) was performed in the Capitol by his friend and patron the ſupreme magiſtrate of the republic. Twelve patrician youths were arrayed in ſcarlet; ſix repreſentatives of the moſt illuſtrious families, in green robes, with garlands of flowers, accompanied the proceſſion; in the midſt of the princes and nobles, the ſenator, count of Anguillara, a kinſman of the Colonna, aſſumed his throne; and at the voice of an herald Petrarch aroſe. After diſcourſing on a text of Virgil, and thrice repeating his vows for the proſperity of Rome, he knelt before the throne, and received from the ſenate a laurel crown, with a more precious declaration, 'This is the reward of merit.' The people ſhouted, 'Long life to the Capitol and the poet!' A ſonnet in praiſe of Rome was accepted as the effuſion of genius and gratitude; and after the whole proceſſion had viſited the Vatican, the profane wreath was ſuſpended before the ſhrine of St Peter. In the act or diploma which was preſented to Petrarch, the

Petrarch

title and prerogatives of poet-laureat are revived in the Capitol after the lapſe 1300 years; and he receives the perpetual privilege of wearing, at his choice, a crown of laurel, ivy, or myrtle: of aſſuming the poetic habit; and of teaching, diſputing, interpreting, and compoſing, in all places whatſoever, and on all ſubjects of literature. The grant was ratified by the authority of the ſenate and people; and the character of citizen was the recompenſe of his affection for the Roman name. They did him honour, but they did him juſtice. In the familiar ſociety of Cicero and Livy, he had imbibed the ideas of an ancient patriot; and his ardent fancy kindled every idea to a ſentiment, and every ſentiment to a paſſion." His love of ſolitude at length induced him to return, to Vaucluſe; but, after the death of the beautiful Laura, Provence became inſupportable to him, and he returned to Italy in 1352; when being at Milan, Galeas Viceconti made him counſellor of ſtate. Petrarch ſpent almoſt all the reſt of his life in travelling to and from the different cities in Italy. He was archdeacon of Parma, and canon of Padua; but never received the order of prieſthood. All the princes and great men of his time gave him public marks of their eſteem; and while he lived at Arcqua, three miles from Padua, the Florentines deputed Boccace to go to him with letters, by which they invited him to Florence, and informed him, that they reſtored to him all the eſtate of which his father and mother had been deprived during the diſſenſions between the Guelphs and Gibelines. He died a few years after at Arcqua in 1374. He wrote many works that have rendered his memory immortal; theſe have been printed in four volumes folio. His life has been written by ſeveral authors. Amongſt theſe there was one by Mrs Suſanna Dobſon, in 2 volumes 8vo, collected and abridged from the French. In this work we have the following elegant and juſt character of Petrarch.

"Few characters, perhaps, have ſet in a ſtronger light the advantage of well-regulated diſpoſitions than that of Petrarch, from the contraſt we behold in one particular of his life, and the extreme miſery he ſuffered from the indulgence of an affection, which, though noble and delightful when juſtly placed, becomes a reproach and a torment to its poſſeſſor when once directed to an improper object. For, let us not deceive ourſelves or others; though (from the character of Laura) they are acquitted of all guilt in their perſonal intercourſe, yet as ſhe was a married woman, it is not poſſible, on the principles of religion and morality, to clear them from that juſt cenſure which is due to every defection of the mind from thoſe laws which are the foundation of order and peace in civil ſociety, and which are ſtamped with the ſacred mark of divine authority.

"In this particular of his character, therefore, it is ſincerely hoped that Petrarch will ſerve as a warning to thoſe unhappy minds, who, partaking of the ſame feelings under the like circumſtances, but not yet ſuffering his miſery, may be led by the contemplation of it, by a generous regard to the honour of human nature, and by a view to the approbation of that all-ſeeing Judge who penetrates the moſt ſecret receſſes of the heart, to check every unhappy inclination in its birth, and deſtroy, while yet in their power the ſeeds of thoſe paſſions which may otherwiſe deſtroy them.

"As to the cavils or cenſures of thoſe who, incapable of tenderneſs themſelves, can neither enjoy the view of it when preſented in its moſt perfect form, nor pity its ſufferings when, as in this work, they appear unhappily indulged beyond the bounds of judgment and tranquility; to ſuch minds I make no addreſs, well convinced, that no callous heart can enjoy, neither will it ever be in danger of being miſled by the example of Petrarch in this tender but unfortunate circumſtance of his character.

Petrarch.

"To ſuſceptible and feeling minds alone Petrarch will be ever dear. Such, while they regret his failings, and conſider them as warnings to themſelves will love his virtues; and touched by the growing piety and heart-felt contrition which often impreſſed his ſoul, will ardently deſire to partake with him in thoſe pathetic and ſublime reflections which are produced in grateful and affectionate hearts, on reviewing their own lives, and contemplating the works of God.

"Petrarch had received from nature a very dangerous preſent. His figure was ſo diſtinguiſhed as to attract univerſal admiration. He appears, in his portraits, with large and manly features, eyes full of fire, a blooming complexion, and a countenance that beſpoke all the genius and fancy which ſhone forth in his works. In the flower of his youth, the beauty of his perſon was ſo very ſtriking, that wherever he appeared, he was the object of attention. He poſſeſſed an underſtanding active and penetrating, a brilliant wit, and a fine imagination. His heart was candid and benevolent, ſuſceptible of the moſt lively affections, and inſpired with the nobleſt ſentiments of liberty.

"But his failings muſt not be concealed. His temper was, on ſome occaſions, violent, and his paſſions headſtrong and unruly. A warmth of conſtitution hurried him into irregularities, which were followed with repentance and remorſe.—No eſſential reproach, however, could be caſt on his manners, till after the 23d year of his age. The fear of God, the thoughts of death, the love of virtue, and theſe principles of religion which were inculcated by his mother, preſerved him from the ſurrounding temptations of his earlier life."

A reſemblance has been traced, in ſeveral inſtances, between this admired poet and our late famous Yorick.—Both, we know, had great wit and genius, and no leſs imprudence than eccentricity; both were canons, or prebendaries, the Italian of Padua, &c. and the Engliſhman of York; they both "ran over France, without any buſineſs there." If the biſhop of Lombes patroniſed and correſponded with the one, a prelate ‡ of the Engliſh church now deceaſed, deſired in a letter, to *Shandyeſe* || with the other. In their attachments to Laura and Eliza, both married women, theſe two prebendaries were equally warm, are equally innocent. And even after death, a moſt remarkable circumſtance has attended them both; ſome perſons, we are told, ſtole Petrarch's bones, in order to ſell them; and, in like manner, Yorick's body, it is confidently affirmed, was alſo ſtolen, and his ſkull has been exhibited at Oxford.

PETRE,

‡ Dr Gilbert, Arch. York.

|| His Grace's own expreſſion.

PETRE, or Saltpetre, in chemiſtry. See Chemistry, n° 724, &c.

PETREA, in botany: A genus of the angioſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 40th order, *Perſonatæ*. The calyx is quinquepartite, very large, and coloured; the corolla rotaceous; the capſule bilocular, and ſituated in the bottom of the calyx: and the ſeeds ſolitary. There is only one ſpecies, a native of New Spain. It riſes to the height of 15 or 16 feet, with a woody ſtalk covered with grey bark, ſending out ſeveral long branches. Theſe have a whiter bark than the ſtem, and are garniſhed with leaves at each joint, which, on the lower part of the branches, are placed by three round them; but, higher up, they are rough, and have a rough ſurface. The flowers are produced at the ends of the branches, in looſe bunches nine or ten inches long, each flower ſtanding on a ſlender flower-ſtalk about an inch long: the empalement of the flower is compoſed of five narrow obtuſe leaves about an inch long, which are of a fine blue colour, and much more conſpicuous than the petals, which are white, and not more than half the length of the empalement. The plant is propagated by ſeeds procured from the places where they are natives, and of which very few are good; for though Dr Houſton, the diſcoverer of the plant, ſent parcels of ſeeds to ſeveral perſons in England, only two plants were produced fom the whole. The ſeeds muſt be ſown in a good hot-bed; and when the plants come up, they ſhould all be planted in a ſeparate ſmall pot filled with light loamy earth, and plunged into a hot-bed of tanners bark, where they ſhould afterwards conſtantly remain.

PETREL, in ornithology. Se Procellaria.

PETRIDIA, in natural hiſtory, a genus of ſcrupi, of a plain uniform texture; of no great variety of colours, and emulating the external form of pebbles.

PETRIFACTION, in phyſiology, denotes the converſion of wood, bones, and other ſubſtances, principally animal or vegetable, into ſtone. Theſe bodies are more or leſs altered from their original ſtate, according to the different ſubſtances they have lain buried among in the earth; ſome of them having ſuffered very litle change, and others being ſo highly impregnated with cryſtalline, ſparry, pyritical, or other extraneous matter, as to appear mere maſſes of ſtone or lumps of the matter of the common pyrites; but they are generally of the external dimenſions, and retain more or leſs of the internal figure, of the bodies into the pores of which this matter has made its way The animal ſubſtances thus found petrified are chiefly ſea-ſhells; the teeth, bony palates, and bones of fiſh, the bones of land animals, &c. Theſe are found variouſly altered, by the inſinuation of ſtony and mineral matter into their pores; and the ſubſtance of ſome or them is now wholly gone, there being only ſtony, ſparry, or other mineral matter remaining in the ſhape and form.

Reſpecting the manner in which petrifaction is accompliſhed, we know but little. It has been thought by many philoſophers, that this was one of the rare proceſſes of nature; and accordingly ſuch places as afforded a view of it, have been looked upon as great curioſities. However, it is now diſcovered, that petrifaction is exceedingly common; and that every kind of water carries in it ſome earthly particles, which being precipitated from it, become ſtone of a greater or leſſer degree of hardneſs; and this quality is moſt remarkable in thoſe waters which are much impregnated with ſelenitic matter. Of late, it has alſo been found by ſome obſervations on a petrifaction in Eaſt Lothian in Scotland, that iron contributes greatly to the proceſs: and this it may do by its precipitation of any aluminous earth which happens to be diſſolved in the water by means of an acid; for iron has the property of precipitating this earth, though it cannot precipitate the calcareous kind. The calcareous kinds of earth, however, by being ſoluble in water without any acid, muſt contribute very much to the proceſs of petrifaction, as they are capable of a great degree of hardneſs by means only of being joined with fixed air, on which depends the ſolidity of our common cement or mortar uſed in building houſes.

Vide Phil. Tranſ. v. 69. part I p. 35.

The name *petrifaction* belongs only, as we have ſeen, to bodies of vegetable or animal origin; and in order to determine their claſs and genus, or even ſpecies, it is neceſſary that their texture, their primitive form, and in ſome meaſure their organization, be ſtill diſcernible. Thus we ought not to place the ſtony kernels, moulded in the cavity of ſome ſhell, or rather organized body, in the rank of petrifaction properly ſo called.

Petrifactions of the vegetable kingdom are almoſt all either gravelly or ſiliceous; and are found in gullies, trenches, &c. Thoſe which ſtrike fire with ſteel are principally found in ſandy fiſſures; thoſe which efferveſce in acids are generally of animal origin, and are found in the horizontal beds of calcareous earth, and ſometimes in beds of clay or gravel; in which caſe the nature of the petrifaction is different. As to the ſubſtances which are found in gypſum, they ſeldom undergo any alteration, either with reſpect to figure or compoſition, and they are very rare.

Organized bodies, in a ſtate of petrifaction, generally acquire a degree of ſolidity of which they were not poſſeſſed before they were buried in the earth, and ſome of them are often fully as hard as the ſtones or matrices in which they are enveloped. When the ſtones are broken, the fragments of petrifactions are eaſily found, and eaſily diſtinguiſhed. There are ſome organized bodies, however ſo changed by petrifaction, as to render it impoſſible to diſcover their origin. That there is a matter more or leſs agitated, and adapted for penetrating bodies, which crumbles and ſeparates their parts, draws them along with it, and diſperſes them here and there in the fluid which ſurrounds them, is a fact of which nobody ſeems to entertain any doubt. Indeed we ſee almoſt every ſubſtance, whether ſolid or liquid, inſenſibly conſume, diminiſh in bulk, and at laſt, in the lapſe of time, vaniſh and diſappear.

A petrified ſubſtance, ſtrictly ſpeaking, is nothing more than the ſkeleton, or perhaps image, of a body which has once had life, either animal or vegetable, combined with ſome mineral. Thus petrified wood is not in that ſtate wood alone. One part of the compound or maſs of wood having been deſtroyed by local cauſes, has been compenſated by earthy and ſandy ſubſtances diluted and extremely minute, which the waters ſurrounding them had depoſited while they themſelves evaporated. Theſe earthy ſubſtances, being then moulded in the ſkeleton, will be more or leſs indurated, and will appear to have its figure, its ſtructure, its ſize, in a word the ſame general characters, the ſame ſpecific attributes, and the ſame individual differences. Farther, in petrified wood, no veſtige of ligneous matter appears to exiſt. We know that common wood is a body in which the volume of ſolid parts is greatly exceeded by that of the pores. When wood is buried in certain places, lapidific fluids, extremely divided and ſometimes coloured, inſinuate themſelves into its pores and fill them up. Theſe fluids are afterwards moulded and condenſed. The ſolid part of the wood is decompoſed and reduced into powder, which is expelled without the maſs by aqueous filtrations. In this manner, the places which were formerly occupied by the wood are now left empty in the form of pores. This operation of nature produces no apparent difference either of the ſize or of the ſhape; but it occaſions both at the ſurface and in the inſide, a change of ſubſtance, in the ligneous texture is inverted; that is to ſay, that which was pore in the natural wood, becomes ſolid in that which is petrified; and that which was ſolid or full in the firſt ſtate, becomes porous in the ſecond. In this way, ſays M Muſard, petrified wood is much leſs extended in pores than ſolid parts, and at the ſame time forms a body much more denſe and heavy than the firſt. As the pores communicate from the circumference to the centre, the petrifaction ought to begin at the centre, and end with the circumference of the organic body ſubjected to the action of the lapidific fluids. Such is the origin of petrifactions. They are organized bodies which have undergone changes at the bottom of the ſea or the ſurface of the earth, and which have been buried by various accidents at different depths under ground.

In order to underſtand properly the detail of the formation of petrified bodies, it is neceſſary to be well acquainted with all their conſtituent parts. Let us take wood for an example. Wood is partly ſolid and partly porous. The ſolid parts conſiſt of a ſubſtance, hard, ligneous, and compact, which forms the ſupport of the vegetable; the porous parts conſiſt of veſſels or interſtices which run vertically and horizontally acroſs the ligneous fibres, and which ſerve for conducting air, lymph, and other fluids. Among theſe veſſels the trachiæ which riſe in ſpiral forms, and which contain only air, are eaſily diſtinguiſhed. The cylindric veſſels, ſome of which contain lymph, and others the *ſuccus proprius*, are full only during the life of the vegetable. After its death they become vacant by the evaporation and abſence of the fluids with which they were formerly filled. All theſe veſſels whether aſcending or deſcending, unite with one another, and form great cavities in the wood and in the bark. According to Malpighi and Duhamel, the ligneous fibres are themſelves tubular, and afford a paſſage to certain liquors; in ſhort, the wood and bark are interſperſed with utriculi of different ſhapes and ſizes. The augmentation of the trunk in thickneſs, according to Malpighi, is accompliſhed by the annual addition of a new exterior covering of fibres and of trachiæ. Others think that a concentric layer of ſapwood is every year hardened, whilſt a new one is forming from the bark. But it is on all ſides agreed that the concentric layers of wood are diſtinct from one another, becauſe at the point of contact betwixt any two of them, the new veſſels, as well as new fibres, are more apparent and perceptible than they are in any other place. Having made theſe preliminary remarks on the ſtructure of vegetables, we ſhall now proceed to give an abridged account of the manner in which M. Mongez explains their petrifaction.

In proportion to the tenderneſs and bad quality of wood, it imbibes the greater quantity of water; therefore this ſort will unqueſtionably petrify more eaſily than that which is hard. It is thought that all the petrified wood ſo often found in Hungary has been originally ſoft, ſuch as firs or poplars. Suppoſe a piece of wood buried in the earth; if it be very dry, it will ſuck up the moiſture which ſurrounds it like a ſpunge. This moiſture, by penetrating it, will dilate all the parts of which it is compoſed. The trachia, or air-veſſels will be filled firſt, and then the lymphatic veſſels and thoſe which contain the *ſuccus proprius*, as they are likewiſe empty, The water which forms this moiſture keeps in diſſolution a greater or a leſs quantity of earth; and this earth, detached, and carried along in its courſe, is reduced to ſuch an attenuated ſtate, that it eſcapes our eyes and keeps itſelf ſuſpended, whether by the medium of fixed air or by the motion of the water. Such is the lapidific fluid. Upon evaporation, or the departure of the menſtruum, this earth, ſand or metal, again appears in the form of precipitate or ſediment in the cavities of the veſſels, which by degrees are filled with it. This earth is there moulded with exactneſs; The lapſe of time, the ſimultaneous and partial attraction of the particles, make them adhere to one another; the lateral ſuction of the ſurrounding fibres, the obſtruction of the moulds, and the hardening of the moulded earth, become general; and there conſiſts nothing but an earthy ſubſtance which prevents the ſinking of the neighbouring parts. If the depoſit is formed of a matter in general pretty pure, it preſerves a whiter and clearer colour than the reſt of the wood; and as the concentric layers are only perceptible and diſtinct in the wood, becauſe the veſſels are there more apparent on account of their ſize, the little earthy cylinders, in the ſtate of petrified wood, muſt be there a little larger, and conſequently muſt repreſent exactly the turnings and ſeparations of theſe layers. At the place of the utriculi, globules are obſerved, of which the ſhapes are as various as the moulds wherein they are formed. The anaſtomoſes of the proper and lymphatic veſſels, form beſides points of ſupport or reunion for this ſtony ſubſtance.

With regard to holes formed by worms in any bits of wood, before they had been buried in the earth, the lapidific fluid, in penetrating theſe great cavities, depoſits there as eaſily the earthy ſediment, which is exactly moulded in them. Theſe vermiform cylinders, are ſomewhat leſs in bulk than the holes in which they are found, which is owing to the retreat of the more refined earth and to its drying up.

Let any one repreſent to himſelf this collection of little cylinders, vertical, horizontal, inclined in different directions, the ſtony maſſes of utriculi and of anaſtomoſes,

tomoſes, and he will have an idea of the ſtony ſubſtance which forms the ground work of petrifaction. Hitherto not a ſingle ligneous part is deſtroyed; they are all exiſting, but ſurrounded on every ſide with earthy depoſits; and that body which, during life, was compoſed of ſolid and of empty parts, is now entirely ſolid: its deſtruction and decompoſition do not take place till after the formation of theſe little depoſits. In proportion as the water abandons them, it penetrates the ligneous ſubſtance, and deſtroys it by an inſenſible fermentation. The woody fibres being decompoſed, form in their turn voids and interſtices, and there remains in the whole piece nothing but little ſtony cylinders. But in proportion as theſe woody fibres diſappear the ſurrounding moiſture, loaded with earth in the ſtate of diſſolution, does not fail to penetrate the piece of wood, and to remain in its new cavities. The new depoſit aſſumes exactly the form of decompoſed fibres; it invelopes in its turn the little cylinders which were formed in their cavities, and ends by incorporating with them. We may ſuppoſe here, that in proportion as it decompoſes, there is a reaction of the ligneous part againſt the lapidific fluid: from this reaction a colour ariſes which ſtains more or leſs the new depoſit; and this colour will make it eaſily diſtinguiſhable from that which has been laid in the inſide of the veſſels. In all petrified wood this ſhade is generally perceptible.

We have then, ſays M. Mongez, four diſtinct epochs in the proceſs by which nature converts a piece of wood into ſtone, or, to ſpeak more juſtly, by which ſhe ſubſtitutes a ſtony depoſit in its place; 1. Perfect vegetable wood, that is to ſay, wood compoſed of ſolid and of empty parts, of ligneous fibres, and of veſſels. 2. Wood having its veſſels obſtructed and choaked up by an earthy depoſit, while its ſolid parts remain unaltered. 3. The ſolid parts attacked and decompoſed, forming new cavities betwixt the ſtony cylinders, which remain in the ſame ſtate, and which ſupport the whole maſs. 4. Theſe new cavities filled with new depoſits, which incorporate with the cylinders, and compoſe nothing elſe but one general earthy maſs repreſenting exactly the piece of wood.

Among the petrifactions of vegetables called *dendrolites*, are found parts of ſhrubs, ſtems, roots, portions of the trunk, ſome fruits, &c. We muſt not, however, confound the impreſſions of moſſes, ferns, and leaves, nor incruſtations, with petrifactions.

Among the petrifactions of animals, we find ſhells, cruſtaceous animals, polyparii, ſome worms, the bony parts of fiſhes and of amphibious animals, few or no real inſects, rarely birds and quadrupeds, together with the bony portions of the human body. The cornua amonis are petrified ſerpents; and with regard to figugured and accidental bodies, theſe are *luſus naturæ*.

In order, ſays M. Bertrand, in his *Dictionaire des Foſſiles*, that a body ſhould become petrified, it is neceſſary that it be, 1. Capable of preſervation under ground: 2. That it be ſheltered from the air and running water (the ruins of Herculaneum prove that bodies which have no connection with free air, preſerve themſelves untouched and entire). 3. That it be ſecured from corroſive exhalations. 4. That it be in a place where there are vapours or liquids, loaded either with metallic or ſtony particles in a ſtate of diſſolution, and which, without deſtroying the body, penetrate it, impregnate it, and unite with it in proportion as its parts are diſſipated by evaporation.

It is a queſtion of great importance among naturaliſts, to know the time which Nature employs in petryfying bodies of an ordinary ſize.—It was the wiſh of the late emperor, Duke of Lorraine, that ſome means ſhould be taken for determining this queſtion. M. le Chevalier de Baillu, director of the cabinet of natural hiſtory of his imperial majeſty, and ſome other naturaliſts, had ſeveral years ago, the idea of making a reſearch which might throw ſome light upon it. His imperial majeſty being informed by the unanimous obſervations of modern hiſtorians and geographers, that certain pillars which are actually ſeen in the Danube in Gervia, near Belgrade, are remains of the bridge which Trajan conſtructed over that river, preſumed that theſe pillars having been preſerved for ſo many ages behoved to be petrified, and that they would furniſh ſome information with regard to the time which nature employs in changing wood into ſtone. The emperor thinking this hope well founded, and wiſhing to ſatiſfy his curioſity, ordered his ambaſſador at the court of Conſtantinople to aſk permiſſion to take up from the Danube one of the pillars of Trajan's bridge. The petition was granted, and one of the pillars was accordingly taken up; from which it appeared that the petrifaction had only advanced three fourths of an inch in the ſpace of 1500 years. There are, however, certain waters in which this tranſmutation is more readily accompliſhed.—Petrifactions appear to be formed more ſlowly in earths that are porous and in a ſlight degree moiſter than water itſelf.

When the foundations of the city of Quebec in Canada were dug up, a petrified ſavage was found among the laſt beds to which they proceeded. Although there was no idea of the time at which that man had been buried under the ruins, it is however, true, that his quiver and arrows were ſtill well preſerved. In digging a lead-mine in Derbyſhire in 1744, a human ſkeleton was found among ſtag's horns. It is impoſſible to ſay how many ages this carcaſe had lain there. In 1695 the entire ſkeleton of an elephant was dug up near Tonna in Thuringia. Some time before this epoch the petrified ſkeleton of a crocodile was found in the mines of that country. We might cite another fact equally curious which happened at the beginning of the laſt century. John Munte, curate of Slægarp in Scania. and ſeveral of his pariſhoners, wiſhing to procure turf from a drained marſhy ſoil, found, ſome feet below ground, an entire cart with the ſkeletons of the horſes and carter. It is preſumed that there had formerly been a lake in that place, and that the carter attempting to paſs over on the ice, had by that means probably periſhed. In fine, wood partly foſſil and partly coaly has been found at a great depth, in the clay of which tile was made for the Abbey of Fontenay. It is but very lately that foſſil wood was diſcovered at the depth of 75 feet in a well betwixt Iſſi and Vauvres near Paris. This wood was in ſand betwixt a bed of clay and pyrites, and water was found four feet lower than the pyrites. M. de Laumont, inſpector general of the mines, ſays (*Journal de Phyſique*, Mai 1736), that in the lead mine at Pontpéan near Rennes, is a fiſſure, perhaps the only one of its kind. In that fiſſure, ſea-ſhells, rounded pebbles, and an entire beech, have been found 240 feet deep. This beech was laid horizontally in the direction of the fiſſure. Its bark was converted into pyrites, the ſap-wood into jet, and the centre into coal.

A great many pieces of petrified wood are found in different counties of France and Savoy. In Cobourg in Saxony, and in the mountains of Miſnia, trees of a conſiderable thickneſs have been taken from the earth which were entirely changed into a very fine agate, as alſo their branches and their roots. In ſawing them, the annual circles of their growth have been diſtinguiſhed. Pieces have been taken up, on which it was diſtinctly ſeen that they had been gnawed by worms; others bear viſible marks of the hatchet. In fine, pieces have been found which were petrified at one end, while the other ſtill remained in the ſtate of wood fit for being burned. It appears then that petrified wood is a great deal leſs rare in nature than is commonly imagined.

Cronſtedt has excluded petrifactions from any place in the body of his ſyſtem of mineralogy, but takes notice of them in his appendix. He diſtinguiſhes them by the name of *Minerali Larvati*, and defines them to be "mineral bodies in the form of animals or vegetables." The moſt remarkable obſervations concerning them according to Mr Kirwan, who differs in ſome particulars from Mongez, are as follow. 1. Thoſe of ſhells are found on or near the ſurface of the earth; thoſe of fiſh deeper; and thoſe of wood deeper ſtill. Shells in ſubſtance are found in vaſt quantities, and at conſiderable depths. 2. The ſubſtances moſt ſuſceptible of petrifaction are thoſe which moſt reſiſt the putrefactive proceſs; of which kind are ſhells, the harder kinds of wood, &c.; while the ſofter parts of animals which eaſily putrify, are ſeldom met with in a petrified ſtate. 3. They are moſt commonly found in ſtrata of marl, chalk, limeſtone, or clay, ſeldom in ſandſtone, ſtill more ſeldom in gypſum; and never in gneiſs, granite, baſaltes, or ſchoerl. Sometimes they are found in pyrites, and ores of iron, copper, and ſilver; conſiſting almoſt always of that kind of earth or other mineral which ſurrounds them; ſometimes of ſilex, agate, or cornelian. 4. They are found in climates where the animals themſelves could not have exiſted. 5. Thoſe found in ſlate or clay are compreſſed and flattened.

The different ſpecies of petrifactions, according to Cronſtedt, are,

I. *Terræ Larvatæ;* extraneous bodies changed into a limy ſubſtance or calcareous changes. Theſe are, 1. Looſe or friable. 2. Indurated. The former are of a chalky nature in form of vegetables or animals; the ſecond filled with ſolid limeſtone in the ſame forms. Some are found entirely changed into a calcareous ſpar. All of them are found in France, Sweden, and other countries in great plenty.

On theſe petrifactions Cronſtedt obſerves, that ſhells and corals are compoſed of limy matter even when ſtill inhabited by their animals, but they are claſſed among the petrifactions as ſoon as the calcareous particles have obtained a new arrangement; for example, when they have become ſparry; filled with calcareous earth either hardened or looſe, or when they lie in the ſtrata of the earth. "Theſe, ſays he, form the greateſt part of the foſſil collections which are ſo induſtriouſly made, often without any regard to the principal and only uſe they can be of, viz. that of enriching zoology. Mineralogiſts are ſatisfied with ſeeing the poſſibility of the changes the limeſtone undergoes in regard to its particles; and alſo with receiving ſome inſight into the alteration which the earth has been ſubject to from the ſtate of the ſtrata which are now found in it." The calcined ſhells, where the petrifactions are of a limy or chalky nature, anſwer extremely well as a manure; but the indurated kind ſerve only for making grottoes. Gypſeous petrifactions are extremely rare; however, Chardin informs us that he had ſeen a lizard incloſed in a ſtone of that kind in Perſia.

II. Larvæ, or bodies changed into a flinty ſubſtance. Theſe are all indurated, and are of the following ſpecies. 1. Cornelians in form of ſhells from the river Tomm in Siberia. 2. Agate in form of wood; a piece of which is ſaid to be in the collection of the Count de Teſſin. 3. Coralloids of white flint *(Millepora)* found in Sweden. 4. Wood of yellow flint found in Italy, in Turkey near Adrianople, and produced by the waters of Lough-neagh in Ireland.

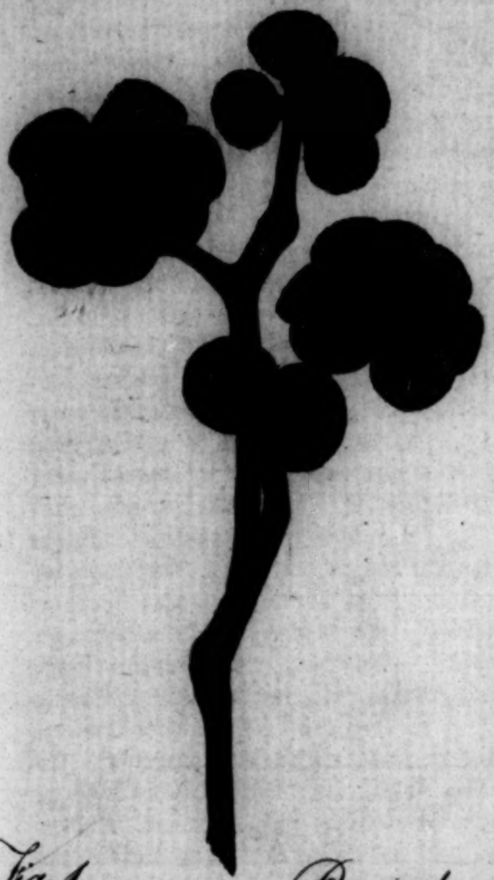
III. *Larvæ Argillaceæ;* where the bodies appear to be changed into clay. Theſe are found either looſe and friable, or indurated. Of the former kind is a piece of porcelain clay met with in a certain collection, with all the marks of the root of the tree upon it. Of the latter kind is the oſteocolla; which is ſaid to be the roots of the poplar-tree changed, and not to conſiſt of any calcareous ſubſtance. A ſort of foſſile ivory, with all the properties of clay, is ſaid likewiſe to be found in ſome places.

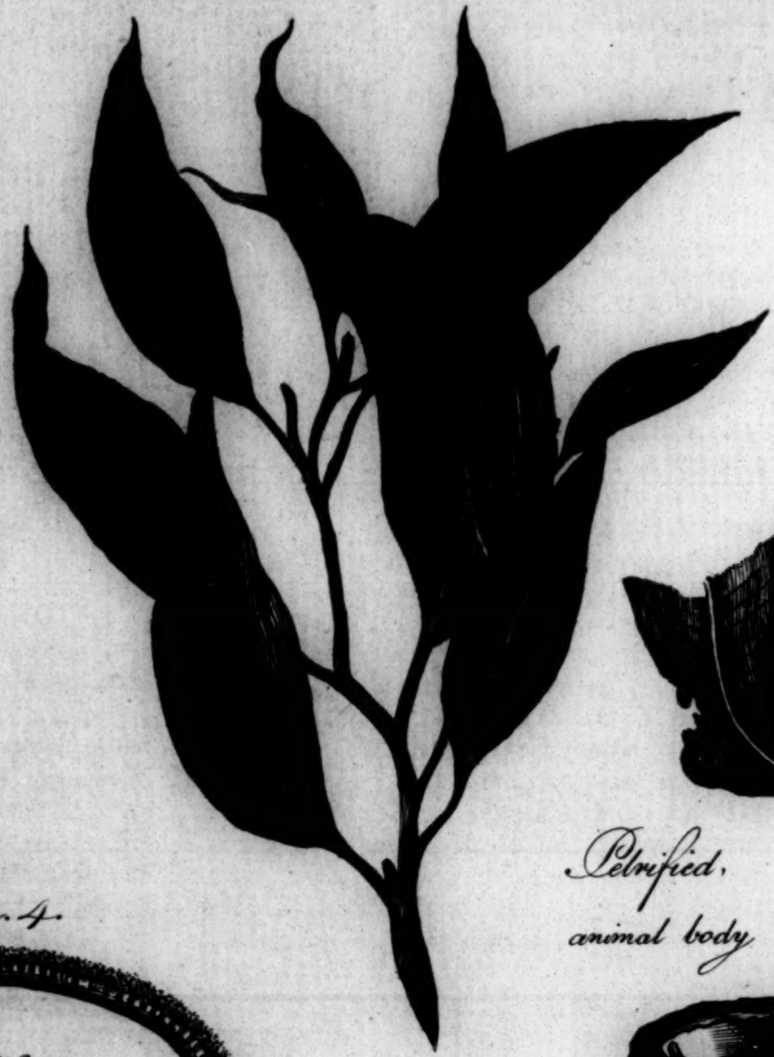
IV. *Larvæ Inſalitæ;* where the ſubſtances are impregnated with great quantities of ſalts. Human bodies have been twice found impregnated with vitriol of iron in the mine of Falun, in the province of Dalarne in Sweden. One of them was kept for ſeveral years in a glaſs caſe, but at laſt began to moulder and fall to pieces. Turf and roots of trees are likewiſe found in water ſtrongly impregnated with vitriol. They do not flame, but look like a coal in a ſtrong fire; neither do they decay in the air.

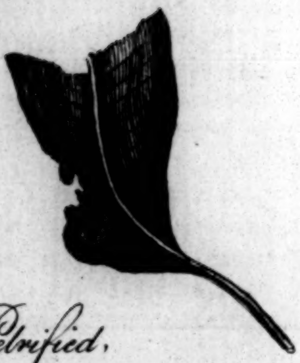
V. Bodies penetrated by mineral inflammable ſubſtances. 1. By pit-coal, ſuch as wood; whence ſome have imagined coal to have been originally produced from wood. Some of the ſubſtances are fully ſaturated with the coaly matter; others not. Among the former Cronſtedt reckons jet; among the latter the ſubſtance called *mumiavegetabilis*, which is of a looſe texture reſembling amber, and may be uſed as ſuch. 2. Thoſe penetrated by aſphaltum, or rock-oil. The only example of theſe given by our author is a kind of turf in the province of Skone in Sweden. The Egyptian mummies, he obſerves, cannot have any place among this ſpecies, as they are impregnated artificially with aſphaltum, in a manner ſimilar to what happens naturally with the wood and coaly matter in the laſt ſpecies. 3. Thoſe impregnated with ſulphur which has diſſolved iron, or with *pyrites*. Human bodies, bivalve and univalve ſhells and inſects, have been all found in this ſtate; and the laſt are found in the alum ſtate at Andrarum, in the province of Skone in Sweden.

VI. *Larvæ metaliferæ;* where the bodies are impregnated with metals. Theſe are, 1. Covered with native ſilver; which is found on the ſurface of ſhells

The Peppermint Tree. **Plate CCCLXXXVIII.**







Petrified. animal body

Pennatula

Fig. 1.

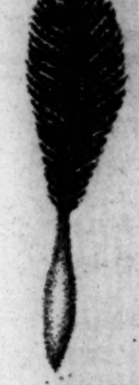


Fig. 6.

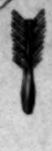


Fig. 4.

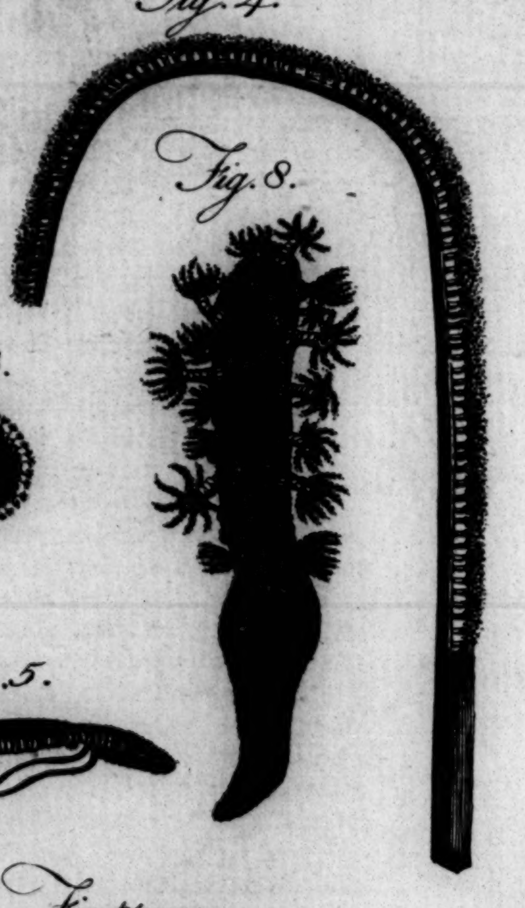


Fig. 8.

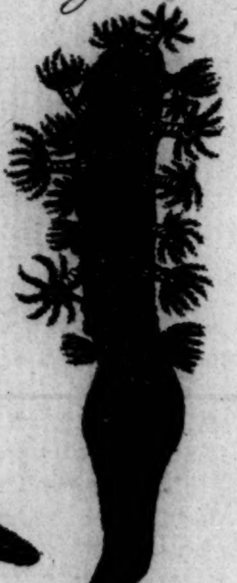


Fig. 3.

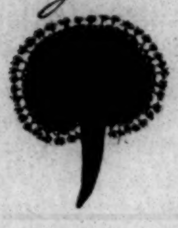


Fig. 2.

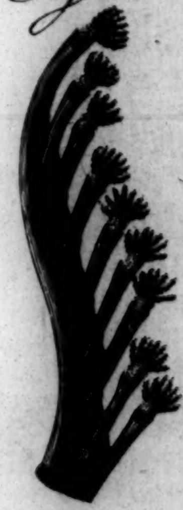


Fig. 5.

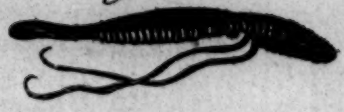


Fig. 7.

Fig. 10.

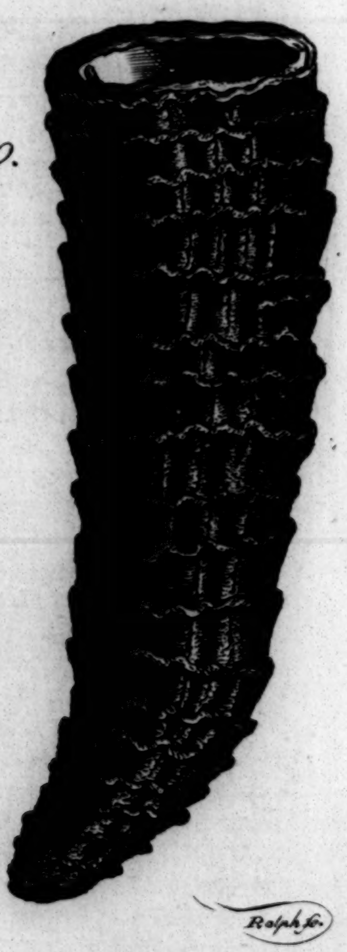
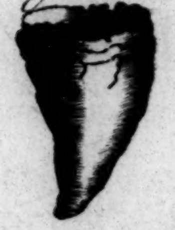


Fig. 9.



Rolph sc.

BRITISH MUSEUM

Petrifaction.

in England. 2. Where the metal is mineraliſed with copper and ſulphur. Of this kind is the fahlertz or greyſilver ore, in the ſhape of ears of corn, and ſuppoſed to be vegetables found in argillaceous ſlate at Frankenberg and Tahlitteren in Heſſe. 3. *Larvæ cupriferæ*, where the bodies are impregnated with copper. To this ſpecies principally belong the Turquoiſe or Turkey ſtones, improperly ſo called; being ivory and bones of the elephant or other animals impregnated with copper. See TURCUOISE. At Simore in Languedoc there are bones of animals dug up, which, during calcination, aſſume a blue colour; but according to Cronſtedt it is not probable that theſe owe their colour to copper. 3. With mineraliſed copper. Of theſe our author gives two examples. One is where the copper is mineraliſed with ſulphur and iron, forming a yellow marcaſitical ore. With this ſome ſhells are impregnated which lie upon a bed of loadſtone in Norway. Other petrifactions of this kind are found in the form of fiſh in different parts of Germany. The other kind is where the copper is impregnated with ſulphur and ſilver. Of this kind is the grey ſilver ore like ears of corn, found in the ſlate quarries at Heſſe. 4. *Larvæ ferriferæ*, with iron in form of a calx, which has aſſumed the place or ſhape of extraneous bodies. Theſe are either looſe or indurated. Of the looſe kind are ſome roots of trees found at the lake Langelma in Finland. The indurated kinds are exemplified in ſome wood found at Orbiſſan in Bohemia. 5. Where the iron is mineraliſed, as in the pyritaceous larvæ, already deſcribed.

VII. Where the bodies are tending to decompoſition, or in a way of deſtruction. Among theſe, our author enumerates MOULD and TURF, which ſee; as alſo CEMENT, MORTAR, ROCK, SAND, SELENITÆ, STONE, and WATER. See likewiſe the article FOSSIL, Plates CC and CCI, and MOUNTAIN.

We ſhall add the following deſcription of a very curious animal petrifaction. The Abbé de Sauvages, celebrated for his refined taſte and knowledge in natural hiſtory, in a tour through Languedoc, between Alais and Uzes, met with a narrow vein of no more than two toiſes wide, which croſſes the road, and is bordered on one-ſide by a grey dirty ſoil, and on the other by a dry ſandy earth, each of a vaſt extant, and on a level with a narrow vein which ſeparates them. In this narrow vein only are contained petrified ſhells, cemented together by a whitiſh marl. They are in prodigious plenty; among which there is one ſpecies which the Abbé does not remember to have known to have been any where deſcribed, and may probably be a new acquiſition to natural hiſtory.

This ſhell has the ſhape of a horn, ſomewhat incurvated towards the baſe. (See figure 9. Plate CCCLXXXVIII.) It ſeems compoſed of ſeveral cups, let into each other, which are ſometimes found ſeparate. They have all deep channels, which extend, as in many other ſhells, from the baſe to the aperture; the projecting ribs which form theſe channels are moſtly worn away, being rarely to be found entire. Sometimes ſeveral are grouped together; and as a proof that they are not a fortuitous aſſemblage cauſed by the petrifaction, they are fixed together through their whole length, in ſuch ſort, that their baſe and aperture are regularly turned the ſame way. The Abbé ſhould have referred this to the genus which Linnæus and the Marquis d'Argenville named *dentellis*, had they not been let into each other. He found ſome of them whoſe aperture or hollow was not ſtopped up by the petrifaction, and ſeemed as cones adapted to one another (fig 10.), forming a row of narrow cells, ſeparated by a very thin partition: this row occupied not more than one half of the cavity of the ſhell.

Petrified City.

Our article has already extended to ſuch a length as to preclude any further additions; we cannot, however, finiſh it without obſerving, that foſſil bones, are very common in Dalmatia. They are of various kinds, and in their nature, apparently very extraordinary; but we have found no tolerable account or probable conjecture of their origin. Vitaliano Donati of Padua, in his *Saggio ſoprala la ſtoric naturale dell' Adriatico*, was the firſt who took notice of them; and Fortis, in his travels into Dalmatia, has given a copious account of them. They are moſt common in the iſlands of *Cherſo* and *Oſera*. See Fortis's Travels into Dalmatia, page 440—460, and our article VITALIANO.

PETRIFIED CITY. The ſtory of a petrified city is well known all over Africa, and has been believed by many conſiderable perſons even in Europe. Louis XIV. was ſo fully perſuaded of its reality, that he ordered his ambaſſador to procure the body of a man petrified from it at any price. Dr Shaw's account of this affair it as follows: "About 40 years ago (now more than 70), when M. le Maire was the French conſul at Tripoli, he made great inquiries, by order of the French court, into the truth of the report concerning a petrified city at Ras Sem; and amongſt other very curious accounts relating to this place, he told me a remarkable circumſtance, to the great diſcredit, and even confutation, of all that had been ſo poſitively advanced with regard to the petrified bodies of men, children, and other animals.

"Some of the janizaries, who in collecting tribute traverſe the diſtrict of Ras Sem, promiſed him, that as an adult perſon would be too cumberſome, they would undertake, for a certain number of dollars, to bring him from thence the body of a little child. After a great many pretended difficulties, delays, and diſappointments, they produced at length a little Cupid, which they had found, as he learned afterwards, among the ruins of Leptis; and, to conceal the deceit, they broke off the quiver, and ſome other of the diſtinguiſhing characteriſtics of that deity. However, he paid them for it according to promiſe, 1000 dollars, which is about 150l. ſterling, as a reward for their faithful ſervice and hazardous undertaking; having run the riſk, as they pretended, of being ſtrangled if they ſhould have been diſcovered in thus delivering up to an infidel one of thoſe unfortunate Mahometans, as they take them originally to have been.

"But notwithſtanding this cheat and impoſition had made the conſul deſiſt from ſearching after the petrified bodies of men and other animals; yet there was one matter of fact, as he told me, which ſtill very ſtrangely embarraſſed him, and even ſtrongly engaged him in favour of the current report and tradition. This was ſome little loaves of bread, as he called them, which had been brought to him from that place. His reaſoning, indeed, thereupon, provided the pretended matter of fact had been clear and evident, was juſt and

Petrified City.

ſatisfactory; for where we find loaves of bread, there, as he urged, ſome perſons muſt have been employed in making them, as well as others for whom they were prepared. One of theſe loaves, he had, among other petrifications, very fortunately brought with him to Cairo, where I ſaw it, and found it to be an echinites of the diſcoid kind, of the ſame faſhion with one I had lately found and brought with me from the deſerts of Marah. We may therefore reaſonably conclude, that there is nothing to be found at Ras Sem, unleſs it be the trunks of trees, echinites, and ſuch petrifications as have been diſcovered at other places.

"M. le Maire's, inquiries, which we find were ſupported by the promiſe and performance of great rewards, have brought nothing further to light. He could never learn that any traces of walls, or buildings, or animals, or utenſils, were ever to be ſeen within the verge of theſe pretended petrifications. The like account I had from a Sicilian renegado, who was the janizary that attended me whilſt I was in Egypt; and as in his earlier years he had been a ſoldier of Tripoli, he aſſured me that he had been ſeveral times at Ras Sem. This I had confirmed again in my return from the Levant by the interpreter of the Britiſh factory at Tunis, who was likewiſe a Sicilian renegado; and being the libertus or freedman of the Baſhaw of Tripoli, was preferred by him to be the bey or viceroy of the province of Darna, where Ras Sem was immediately under his juriſdiction. His account was likewiſe the ſame: neither had he ever ſeen, in his frequent journeys over this diſtrict, any other petrification than what are above-mentioned. So that the petrified city, with its walls, caſtles, ſtreets, ſhops, cattle, inhabitants, and utenſils, were all of them at firſt the mere inventions of the Arabs, and afterwards propagated by ſuch perſons, who, like the Tripoli ambaſſador, and his friend above-mentioned, were credulous enough to believe them.

"However, there is one remarkable circumſtance relating to Ras Sem that deſerves well to be recorded. When the winds have blown away the billows of ſand which frequently cover and conceal theſe petrifications, they diſcover, in ſome of the lower and more depreſſed places of this diſtrict, ſeveral little pools of water, which is uſually of ſo ponderous a nature, that, upon drinking it, it paſſes through the body like quick-ſilver. This perhaps may be that petrifying fluid which has all along contributed to the converſion of the palm-trees and the echini into ſtone: for the formation not only of theſe, but of petrifications of all kinds, may be entirely owing to their having firſt of all lodged in a bed of loam, clay, ſand, or ſome other proper nidus or matrix and afterward gradually been acted upon and pervaded by ſuch a petrifying fluid as we may ſuppoſe this to be."

To this account it may not be amiſs to ſubjoin the memorial of Caſſem Aga, the Tripoli ambaſſador at the court of Britain. The city, he ſays, is ſituated two days journey ſouth from Onguela, and 17 days journey from Tripoli by caravan to the ſouth eaſt. "As one of my friends (ſays the ambaſſador) deſired me to give him in writing an account of what I knew touching the petrified city, I told him what I had heard from different perſons, and particularly from the mouth of one of credit who had been on the ſpot: that is to ſay, that it was a very ſpacious city, of a round form, having great and ſmall ſtreets therein furniſhed with ſhops, with a vaſt caſtle magnificently built; that he had ſeen there ſeveral ſorts of trees, the moſt part olives and palms, all of ſtone, and of a blue or rather lead colour: that he ſaw alſo figures of men in a poſture of exerciſing their different employments, ſome holding in their hands ſtuffs, others bread, every one doing ſomething, even women ſuckling their children, and in the embraces of their huſbands, all of ſtone; that he went into the caſtle by three different gates, though there were many more where he ſaw a man lying upon a bed of ſtone: that there were guards at the gates with pikes and javelins in their hands: in ſhort, that he ſaw in this wonderfully city many ſorts of animals, as camels, oxen, horſes, aſſes, ſheep, and birds, all of ſtone, and the colour above mentioned."

Petrobruſſians ‖ Petrojoannites.

We have ſubjoined this account, becauſe it ſhows in ſtriking colours the amazing credulity of mankind, and the avidity with which they ſwallow the marvellous, and the difficulty of diſcovering the truth reſpecting places or things at a diſtance from us.

PETROBRUSSIANS, a religious ſect, which had its riſe in France and the Netherlands about the year 1110. The name is derived from *Peter Bruys*, a Provençal, who made the moſt laudable attempt to reform the abuſes and remove the ſuperſtition that diſgraced the beautiful ſimplicity of the goſpel. His followers were numerous; and for 20 years his labour in the miniſtry was exemplary and unremitted. He was, however, burnt in the year 1130 by an enraged populace ſet on by the clergy.

The chief of Bruys's followers was a monk named *Henry*; from whom the Petrobruſſians were alſo called *Henricians*. Peter the Venerable, abbot of Clugny, has an expreſs treatiſe againſt the Petrobruſſians; in the preface to which he reduces their opinions to five heads. 1. They denied that children before the age of reaſon can be juſtified by baptiſm, in regard it is our own faith that ſaves by baptiſm. 2. They held that no churches ſhould be built, but that thoſe that already are ſhould be pulled down; an inn being as proper for prayers as a temple, and a ſtable as an altar. 3. That the croſs ought to be pulled down and burnt, becauſe we ought to abhor the inſtruments of our Saviour's paſſion. 4. That the real body and blood of Chriſt are not exhibited in the euchariſt, but merely repreſented by their figures and ſymbols. 5. That ſacrifices, alms, prayers, &c. do not avail the dead. F. Langlois objects Manicheiſm to the Petrobruſſians; and ſays, they maintained two gods, the one good, the other evil: but this we rather eſteem an effect of his zeal for the catholic cauſe, which determined him to blacken the adverſaries thereof than any real ſentiment of the Petrobruſſians.

PETROJOANNITES, were followers of Peter John, or Peter Joannis, *i. e.* Peter the ſon of John, who flouriſhed in the 13th century. His doctrine was not known till after his death, when his body was taken out of his grave and burnt. His opinions were, that he alone had the knowledge of the true ſenſe wherein the apoſtles preached the goſpel; that the reaſonable ſoul is not the form of man; that there is no grace infuſed by baptiſm: and that Jeſus Chriſt was pierced with a lance on the croſs before he expired.

* See Chemiſtry n° 1443.

PETROLEUM *, or ROCK OIL; a thick oily ſubſtance exſuding out of the earth, and collected on the ſurface of the wells in many parts of the world. It is found on ſome in Italy, and in a deſerted mine in the province of Dalame in Sweden. In this laſt place it collects itſelf in ſmall hollows of limeſtone, like reſin into wood of the pine-tree. It is found trickling from the rocks, or iſſuing from the earth, in many parts of the duchy of Modena, and in various parts of France, Switzerland, Germany, and Scotland as well as in Aſia. It is alſo found not only on the ſurface of wells as already mentioned, but mixed with earth and ſand, from whence it may be ſeparated by infuſion of water. It is of a pungent and acrid taſte, and ſmells like the oil of amber, but more agreeable. It is very light and very pellucid; but though equally bright and clear under all circumſtances, it is liable to a very great variety in its colour. It is naturally almoſt colourleſs, and in its appearance greatly reſembles the moſt pure oil of turpentine: this is called *white petroleum*, though it has no more colour than water. It is ſometimes tinged of a browniſh, reddiſh, yellowiſh, or faint greeniſh colour; but its moſt frequent colour is a mixture of the reddiſh and blackiſh, in ſuch a degree that it looks black when viewed behind the light, but purple when placed between the eye and a candle or window. It is rendered thinner by diſtillation with water, and leaves a reſinous reſiduum; when diſtilled with a volatile alkali, the latter acquires the properties of ſuccinated ammoniac, and contains the acid of amber. It is the moſt frequent of all the liquid bitumens, and is perhaps the moſt valuable of them all in medicine. It is to be choſen the pureſt, lighteſt, and moſt pellucid that can be had, ſuch as is of the moſt penetrating ſmell and is moſt inflammable. Monet informs us that ſome kinds of it are of the denſity of nut-oil. It is inſoluble in ſpirit of wine; which though it be the great diſſolvent of ſulphur, has no effect upon petroleum, not even with ever ſo long a digeſtion. It will not take fire with the dephlegmated acid ſpirits; as oil of cloves and other of the vegetable eſſential oils do: and in diſtillation, either by balneum mariæ or in ſand, it will neither yield phlegm nor acid ſpirit; but the oil itſelf riſes in its own form, leaving in the retort only a little matter, thick as honey, and of a browniſh colour.

The finer kinds reſemble naphtha. Kirwan is of opinion that naphtha is converted into petroleum by a proceſs ſimilar to what takes place in eſſential oils when expoſed to the atmoſphere; in which caſe the oil abſorbs not only the pure, but alſo the phlogiſticated, part of the atmoſphere, in conſequence of which ſeveral alterations take place in them.

Mr Bouldoc made ſeveral experiments with the white petroleum of Modena: an account of which he gave to the Paris academy.

It eaſily took fire (A) on being brought near a candle and that without immediately touching the flame; and when heated in any veſſel it will attract the flame of a candle, though placed at a great height above the veſſel; and the vapour it ſends up taking fire, the flame will be communicated to the veſſel of heated liquor, and the whole will be conſumed. It burns in the water; and when mixed with any liquor ſwims on the ſurface of it, even of the higheſt rectified ſpirit of wine, which is 1/[illegible]th heavier than pure petroleum. It readily mixes with all the eſſential oils of vegetables, as oil of lavender, turpentine, and the reſt, and ſeems very much of their nature; nor is this very ſtrange, ſince the alliance between theſe bodies is probably nearer than is imagined, as the eſſential oils of vegetables may have been originally mineral ones, and drawn up out of the earth into the veſſels of the plants.

The diſtinguiſhing characteriſtic of the petroleum is its thickneſs, reſembling inſpiſſated oil; when pure it is lighter than ſpirit of wine; but though ever ſo well rectified, it becomes in time thick and black as before. Petroleum, when ſhaken, yields a few bubbles; but they ſooner ſubſide than in almoſt any other liquor, and the liquor reſumes its clear ſtate again almoſt immediately. This ſeems owing to the air in this fluid being very equally diſtributed to all its parts, and the liquor being compoſed of particles very evenly and nicely arranged. This extenſibility of the oil is alſo amazing. A drop of it will ſpread over ſeveral feet of water, and in this condition it gives a great variety of colours; that is, the ſeveral parts of which this thin film is compoſed act as ſo many priſms. The moſt ſevere froſt never congeals petroleum into ice; and paper wetted with it becomes tranſparent as when wetted with oil; but it does not continue ſo, the paper becoming opaque again in a few minutes as the oil dries away.

There are three varieties of it according to Mongez. 1. The yellow, found at Modena in Italy: very light and volatile. 2. The reddiſh, or yellowiſh red: ſome of which is collected at Gabian in Languedoc and in Alſace. 3. The heavy, black, or brown kind, which is the moſt common, and met with in England, France, Germany, and ſome other countries. It generally runs out either from chinks or gaps of rocks, or is mixed with the earth, and guſhes out of it; or it ſwims on the water of ſome fountains, as already mentioned. According to Dr Lippert, a kind of roſin is produced by mixing petroleum with ſmoking nitrous acid. The taſte of this ſubſtance is very bitter, but the ſmell reſembles that of muſk. The vitriolic acid, according to the ſame author, produces a reſin ſtill more bitter, but without any aromatic ſmell. Cronſtedt enumerates the following ſpecies.

1. *Moltha*, or Barbadoes tar, a thick ſubſtance reſembling ſoft pitch. It is found in ſeveral parts of Europe and Aſia; particularly Sweden, Germany, and Switzerland: on the coaſt of the Dead Sea in Paleſtine;

(A) Alonſo Barba, in his book of metals, gives a very melancholy inſtance of the power of petroleum of taking fire at a diſtance. He tells us, that a certain well yielding petroleum on the ſurface of its water, being to be repaired, the workman took down into the well with him a lantern and a candle in it; there were ſome holes in the lantern, through which the petroleum at a conſiderable diſtance ſucked out the flame of the candle, and, taking fire, burſt up with the noiſe of a cannon, and tore the man to pieces.

Paleſtine; in Perſia, in the chinks of rocks, and in ſtrata of gypſum and limeſtone, or floating upon water. It is found alſo in America, and at Colebrookdale in England. Kirwan tells us, that petroleum expoſed for a long time to the air forms this ſubſtance. It is of a viſcid conſiſtence; and of a brown, black, or reddiſh black colour. Sometimes it is inodorous, but generally of a more or leſs diſagreeable ſmell, particularly when burned. It melts eaſily, and burns with much ſmoke and ſoot, leaving either aſhes or a ſlag according to the heterogeneous matter it contains. It contains a portion of the acid of amber. It gives a bitter ſalt with mineral alkali, more difficult of ſolution than common ſalt, and which, when treated with charcoal, does not yield any ſulphur.

II. *Elaſtic Petrol;* a very ſingular kind of foſſil met with in ſome parts of England. This in colour and conſiſtency, exactly reſembles the Caoutchouc, or elaſtic, gum-reſin, commonly called *Indian rubber*, found in South America, and uſed for rubbing out the traces of black lead pencils from paper. It is of a dark brown colour, almoſt black; and in ſome pieces has a yellowiſh brown caſt like the ſame gum reſin. It can ſcarce be diſtinguiſhed from the caoutchouc with regard to its elaſtic property, excepting that the coheſion of its parts is not ſo great. It burns with a ſmoky flame, and melts likewiſe into a thick oily fluid: but emits a diſagreeable ſmell like the *Foſſil Pitch* or Barbadoes tar. On the whole (ſays M. Magellan, this foſſile ſeems to confirm the opinion of thoſe mineralogiſts who believe that theſe oily combuſtibles derive their origin from the vegetable kingdom. It ſeems worth trying whether pieces of aſphaltum, buried in damp beds of ſparry rubbiſh or other kinds of earth, would take the ſame elaſtic conſiſtence." This ſubſtance was found in the year 1785 near Caſſelton in Derbyſhire, but in very ſmall quantities. Some of the ſpecimens were of a cylindrical form, like bits of ſmall branches or ſtalks of vegetables: tho' much more flexible, being perfectly elaſtic.

III. *Hardened rock-oil*, or foſſil pitch, an inflammable ſubſtance dug out of the ground in many parts of the world, and known by the names of *petroleum induratum, pix montana, indenpech, berghartz*, &c. There are two ſpecies. 1. The aſphaltum (b), or pure foſſil pitch, found on the ſhores of the Dead Sea and of the Red Sea; alſo in Sweden, Germany, and France; See Asphaltum. It is a ſmooth, hard, brittle, inodorous ſubſtance, of a black or brown colour when looked at: but on holding it up betwixt the eye and the light, appears of a deep red. It ſwims in water; breaks with a ſmooth and ſhining ſurface; melts eaſily; and, when pure, burns without leaving any aſhes; but, if impure, leaves aſhes, or a ſlag. M. Monet aſſerts that it contains ſulphur, or at leaſt the vitriolic acid. It is ſlightly and partially acted upon by ſpirit-of-wine and

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(b) This ſpecies is found in great quantity in a bituminous lake or plain in the iſland of Trinidad, of which Mr Anderſon gives the following copious acccount in the 79th volume of the Philoſophical Tranſactions.

“ A moſt remarkable production of nature in the iſland of Trinidad, is a bituminous lake, or rather plain, known by the name of *Tar Lake;* by the French called *La Bray*, from the reſemblance to, and anſwering the intention of, ſhip-pitch. It lies in the leeward ſide of the iſland, about half-way from the Bocas to the ſouth end, where the mangrove ſwamps are interrupted by the ſand-banks and hills; and on a point of land which extends into the ſea about two miles, exactly oppoſite to the high mountains of Paria, on the north ſide of the gulf.

“ This cape, or headland, is about 50 feet above the level of the ſea, and is the greateſt elevation of land on this ſide of the iſland. From the ſea it appears a maſs of black vitrified rocks; but, on a cloſe examination, it is found a compoſition of bituminous ſcoriæ, vitrified ſand, and earth, cemented together: in ſome parts beds of cinders only are found. In approaching this cape, there is a ſtrong ſulphureous ſmell, ſometimes diſagreeable. This ſmell is prevalent in many parts of the ground to the diſtance of eight or ten miles from it.

This point of land is about two miles broad, and on the eaſt and weſt ſides, from the diſtance of about half a mile from the ſea, falls with a gentle declivity to it, and is joined to the main land on the South by the continuation of the mangrove ſwamps; ſo that the bituminous plain is on the higheſt part of it, and only ſeparated from the ſea by a margin of wood which ſurrounds it, and prevents a diſtant proſpect of it. Its ſituation is ſimilar to a ſavannah, and like them, it is not ſeen till treading upon its verge. Its colour and even ſurface preſent at firſt the aſpect of a lake of water; but it is poſſible it got the appellation of *Lake* when ſeen in the hot and dry weather, at which time its ſurface to the depth of an inch is liquid; and then from its coheſive quality it cannot be walked upon.

“ It is of a circular form, about three miles in circumference. At my firſt approach it appeared a plain, as ſmooth as glaſs, excepting ſome ſmall clumps of ſhrubs and dwarf trees that had taken poſſeſſion of ſome ſpots of it; but when I had proceeded ſome yards on it, I found it divided into areolæ of different ſizes and ſhapes: the chaſms or diviſions anaſtomoſed through every part of it; the ſurface of the areolæ perfectly horizontal and ſmooth; the margins undulated, each undulation enlarged to the bottom till they join the oppoſite. On the ſurface the margin or firſt undulation is diſtant from the oppoſite from four to ſix feet, and the ſame depth before they coaleſce; but where the angles of the areolæ oppoſe, the chaſms or ramifications are wider and deeper. When I was at it, all theſe chaſms were full of water, the whole forming one true horizontal plane, which rendered my inveſtigation of it difficult and tedious, being neceſſitated to plunge into the water a great depth in paſſing from one areolæ to another. The trueſt idea that can be formed of its ſarface will be from the areolæ and their ramifications on the back of a turtle. Its more common conſiſtence and appearance is that of pit-coal, the colour rather greyer. It breaks into ſmall fragments of a and ether. Beſides the countries above-mentioned, Brumich informs us that the aſphaltum comes from Porto Principe in the iſland of Cuba in the Weſt-Indies. It is likewiſe found, according to Fourcroy, in many parts of China; and is uſed for a covering to ſhips by Arabs and Indians. 2. The *pix montana impura* contains a great quantity of earthy matter, which is left in the retort after diſtillation, or upon the charcoal if burnt in the open fire. It coheres like a ſlag, and is of the colour of black-lead; but in a ſtrong heat this earth is ſoon volatiliſed, ſo that its nature is not yet well known. During the diſtillation a liquid ſubſtance falls into the receiver, which is found to be of the ſame nature with rock-oil. The ſubſtance itſelf is found in Sweden and ſeveral other countries. The piſaſphaltum is of a mean conſiſtence between the aſphaltum and the common petroleum. Mongez ſays that it is the ſame with the bitumen collected from a well named *De la Pege*, near Clermont Ferrand in France.

The people of mount Ciaro, in Italy, have ſome years ſince found out a much eaſier way of finding petroleum than that which they formerly had been uſed to. This mountain abounds with a ſort of greyiſh ſalt, which lies in large horizontal beds, mingled with ſtrata of clay, and large quantities of a ſpar of that kind called

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a cellular appearance, and gloſſy, with a number of minute and ſhining particles interſperſed through its ſubſtance; it is very friable, and, when liquid, is of a jet black colour. Some parts of the ſurface are covered with a thin and brittle ſcoria, a little elevated.

"As to its depth, I can form no idea of it; for in no part could I find a ſubſtratum of any other ſubſtance: in ſome parts I found calcined earth mixed with it.

"Although I ſmelt ſulphur very ſtrong on paſſing over many parts of it, I could diſcover no appearance of it, or any rent or crack through which the ſteams might iſſue; probably it was from ſome parts of the adjacent woods: for although ſulphur is the baſis of this bituminous matter, yet the ſmells are very different, and eaſily diſtinguiſhed, for its ſmell comes the neareſt to that of pitch of any thing I know. I could make no impreſſion on its ſurface without an axe: at the depth of a foot I found it a little ſofter, with an oily appearance, in ſmall cells. A little of it held to a burning candle makes a hiſſing or crackling noiſe like nitre, emitting ſmall ſparks with a vivid flame, which extinguiſh the moment the candle is removed. A piece put in the fire will boil up a long time without ſuffering much diminution: after a long time's ſevere heat, the ſurface will burn and form a thin ſcoria, under which the reſt remains liquid. Heat ſeems not to render it fluid, or occupy a larger ſpace than when cold; from which, I imagine, there is but little alteration on it during the dry months, as the ſolar rays cannot exert their force above an inch below the ſurface. I was told by one Frenchman, that in the dry ſeaſon the whole was an uniform ſmooth maſs; and by another, that the ravins contained water fit for uſe during the year. But neither can I believe: for if, according to the firſt aſſertion, it was an homogeneous maſs, ſomething more than an external cauſe muſt affect it to give it the preſent appearances; nor without ſome hidden cauſe can the ſecond be granted. Although the bottoms of theſe ramified channels admit not of abſorption, yet from their open expoſure, and the black ſurface of the circumjacent parts, evaporation muſt go on amazingly quick, and a ſhort time of dry weather muſt ſoon empty them; nor from the ſituation and ſtructure of the place is there a poſſibility of ſupply but from the clouds. To ſhow that the progreſs of evaporation is inconceivably quick here, at the time I viſited it there were, on an average, two thirds of the time inceſſant torrents of rains; but from the afternoon being dry, with a gentle breeze (as is generally the caſe during the rainy ſeaſon in this iſland), there evidently was an equilibrium between the rain and the evaporation; for in the courſe of three days I ſaw it twice, and perceived no alteration on the height of the water, nor any outlet for it but by evaporation.

"I take this bituminous ſubſtance to be the *bitumen aſphaltum Linnæi*. A gentle heat renders it ductile; hence, mixed with a little greaſe or common pitch, it is much uſed for the bottoms of ſhips, and for which intention it is collected by many; and I ſhould conceive it a preſervative againſt the borer, ſo deſtructive to ſhips in this part of the world.

"Beſides this place, where it is found in this ſolid ſtate, it is found liquid in many parts of the woods; and at the diſtance of 20 miles from this about two inches thick in round holes of three or four inches diameter, and often at cracks or rents. This is conſequently liquid, and ſmells ſtronger of tar than when indurated, and adheres ſtrongly to any thing it touches; greaſe is the only thing that will diveſt the hands of it.

"The ſoil in general for ſome diſtance round La Bray, is cinders and burnt earths; and where not ſo, it is a ſtrong argillaceous ſoil; the whole exceedingly fertile, which is always the caſe where there are any ſulphureous particles in it. Every part of the country, to the diſtance of 30 miles round, has every appearance of being formed by convulſions of nature from ſubterraneous fires. In ſeveral parts of the woods are hot ſprings; ſome I tried, with a well-graduated thermometer of Fahrenheit, were 20° and 22° hotter than the atmoſphere at the time of trial. From its poſition to them, this part of the iſland has certainly experienced the effects of the volcanic eruptions, which have heaped up thoſe prodigious maſſes of mountains that terminate the province of Paria on the north; and no doubt there has been, and ſtill probably is, a communication between them. One of theſe mountains oppoſite to La Bray in Trinidad, about 30 miles diſtant has every appearance of a volcanic mountain: however, the volcanic efforts have been very weak here, as no traces of them extend above two miles from the ſea in this part of the iſland, and the greater part called by the Germans *ſelenites*; which is the common ſort, that ferments with acids, and readily diſſolves in them, and calcines in a ſmall fire. They pierce theſe ſlates in a perpendicular direction till they find water; and the petroleum which had been diſperſed among the cracks of thoſe ſlates is then waſhed out by the water, and brought from all the neighbouring places to the hole or well in which they have dug, on the ſurface of the water of which it ſwims after eight or ten days. When there is enough of it got together, they lade it from the top of the water with braſs baſons; and it is then eaſily ſeparated from what little water is taken up with it. Theſe wells or holes continue to furniſh the oil in different quantities for a conſiderable time; and when they will yield no more, they pierce the ſlates in ſome other place.

It is never uſed in Britain as a medicine; but the French give it internally in hyſteric complaints, and to their children for worms: ſome alſo give it from 10 to 15 drops in wine for ſuppreſſions of the menſes. This, however, is rather the practice of the common people than of the faculty.

PETROMYZON, the Lamprey, a genus of fiſhes belonging to the claſs of amphibia nantes. It has ſeven ſpiracula at the ſide of the neck, no gills, a fiſtula on the top of the head, and no breaſt or belly fins. There are three ſpecies, diſtinguiſhed by peculiarities in their back fins.

1. The marinus, or ſea-lamprey, is ſometimes found ſo large as to weigh four or five pounds. It greatly reſembles the eel in ſhape; but its body is larger, and its ſnout longer, narrower, and ſharper, at the termination. The opening of the throat is very wide; each jaw is furniſhed with a ſingle row of very ſmall teeth; in the middle of the palate are ſituated one or two other teeth, which are longer, ſtronger, and moveable towards the inſide of the throat; the inferior part of the palate preſents moreover a row of very ſmall teeth, which reaches to the bottom of the throat, where we find four long notched bones; two ſhort fiſtulous proceſſes are obſervable at the extremity of the ſnout, and there are two others thicker but ſtill ſhorter above the eyes. Willoughby ſuppoſes that the latter are the organs of hearing, and the former the organ of ſmell. His opinion with regard to the auditory faculty of this fiſh is founded on what we read in ancient authors, that the fiſhermen attracted the lampreys by whiſtling, and that Craſſus had tamed one of them to ſuch a degree that it knew his voice and obeyed his call.

The eyes of the lamprey are ſmall, and covered with a tranſparent light blue membrane; the pupil is bordered with a circle of a colour reſembling gold; near the gills, which are four in number, there is a round hole on both ſides, through which it diſcharges the water. The lamprey has no fins on his belly or breaſt; on the back we obſerve a fin, which begins pretty near the head, extends to the tail which it turns round, and is afterwards continued to the anus: this fin is covered by the ſkin of the body, to which it adheres but looſely; the ſkin is ſmooth, of a red blackiſh colour, and ſtreaked with yellow; the lamprey advances in the water with winding motions like thoſe of a ſerpent, which is common to it, with all the anguilliform fiſhes.

The lamprey lives on fleſh. During the cold it lies concealed in the crevices of ſea-rocks, and conſequently is fiſhed for only at certain ſeaſons. It lives in a ſtate of hoſtility with the poulpe, a kind of ſea-polypus, which ſhuns the combat as long as it can; but when it finds the impoſſibility of eſcape, it endeavours to ſurround the lamprey with its long arms. The latter ſlips away, and the poulpe becomes its prey. The lobſter, we are told, avenges the poulpe, and deſtroys the lamprey in his turn. See Cancer.

Rondelet ſays, that the fiſhermen conſider the bite of the lamprey as venomous and dangerous, and never touch it while alive but with pincers. They beat it on the jaws with a ſtick, and cut off its head. The ſame naturaliſt obſerves, that its aſhes are a cure for its bite and for the king's evil. When any one has been

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part of it has had its origin from a very different cauſe to that of volcanoes; but they have certainly laid the foundation of it, as is evident from the high ridge of mountains which ſurrounds its windward ſide to protect it from the depredations of the ocean, and is its only barrier againſt that overpowering element, and may properly be called the ſkeleton of the iſland.

"From every examination I have made, I find the whole iſland formed of an argillaceous earth, either in its primitive ſtate or under its different metamorphoſes. The baſes of the mountains are compoſed of *ſchiſtus, argillaceus* and *talcum lithomargo*; but the plains or lowlands remaining nearly in the ſame moiſt ſtate as at its formation, the component particles have not experienced the viciſſitudes of nature ſo much as the more elevated parts, conſequently retain more of their primitive forms and properties. As argillaceous earth is formed from the ſediment of the ocean, from the ſituation of Trinidad to the continent its formation is eaſily accounted for, granting firſt the formation of the ridge of mountains that bound its windward ſide, and the high mountains on the continent that nearly join it; for the great influx of currents into the gulph of Paria from the coaſts of Brazil and Andaluſia muſt bring a vaſt quantity of light earthy particles from the mouth of the numerous large rivers which traverſe theſe parts of the continent: but the currents being repelled by theſe ridges of mountains, eddies and ſmooth water will be produced where they meet and oppoſe; and therefore the earthy particles would ſubſide, and form banks of mud, and by freſh accumulations added, would ſoon form dry land: and from theſe cauſes it is evident ſuch a tract of country as Trinidad muſt be formed. But theſe cauſes ſtill exiſt, and the effect from them is evident; for the iſland is daily growing on the leeward ſide, as may be ſeen from the mud-beds that extend a great way into the gulf, and there conſtantly increaſe. But from the great influx from the ocean at the ſouth end of the iſland, and its egreſs to the Atlantic again, through the Bocas, a channel muſt ever exiſt between the continent and Trinidad." See Trinidad.

been bit by a lamprey, the moſt effectual method is to cut out the part affected. Lampreys are very dexterous in ſaving themſelves: when taken with a hook, they cut the line with their teeth; and when they perceive themſelves caught in a net, they attempt to paſs through the meſhes. They fiſh for lampreys only on the pebbly edges of ſea-rocks; ſome of theſe pebbles are drawn together to make a pit as far as the water-edge, or perhaps a little blood is thrown in, and the lamprey is immediately obſerved to put forth its head between two rocks. As ſoon as the hook, which is baited with crab or ſome other fiſh, is preſented to it, it ſwallows it greedily, and drags it into its hole. There is then occaſion for great dexterity to pull it out ſuddenly; for if it is allowed time to attach itſelf by the tail, the jaw would be torn away before the fiſh could be taken. This ſhows that its ſtrength reſides in the end of its tail; the reaſon of which is, that the great bone of this fiſh is reverſed, ſo that the bones, which in all other fiſhes are bent towards the tail, are here turned in a contrary direction, and aſcend towards the head. After the lamprey is taken out of the water, it is not killed without a great deal of trouble: the beſt way is to cut the end of its tail, or perhaps to cruſh it with repeated blows on the ſpine, in order to prevent it from leaping. This ſhows that in the lamprey animal life extends to the end of the ſpinal marrow.

M. de Querhoent removes our fears concerning the ſuppoſed poiſon of the lamprey. This ſpecies of fiſh, he tells us, abounds on the coaſts of Africa and at the Antilles iſles; it is found likewiſe on the coaſt of Brazil, at Surinam, and in the Eaſt-Indies. When taken with a hook, we muſt have the precaution to kill it before we take it off, otherwiſe it darts upon the fiſher and wounds him ſeverely. Its wounds, however, are not venomous, M. de Querhoent having ſeen ſeveral ſailors who were bit by it, but experienced no diſagreeable conſequences. Lampreys are likewiſe found in great abundance at Aſcenſion Iſland, but particularly in the ſeas of Italy: their fleſh when dried is excellent; and boiling gives to the vertebræ the colour of gridelin.

The fleſh of the lamprey is white, fat, ſoft, and tender; it is pretty agreeable to the taſte, and almoſt as nouriſhing as that of the eel; thoſe of a large ſize are greatly ſuperior to the ſmall ones. We know that the moſt wealthy of the Romans kept them in fiſh ponds at a great expence. Vedius Pollio, the friend of Auguſtus, who is diſtinguiſhed in hiſtory for his ſavage gluttony, on ſuppoſition that lampreys fed on human fleſh, were more delicate, ordered his ſlaves when accuſed of the ſlighteſt faults to be thrown into his fiſh ponds. We are no leſs ſurprized, in reading the ancient authors, to perceive the extraordinary attachment which the celebrated orators Hortenſius and Craſſus, men in other reſpects ſo grave and ſenſible, had to this animal. One of them ſhed tears at the loſs of a lamprey; the other improved upon this puerility, and wore mourning at the death of his favourite. It is remarkable, that this fiſh, which is proper to the ſea, and never comes into the rivers, can live and fatten in freſh water. For the advancement of natural hiſtory, it were to be wiſhed, that ſome perſon who lives near the ſea ſhore would make obſervations, in order to diſcover whether the lamprey is viviparous; its ſcales are ſo imperceptible, that they have been overlooked by moſt ichthyologiſts.

Mr Pennant is of opinion, that the ancients were unacquainted with this fiſh; at leaſt, he ſays, it is certain, that which Dr Arbuthnot and other learned men render the word *lamprey*, is a ſpecies unknown in our ſeas, being the *muræna* of Ovid, Pliny, and others, for which we want an Engliſh name. This fiſh, the *lupus* (our baſſe), and the *myxo*, (a ſpecies of mullet), formed that pride of Roman banquets the *tripatinam*, ſo called, according to Arbuthnot, from their being ſerved up in a machine with three bottoms. The words *lampetra* and *petromyzon* are but of modern date, invented from the nature of the fiſh; the firſt a *lambendo petras*, the other from πετρος and μυσαω becauſe they are ſuppoſed to lick or ſuck the rocks.

2. The fluviatilis, or leſſer lamprey, ſometimes grows to the length of 10 inches. The mouth is formed like that of the preceeding. On the upper part is a large bifurcated tooth: on each ſide are three rows of very minute ones; on the lower part are ſeven teeth; the exterior of which on one ſide is the largeſt. The irides are yellow. As in all the other ſpecies, between the eyes on the top of the head is a ſmall orifice, of great uſe to clear its mouth of the water that remains on adhering to the ſtones; for through that orifice it ejects the water in the ſame manner as cetaceous fiſh. On the lower part of the back is a narrow fin, beneath that riſes another, which at the beginning is high and angular, then grows narrow; ſurrounds the tail, aad ends near the anus. The colour of the back is brown or duſky, and ſometimes mixed with blue; the whole underſide ſilvery. Theſe are found in the Thames, Severn, and Dee; are potted with the larger kind; and are by ſome preferred to it, as being milder taſted. Vaſt quantities are taken about Mortlake, and ſold to the Dutch for bait for their cod-fiſhery. Above 430,000 have been ſold in a ſeaſon at 40 s. per 1000; and of late, about 100,000 have been ſent to Harwich for the ſame purpoſe. It is ſaid that the Dutch have the ſecret of preſerving them till the turbot fiſhery.

3. The bronchialis or lampern, is ſometimes found of the length of eight inches, and about the thickneſs of a ſwan's quill; but they are generally much ſmaller. The body is marked with numbers of tranſverſe lines, that paſs croſs the ſides from the back to the bottom of the belly, which is divided from the mouth to the anus by a ſtraight line. The back fin is not angular like that of the former, but of an equal breadth. The tail is lanceolated, and ſhort at the end. They are frequent in the rivers near Oxford, particularly the Iſis; but not peculiar to that county, being found in others of the Engliſh rivers, where, inſtead of concealing themſelves under the ſtones, they lodge themſelves in the mud, and never are obſerved to adhere to any thing like other lampreys.

PETRONIUS was a renowned Roman ſenator. When governor of Egypt, he permitted Herod, king of the Jews, to purchaſe in Alexandria any quantity of corn which he ſhould judge neceſſary for the ſupply of his ſubjects, who were afflicted with a ſevere famine. When Tiberius died, Caius Caligula, who ſucceeded him, took from Vitellius the government of Syria, and gave it to Petronius, who diſcharged the duties of his office with dignity and honour. From his inclination to favour the Jews, he run the riſk of loſing the emperor's friendſhip and his own life; for when that prince gave orders to have his ſtatue depoſited in the temple of Jeruſalem, Petronius, finding that the Jews would rather ſuffer death than ſee that ſacred place profaned, was unwilling to have recourſe to violent meaſures; and therefore preferred a moderation, dictated by humanity, to a cruel obedience. (We muſt not confound him with another of the ſame name, *viz.* Petronius Granius, who was a centurion in the eighth legion, and ſerved under Cæſar in the Gallic war), In his voyage to Africa, of which country he had been appointed quæſtor, the ſhip in which he ſailed was taken by Scipio, who cauſed all the ſoldiers to be put to the ſword, and promiſed to ſave the quæſtor's life provided that he would renounce Cæſar's party. To this propoſal Petronius replied, that "Cæſar's officers were accuſtomed to grant life to others, and not to receive it;" and, at the ſame time, he ſtabbed himſelf with his own ſword.

PETRONIUS Arbiter (Titus), a great critic and polite writer of antiquity, the favourite of Nero, ſuppoſed to be the ſame mentioned by Tacitus in the 16th book of his Annals. He was proconſul of Bithynia, and afterwards conſul, and appeared capable of the greateſt employments. He was one of Nero's principal confidents, and in a manner the ſuperintendant of his pleaſures; for that prince thought nothing agreeable or delightful but what was approved by Petronius, The great favour ſhown him drew upon him the envy of Tigellinus, another of Nero's favourites, who accuſed him of being concerned in a conſpiracy againſt the emperor: on which Petronius was ſeized, and was ſentenced to die. He met death with a ſtriking indifference, and ſeems to have taſted it nearly as he had done his pleaſures. He would ſometimes open a vein and ſometimes cloſe it, converſing with his friends in the meanwhile, not on the immortality of the ſoul, which was no part of his creed, but on topics which pleaſed his fancy, as of love verſes, agreeable and paſſionate airs; ſo that it has been ſaid "his dying was barely ceaſing to live." Of this diſciple of Epicurus, Tacitus gives the following character, "He was (ſays he) neither a ſpendthrift nor a debauchee, like the generality of thoſe who ruin themſelves; but a refined voluptuary, who devoted the day to ſleep, and the night to the duties of his office and to pleaſure." This courtier is much diſtinguiſhed by a ſatire which he wrote, and ſecretly conveyed to Nero; in which he ingeniouſly deſcribes, under borrowed names, the character of this prince. Voltaire is of opinion that we have no more of this performance but an extract made by ſome obſcure libertine, without either taſte or judgment. Peter Petit diſcovered at Traw in Dalmatia, in 1665, a conſiderable fragment containing the ſequel of Trimalcion's Feaſt. This fragment, which was printed the year after at Padua and at Paris, produced a paper war among the learned. While ſome affirmed that it was the work of Petronius, and others denied it to be ſo, Petit continued to aſſert his right to the diſcovery of the manuſcript, and ſent it to Rome, where it was acknowledged to be a production of the 15th century. The French critics, who had attacked its authenticity, were ſilent from the moment it was depoſited in the royal library. It is now generally attributed to Petronius, and found in every ſubſequent edition of the works of that refined voluptuary. The public did not form the ſame favourable opinion of ſome other fragments, which were extracted from a manuſcript found at Belgrade in 1688, and printed at Paris by Nodot in 1694, tho' they are aſcribed by the editor Charpentier, and ſeveral other learned men, to Petronius; yet, on account of the Galliſciſms and other barbarous expreſſions with which they abound, they have generally been conſidered as unworthy of that author. His genuine works are, 1, A Poem on the civil war between Cæſar and Pompey, tranſlated into proſe by Abbé de Marolles, and into French verſe by Preſident Bouhier, 1737, in 4to. Petronius, full of fire and enthuſiaſm, diſguſted with Lucan's flowery language, oppoſed Pharſalia to Pharſalia; but his work though evidently ſuperior to the other in ſome reſpects, is by no means in the true ſtyle of epic poetry. 2. A Poem on the Education of the Roman Youth. 3. Two treatiſes; one upon the Corruption of Eloquence, and the other on the Cauſes of the Decay of Arts and Sciences. 4. A poem on the Vanity of Dreams. 5. The Shipwreck of Licas. 6. Reflections on the Inconſtancy of Human Life. And, 7. Trimalcion's Banquet. To this laſt performance morality is not much indebted. It is a deſcription of the pleaſures of a corrupted court; and the painter is rather an ingenious courtier than a perſon whoſe aims is to reform abuſes. The beſt editions of Petronius are thoſe publiſhed at Venice, 1499, in 4to; at Amſterdam, 1669, in 8vo, *cum notis variorum;* Ibid. with Boſchius's notes, 1677, in 24to; and 1700, 2 vols in 24to. The edition of *variorum* was reprinted in 1743, in 2 vols 4to, with the learned Peter Burman's commentaries. Petronius died in the year 65 or 66.

PETRONIUS (Maximus) was born in the year 395 of an illuſtrious family, being at firſt a ſenator and conſul of Rome. He put on the imperial purple in 455, after having effected the aſſaſſination of Valentinian III. In order to eſtabliſh himſelf upon the throne, he married Eudoxia the widow of that unfortunate prince; and, as ſhe was ignorant of his villany, he confeſſed to her in a tranſport of love, that the ſtrong deſire he had of being her huſband, had made him commit this atrocious crime. Whereupon Eudoxia privately applied to Genſeric, king of the Vandals, who coming into Italy with a very powerful army, entered Rome, where the uſurper then was. The unhappy wretch endeavoured to make his eſcape, but the ſoldiers and people enraged at his cowardice, fell upon him, and overwhelmed him with a ſhower of ſtones. His body was dragged through the ſtreets of the city for three days; and after treating it with every mark of diſgrace, they threw it into the Tiber the 12th of June the ſame year, 455. He reigned only 77 days. He had ſome good qualities. He loved and cultivated the ſciences. He was prudent in his councils, circumſpect in his actions, equitable in his judgments: a facetious companion, and ſteady friend. He had the good fortune to win the affections of every body, while he remained a private character; but as a prince, he was ſo much the more deteſtable, in that, after he had obtained the throne by villany, he kept poſſeſſion of it only by violence.

The crown was ſcarcely on his head before it appeared to him an inſupportable burden. "Happy Democles (exclaimed he in his deſpair), thou wert a king during a ſingle entertainment!"

PETROSA ossa, in anatomy, a name given to the fourth and fifth bones of the cranium, called alſo *oſſa temporum* and *oſſa ſquamoſa;* the ſubſtance whereof, as their firſt and laſt names expreſs, is ſquamoſe and very hard.

PETROSELINUM (apium petroselinum, Lin.) *Parſley*. This plant is commonly cultivated for culinary purpoſes. The ſeeds have an aromatic flavour, and are occaſionally uſed as carminatives, &c. The root of parſley is one of the five aperient roots, and with this intention is ſometimes made an ingredient in apozems and diet-drinks: if liberally uſed, it is apt to occaſion flatulencies; and this, by diſtending the viſcera, produces a contrary effect to that intended by it: the taſte of this root is ſomewhat ſweetiſh, with a light degree of warmth and aromatic flavour.

PETTEIA, in the ancient muſic, a term to which we have no one correſponding in our language.

The melopœia, or the art of arranging ſounds in ſucceſſion ſo as to make melody, is divided into three parts, which the Greeks call *lepſis*, *mixis*, and *chreſis;* the Latins *ſumptio*, *mixtio*, and *uſus;* and the Italians *preſa*, *meſcolamento*, and *uſo*. The laſt of theſe is called by the Greeks πεττεια, and by the Italians *pettia;* which therefore means the art of making a juſt diſcernment of all the manners of ranging or combining ſounds among themſelves, ſo as they may produce their effect, *i. e.* may expreſs the ſeveral paſſions intended to be raiſed. Thus it ſhows what ſounds are to be uſed, and what not; how often they are ſeverally to be repeated; with which to begin, and with which to end; whether with a grave ſound to riſe, or an acute one to fall, &c. The petteia conſtitutes the manners of the muſic; chooſes out this or that paſſion, this or that motion of the ſoul, to be awakened; and determines whether it be proper to excite it on this or that occaſion. The petteia, therefore, is in muſic much what the manners are in poetry.

It is not eaſy to diſcover whence the denomination ſhould have been taken by the Greeks, unleſs from πεττεια, their game of cheſs; the muſical petteia being a ſort of combination and arrangement of ſounds, as cheſs is of pieces called πεττοι, *calculi*, or "cheſs-men."

PETTY (Sir Willliam), ſon of Anthony Petty a clothier, was born at Rumſey, a little haven-town in Hampſhire, in 1623; and while a boy took great delight in ſpending his time among the artificers there, whoſe trades he could work at when but twelve years of age. Then he went to the grammar-ſchool there: at 15 he was maſter of the Latin, Greek, and French tongues, and of arithmetic and thoſe parts of practical geometry and aſtronomy uſual to navigation. Soon after he went to Caen in Normandy, and Paris, where he ſtudied anatomy, and read Veſalius with Mr Hobbes. Upon his return to England, he was preferred in the king's navy. In 1643, when the war between the king and parliament grew hot, he went into the Netherlands and France for three years; and having vigorouſly proſecuted his ſtudies, eſpecially in phyſic, at Utrecht, Leyden, Amſterdam, and Paris, he returned home to Rumſey. In 1647, he obtained a patent to teach the art of double writing for ſeventeen years. In 1648, he publiſhed at London "Advice to Mr Samuel, Hartlib, for the advancement of ſome particular parts of learning." At this time he adhered to the prevailing party of the kingdom; and went to Oxford where he taught anatomy and chemiſtry, and was created a doctor of phyſic. 1650, he was made profeſſor of anatomy there; and ſoon after a member of the college of phyſicians in London. The ſame year he became phyſician to the army in Ireland; where he continued till 1659, and acquired a great fortune. After the reſtoration, he was introduced to King Charles II. who knighted him in 1661. In 1662, he publiſhed "A Treatiſe of taxes and contributions." Next year he was greatly applauded in Ireland for his invention of a double bottomed ſhip. He died at London of a gangrene in the foot, occaſioned by the ſwelling of the gout, in 1687.

The character of his genius is ſufficiently ſeen in his writings, which were much more numerous than thoſe we have mentioned above. Amongſt theſe, it is ſaid, he wrote the hiſtory of his own life, which unqueſtionably contained a full account of his political and religious principles, as may be conjectured from what he has left us upon thoſe ſubjects in his will. In that he has theſe remarkable words: "As for legacies to the poor, I am at a ſtand; and for beggars by trade and election I give them nothing: as for impotents by the hand of God, the public ought to maintain them; as for thoſe who can get no work, the magiſtrates ſhould cauſe them to be employed; which may be well done in Ireland, where are fifteen acres of improveable land for every head: as for priſoners for crimes by the king, or for debt by their proſecutors, thoſe who compaſſionate the ſufferings of any object, let them relieve themſelves by relieving ſuch ſufferers; that is, give them alms (A), &c. I am contented, that I have aſſiſted all my poor relations, and put many into a way of getting their own bread, and have laboured in public works and inventions, and have ſought out real objects of charity; and do hereby conjure all who partake of my eſtate, from time to time to do the ſame at their peril. Neverthelеſs, to anſwer cuſtom, and to take the ſure ſide, I give twenty pounds to the moſt wanting of the pariſh wherein I die." As for religion, he ſays, "I die in the profeſſion of that faith, and in the practice of ſuch worſhip, as I find eſtabliſhed by the laws of my country; not being able to believe what I myſelf pleaſe, nor to worſhip God better than by doing as I would be done unto, and obſerving the laws of my country, and expreſſing my love and honour to Almighty God, by ſuch ſigns and tokens as are underſtood to be ſuch by the people with whom I live." He died poſſeſſed of a very large fortune, as appears by his will; where he makes his real eſtate about

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(A) In the town of Rumſey there is a houſe which was given by him for the maintenance of a charity ſchool: the rent of which is ſtill applied to that uſe.

about 6500 l. *per annum*, his perſonal eſtate about 45,000 l. his bad and deſperate debts 30,000 l. and the demonſtrable improvements of his Iriſh eſtate, 4000 l. *per annum;* in all, at ſix *per cent.* intereſt, 15,000 l. *per annum*. This eſtate came to his family, who were afterwards ennobled.

The variety of purſuits in which Sir William Petty was engaged ſhows him to have had a genius capable of any thing to which he choſe to apply it; and it is very extraordinary, that a man of ſo active and buſy a ſpirit could find time to write ſo many things as it appears he did.

Petty, any thing little or diminutive, when compared with another.

Petty Bag, an office in chancery; the three clerks of which record the return of all inquiſitions out of every county, and make all patents of comptrollers, gaugers, cuſtomers, &c.

Petty-Chaps, in ornithology. See Motacilla.

Petty-Fogger, a little tricking ſolicitor or attorney, without either ſkill or conſcience.

Petty, or *Petit*, *Larceny*. See Larceny.

Petty-Patees, among confectioners, a ſort of ſmall pies, made of a rich cruſt filled with ſweet meats.

Petty-Singles, among falconers, are the toes of a hawk.

Petty-Tally, in the ſea language, a competent allowance of victuals, according to the number of the ſhip's company.

Petty, or *Petit*, *Treaſon*. See Treason.

PETUNSE, in natural hiſtory, one of the two ſubſtances whereof porcelain or china-ware is made. The petunſe is a coarſe kind of flint or pebble, the ſurface of which is not ſo ſmooth when broken as that of our common flint. See Porcelain.

PETWORTH, in Suſſex in England, five miles from Midhurſt and the Suſſex Downs, and 49 from London, is a large, populous, and handſome town. It is adorned with ſeveral ſeats of gentlemen, particularly the magnificent ſeat of the Percies, earls of Northumberland, many of whom lie buried in a ſeparate vault of its church. The rectory, the richeſt in the county, is ſaid to be worth 600l. or 700 l. a year, and is in the Duke of Somerſet's gift: in whoſe armory in this place, there is a ſword which, by circumſtances, appears to have been the weapon of the famous Henry Hotſpur, though it is not ſo unwieldy as other ancient ſwords generally are.

PEUCEDANUM, or sulphur-wort: A genus of the dygynia order, belonging to the petandria claſs of plants; and in the natural method ranking under the 45th order *Umbellatæ*. The fruit is lobated, ſtriated on both ſides, and ſurrounded by a membrane; the involucra are very ſhort. There are three ſpecies; none of which have any remarkable properties excepting the officinale, or common hog's fennel, growing naturally in the Engliſh ſalt marſhes. This riſes to the height of two feet, with channelled ſtalks, which divide into two or three branches, each crowned with an umbel of yellow flowers, compoſed of ſeveral ſmall circular umbels. The roots, when bruiſed, have a ſtrong fetid ſcent like ſulphur, and an acrid, bitteriſh, unctuous taſte. Wounded in the ſpring, they yield a conſiderable quantity of yellow juice, which dries into a gummy reſin, and retains the ſtrong ſmell of the root. This ſhould ſeem to be poſſeſſed of ſome medicinal virtues, but they have never been aſcertained with any preciſion. The expreſſed juice was uſed by the ancients in lethargic diſorders.

PEUTEMAN (Peter) was born at Rotterdam in 1650, and was a good painter of inanimate objects; but the moſt memorable particular relative to this artiſt was that incident which occaſioned his death.

Dict. of Painters

He was requeſted to paint an emblematical picture of mortality, repreſenting human ſkulls and bones ſurrounded with rich gems and muſical inſtruments, to expreſs the vanity of this world's pleaſures, amuſements, or poſſeſſions; and that he might imitate nature with the greater exactneſs, he went into an anatomy room, where ſeveral ſkeletons hung by wires from the ceiling, and bones, ſkulls, &c. lay ſcattered about; and immediately prepared to make his deſigns.

While he was thus employed, either by fatigue, or by intenſe ſtudy, inſenſibly he fell aſleep; but was ſuddenly rouſed by a ſhock of an earthquake, which happened at that inſtant, on the 18th of September 1692. The moment he awoke, he obſerved the ſkeletons move about as they were ſhaken in different directions, and the looſe ſkulls roll from one ſide of the room to the other; and being totally ignorant of the cauſe, he was ſtruck with ſuch a horror, that he threw himſelf down ſtairs, and tumbled into the ſtreet half dead. His friends took all poſſible pains to efface the impreſſion made on his mind by that unlucky event, and acquainted him with the real cauſe of the agitation of the ſkeletons; yet the tranſaction ſtill affected his ſpirits in ſo violent a manner, that it brought on a diſorder, which in a very ſhort time ended his days. His general ſubjects were either allegorical or emblematical alluſions to the ſhortneſs and miſery of the human life.

PEWIT, sea crow, or *Mire crow*, in ornithology. See Larus.

PEWTER, a factitious metal uſed in making domeſtic utenſils, as plates, diſhes, &c.—The baſis of the metal is tin; which is converted into pewter by mixing at the rate of an hundred weight of tin with 15 pounds of lead and ſix pounds of braſs.—Beſides this compoſition, which makes the common pewter, there are other kinds, compounded of tin, regulus of antimony, biſmuth, and copper, in ſeveral proportions.

PEYRERE (Iſaac la), was born at Bourdeaux, of proteſtant parents. He entered into the ſervice of the Prince of Conde, who was much pleaſed with the ſingularity of his genius. From the peruſal of St Paul's writings he took into his head to aver, that Adam was not the firſt of the human race; and, in order to prove this extravagant opinion, he publiſhed in 1655 a book, which was printed in Holland in 4to and in 12mo, with this title, *Præadamitæ, ſive exercitatio ſuper verſibus 12, 13, 14, cap. 15. Epiſtolæ Pauli ad Romanos.* This work was burnt at Paris, and the author impriſoned at Bruſſels, through the influence of the archbiſhop of Maline's grand vicar. The Prince of Conde having obtained his liberty, he travelled to Rome in 1656, and there gave into Pope Alexander VII. a ſolemn renunciation both of Calviniſm and Preadamiſm. His converſion was not thought to be ſincere, at leaſt with regard to this laſt hereſy. His deſire to be the head of a new ſect is evident; and his book diſcovers his ambition; for he there pays many compliments to the Jews, and invites them to attend his lectures. Upon his return to Paris, notwithſtanding the earneſt ſolicitations of his holineſs to remain at Rome, he went again into the Prince of Conde's ſervice in the quality of librarian. Some time after he retired to the ſeminary *des Vertus*, where he died the 30th of January 1676, at the age of 82, after the ſacraments of the church had been adminiſtered to him. Father Simon ſays, that when he was importuned in his laſt moments to retract the opinion which he had formed reſpecting the Preadmites, his anſwer was, *Hi quæcunque ignorant, blaſphemant.* His having no fixed ſentiments of religion is ſuppoſed to proceed more from a peculiar turn of mind than a corruption of the heart; for good nature, ſimplicity of manners, and humanity, ſeem to have formed his character. "He was, ſays Niceron, a man of a very equal temper, and moſt agreeable converſation. He was a little too fond, however, of indulging his wit, which ſometimes bordered on raillery; but he took care never to hurt or wound the feelings of his neighbour. As to his learning, it was extremely limited. He knew nothing either of Greek or Hebrew; and yet he ventured to give a new interpretation of ſeveral paſſages of the ſacred volume. He piqued himſelf on his knowledge of the Latin; but excepting a few poets which he had read, he was by no means an adept in that language. His ſtyle is very unequal; ſometimes too ſwelling and pompous, at other times low and grovelling." Beſides the work already mentioned, he has left behind him, I. A treatiſe as ſingular as it is ſcarce, intitled, *Du rappel des Juifs*, 1643, in 8vo. The recal of the Iſraelites, in the opinion of this writer, will be not only of a ſpiritual nature, but they will be reinſtated in the temporal bleſſings which they enjoyed before their rejection. They will again take poſſeſſion of the holy land, which will reſume its former fertility. God will then raiſe up to them a king more juſt, and more victorious, than any of their former ſovereigns had been. Now, though all this is doubtleſs to be underſtood ſpiritually of Jeſus Chriſt, yet our author is of opinion, that it ought alſo to be underſtood of a temporal prince, who ſhall ariſe for the purpoſe of effecting the temporal deliverance of the Jews; and that this prince ſhall be no other than the king of France, for the following reaſons, which, it is believed, will carry conviction to few minds: 1. Becauſe the two titles of *Moſt Chriſtian*, and of *Eldeſt Son of the Church*, are aſcribed to him by way of excellence. 2. Becauſe it is preſumable, if the kings of France poſſeſs the virtue of curing the evil or ſcrofula, which can only afflict the bodies of the Jews; that they will likewiſe have the power of curing their obſtinate incredulity and the other inveterate diſeaſes of their ſouls. 3. Becauſe the kings of France have for their arms a *fleur de luce*; and becauſe the beauty of the church is in ſcripture compared to the beauty of lilies. 4. Becauſe it is probable that France will be the country whither the Jews ſhall firſt be invited to come and embrace the Chriſtian faith, and whither they ſhall retreat from the perſecution of the nations that have dominion over them; for France is a land of freedom; it admits of no ſlavery, and whoever touches it is free. Peyrere, after explaining his ſtrange ſyſtem, propoſes a method of converting the Jews to Chriſtianity; a method, ſays Niceron, which will not be acceptable to many. He propoſes to reduce the whole of religion to a bare faith or belief in Jeſus Chriſt; taking it for granted, without any ſhadow of proof, that it is as difficult to comprehend the articles of our faith, as to obſerve the ceremonies of Moſes.—From this ſcheme (ſays he) there would reſult a double advantage to the church; the reunion of the Jews, and of all thoſe Chriſtians who are ſeparated from the body of the church." Peyrere, when he wrote this book, was a Calviniſt; but his Calviniſm too nearly reſembled the Deiſm of our age. He confeſſed himſelf that his reaſon for quitting the Proteſtants was on account of their being the firſt and principal oppoſers of his book concerning the Preadamites. II. A curious and entertaining account of Greenland, printed in 8vo, 1647. When he was aſked, on occaſion of this work, why there were ſo many witches in the north; he replied, "It is becauſe part of the property of theſe pretended conjurers, when condemned to ſuffer death, is declared to belong to their judges." III. An equally intereſting account of Iceland, 1663, 8vo. IV. A letter to Philotimus, 1658, in 8vo, in which he explains the reaſons of his recantation, &c. We find in Moreri the following epitaph of him, written by a poet of his own times.

La Peyrere ici git, ce bon Iſraelite,
Huguenot, Catholique, enfin Preadamite:
Quatre religions lui plurent à la fois,
Et ſon indifference étoit ſi peu commune,
Qu'après quatre-vingts ans qu'il eut à faire un choix,
Le bon homme partit, & n'en choiſit pas une.

PEYRONIUS (Francis de la) for a long time practiſed ſurgery at Paris with ſuch diſtinguiſhed eclat, that he obtained for himſelf the appointment of firſt ſurgeon to Louis XV. He improved this favourable ſituation with his majeſty, and procured to his profeſſion thoſe honours which had the effect to quicken its progreſs, and thoſe eſtabliſhments which contributed to extend its benefits. The royal College of Surgery at Paris was founded by his means in 1731, was enlightened by his knowledge, and encouraged by his munificence. At his death which happened at Verſailles the 24th of April, 1747, he bequeathed to the ſociety of ſurgeons in Paris two thirds of his effects, his eſtate of Marigni, which was ſold to the king for 200,000 livres, and his library. This uſeful citizen alſo left to the ſociety of ſurgeons at Montpellier two houſes ſituated in that town, with 100,000 livres, for the purpoſe of erecting there a chirurgical amphitheatre. He appointed the ſame ſociety univerſal legatee for the third of his effects; and all theſe legacies contain clauſes whoſe ſole object is to promote the public good, the perfection and improvement of ſurgery; for which he always ſolicited the protection of the court. At the time of the famous diſpute between the phyſicians and ſurgeons, he entreated the Chancellor d'Agueſſau to build up a brazen wall between the two bodies. "I will do ſo, replied the miniſter, but on what ſide of the wall ſhall we place the ſick;" Peyronius afterwards behaved with more moderation.—He was a philoſopher without any oſtentation; but his philoſophy was tempered by a long acquaintance with the world and with the court. The acuteneſs and delicacy of his

his underſtanding, joined to his natural vivacity, rendered his converſation agreeable; and all theſe advantages were crowned with a quality ſtill more valuable, an uncommon degree of ſympathy for thoſe in diſtreſs. He was no ſooner known to be at his eſtate in the country, than his houſe was filled with ſick people, who came to him from the diſtance or 7 or 8 leagues round about. He had once a plan of eſtabliſhing, on this ſpot, an hoſpital, to which he intended to retire, that he might devote the remainder of his life to the ſervice of the poor.

PEZAY (N. Maſſon, marquis of), born at Paris, very early applied himſelf to the ſtudy of letters, and afterwards went into the army. He was made a captain of dragoons; and had the honour of giving ſome leſſons on tactics to the ill-fated Louis XVI. Being appointed inſpector-general of ſome coaſting veſſels, he repaired to the maritime towns, and executed his commiſſion with more care and attention than was to have been expected from a votary of the muſes. But as, at the ſame time, he ſhowed too much haughtineſs, a complaint was brought againſt him to the court, and he was baniſhed to his country ſeat, where he died ſoon after, in the beginning of 1778. He was the intimate friend and companion of Dorat. He had ſtudied, and ſucceſsfully imitated, his manner of writing, but his poems have more delicacy, and are leſs diſfigured with trifling converſations of gallantry. He has left behind him, 1. A tranſlation of Catullus, which is not much eſteemed. 2. Les Soirées Helvetiennes, Alſaciennes, & Franc-Comtoiſes, in 8vo, 1770; a work very agreeably diverſified, full of charming landſcapes, but written with too little accuracy. 3. Les Soirées Provençales, in manuſcript, which are ſaid to be no wiſe inferior in merit to the foregoing ones. 4. La Roſiere de Salency; a paſtoral in three acts, and which has been performed with ſucceſs on the Italian theatres. 5. Les campagnes de Maillebois, in 3 vols 4to, and a volume of maps.

PEZENAS, a place in France about 24 miles from Montpelier. The ſoil about it is ſandy. The rock is limeſtone. The fields are open, and produce corn, wine, and oil. There are to be ſeen at this place the extenſive ruins of a caſtle, which formerly belonged to the Montmorency family. This ſtrong fortreſs was hewn out of the rock on which it ſtands, and appears to have been complicated and full of art. The walls are lofty, and above 8 feet in thickneſs. The rock, which is perpendicular, is a maſs of ſhells, ſuch as turbinæ, oyſters, cockles, with a calcareous cement. From hence the circumjacent plain decked with luxuriant verdure, and ſhut in by rugged mountains, affords a moſt delightful proſpect. E. Long. 3. 35. N. L. 43. 18.

PEZIZA, cup muſhroom, in botany; a genius of the natural order of fungi, belonging to the cryptogamia claſs of plants. The fungus campanulated and ſeſſile. Linnæus enumerates 8 ſpecies.

PEZRON (Paul), a very learned and ingenious Frenchman, born at Hennebon in Brittany in 1639, and admitted into the order of Citeaux in 1660. He was a great antiquarian, and was indefatigable in tracing the origin of the language of the Goths; the reſult of which was, that he was led to eſpouſe a ſyſtem of the world's being much more ancient than modern chronologers have ſuppoſed. This he communicated to the public in a treatiſe printed at Paris in 1687, 4to, intitled, *The antiquity of Time, reſtored and defended againſt the Jews and modern chronologers.* This book of Pezron's was extremely admired for the ingenuity and learning in it; yet cauſed no ſmall alarm among the religious, againſt whom he nevertheleſs defended his opinions. He went through ſeveral promotions, the laſt of which was to the abbey of Charmoye, to which he was nominated by the king; and died in 1706.

PHACA, in botany: A genus of the decandria order, belonging to the diadelphia claſs of plants; and in the natural method ranking under the 32d order, *Papilionaceæ*. The legumen is ſemibilocular.

PHÆA, a famous ſow which infeſted the neighbourhood of Cromyon. Theſeus deſtroyed it as he was travelling from Trœzene to Athens to make himſelf known to his father. Some imagine that the boar of Calydon ſprang from this ſow. According to ſome authors, Phæa was a woman who proſtituted herſelf to ſtrangers, whom ſhe murdered, and afterwards plundered.

PHÆACIA, one of the names of the iſland Corcyra, (Homer, Stephanus). *Phæaces* the people, (Ovid), noted for their indolence and luxury; hence Horace uſes *Phæax* for a perſon indolent and ſleek; and hence aroſe their inſolence and pride, (Ariſtotle). The iſland was famous for producing large quantities of the fineſt flavoured apples, (Ovid, Juvenal, Propertius).

PHÆDON, a diſciple of Socrates, who had been ſeized by pirates in his youth; and the philoſopher, who ſeemed to diſcover ſomething uncommon and promiſing in his countenance, bought his liberty for a ſum of money, and ever after eſteemed him, Phædon, after Socrates's death, returned to Elis his native country, where he founded a ſect of philoſophers who compoſed what was called the *Eliac ſchool.* The name of Phædon is affixed to one of Plato's dialogues.

PHÆDRA (fab. hiſt.) was a daughter of Minos and Paſiphae; ſhe married Theſeus, by whom ſhe was the mother of Acamas and Demophoon. They had already lived for ſome time in conjugal felicity when Venus, who hated all the deſcendants of Apollo, becauſe he had diſcovered her amours with Mars, inſpired Phædra with the ſtrongeſt paſſion for Hippolytus the ſon of Theſeus, by the Amazon Hippolyte. This paſſion ſhe long attempted to ſtifle, but in vain; and therefore, in the abſence of Theſeus, ſhe addreſſed Hippolytus with all the impatience of deſponding love. He rejected her with horror and diſdain. She, however, incenſed by the reception ſhe had met, reſolved to puniſh his coldneſs and refuſal; and at the return of Theſeus ſhe accuſed Hippolytus of attempts upon her virtue. He liſtened to her accuſation; and without hearing Hippolytus's defence, he baniſhed him from his kingdom, and implored Neptune, who had promiſed to grant three of his requeſts, to puniſh him in an exemplary manner. As Hippolytus fled from Athens, his horſes were ſuddenly terrified by a ſea monſter, which Neptune had ſent on the ſhore; and he was thus dragged through precipices and over rocks, trampled under the feet of his horſes, and cruſhed under the wheels of his chariot. When his tragical end was known at Athens, Phædra confeſſed her crime, and hung herſelf

ſelf in deſpair, unable to ſurvive one whoſe death her extreme guilt had occaſioned. The death of Hippolytus, and the infamous paſſion of Phædra, is the ſubject of one of the tragedies of Euripides and of Seneca. She was buried at Trœzene, where her tomb was ſtill to be ſeen in the age of the geographer Pauſanias, near the temple of Venus, which ſhe had built to render the goddeſs favourable to her inceſtuous paſſion. Near her tomb was a myrtle, whoſe leaves were full of ſmall holes, which, it was reported, Phædra had done with a hair pin, when the vehemence of her paſſion had rendered her melancholy and almoſt deſperate. She was repreſented in a painting in Apollo's temple at Delphi, as ſuſpended in the air, while her ſiſter Ariadne ſtood near to her, and fixed her eyes upon her.

PHÆDRUS, an ancient Latin writer, who compoſed five books of fables, in Iambic verſe. He was a Thracian; and was born, as there is reaſon to conclude, ſome years before Julius Cæſar made himſelf maſter of the Roman empire. How he came into the ſervice of Auguſtus is not known: but his being called *Auguſtus's freedman* in the title of the book, ſhows that he had been that emperor's ſlave. The fables of Phædrus are valued for their wit and good ſenſe, expreſſed in very pure and elegant language: and it is remarkable that they remained buried in libraries altogether unknown to the public, until they were diſcovered and publiſhed by Peter Pithou, or Pithœus, a learned French gentleman, toward the cloſe of the 16th century.

PHÆDRUS (Thomas) was a profeſſor of eloquence at Rome, early in the 16th century. He was canon of Lateran, and keeper of the library in the Vatican. He owed his riſe to the acting of Seneca's Hippolytus. in which he performed the part of Phædra; from whence he ever after got the name of Phædrus. Eraſmus, who tells this, ſays he had it from Cardinal Raphael Georgianus, in whoſe court-yard, before the palace, that tragedy was acted. The cauſe of his death was very remarkable; for as he was riding through the city on a mule, he met a cart drawn by wild oxen, and was thrown by his mule, who took fright at them. Though corpulent, the cart fortunately paſſed over him without doing him any hurt, as he fell in the ſpace between the wheels; but fright and the fall together ſpoiled the whole maſs of his blood ſo much, that he contracted a diſtemper, of which, after languiſhing ſome time, he died under the age of 50. If he had lived, he would moſt probably have become an author; and perhaps, adds Bayle, have confirmed what has been obſerved of him, that his tongue was better than his pen. The obſervation was made by Eraſmus, who tells us, that he knew and loved him; and owns that he was called the Cicero of his time. Janus Parrhaſius, his colleague, was much grieved at his death, and gave the titles of ſeveral works, which were almoſt ready for public view.

PHÆNOMENON, in philoſophy, denotes any remarkable appearance, whether in the heavens or earth, and whether diſcovered by obſervation or experiment.

PHAETON, in fabulous hiſtory, was the ſon of the Sun, or Phœbus and Clymene, one of the Oceanides. He was ſon of Cephalus and Aurora, according to Heſiod and Pauſanius; or of Tithonus and Aurora, according to Apollodorus. He is, however, more generally acknowledged to be the ſon of Phœbus and Clymene. He was naturally of a lively diſpoſition, and a handſome figure. Venus became enamoured of him, and entruſted him with the care of one of her temples. This diſtinguiſhing favour of the goddeſs rendered him vain and aſpiring; and when Epaphus, the ſon of Io, had told him, to check his pride, that he was not the ſon of Phœbus, Phaeton reſolved to know his true origin, and at the inſtigation of his mother he viſited the palace of the ſun. He begged Phœbus, that if he really were his father he would give him inconteſtable proofs of his paternal tenderneſs, and convince the world of his legitimacy. Phœbus received him with great tenderneſs, and ſwore by Styx to grant whatever he requeſted as a proof of his acknowledging him for his ſon. The youth boldly aſked the direction of the chariot of the ſun for one day. His father, grieved and ſurpriſed at this demand, uſed all his arguments to diſſuade him from the raſh attempt; but all was in vain: and being by his oath reduced to ſubmit to his obſtinacy, entruſted him with the reins, after he had directed him how to uſe them. The young adventurer was however ſoon ſenſible of his madneſs. He was unable to guide the fiery ſteeds; and looſing the reins, Jupiter, to prevent his conſuming the heavens and earth, ſtruck him with a thunderbolt, and hurled him from his ſeat into the river Eridanus or Po. His ſiſters Phaethuſa, Lambetia, and Phœbe, lamenting his loſs upon its banks, were changed by the gods into black poplar trees; and Cycnus king of Liguria, alſo grieving at his fate, was transformed into a ſwan.

The poets ſay, that while Phaeton was driving the chariot of his father, the blood of the Ethiopians was dried up: and their ſkin became black; a colour which is ſtill preſerved among the greateſt part of the inhabitants of the torrid zone. The territories of Libya were alſo, they tell us, parched up, on account of their too great vicinity to the ſun; and ever ſince, Africa, unable to recover her original verdure and fruitfulneſs, has exhibited a ſandy country and uncultivated waſte, According to thoſe who explain this poetical fable, Phæton was a Ligurian prince, who ſtudied aſtronomy, and in whoſe age the neighbourhood of the Po was viſited with uncommon heats.

PHAETON, in ornithology, a genus of birds belonging to the order of anſeres; the characters of which are: The bill is ſharp, ſtraight, and pointed; the noſtrils are oblong, and the hinder toe is turned forward. There are two ſpecies, *viz.*

1. The demerſus, or red footed pinguin, has a thick, arched, red bill; the head, hind-part of the neck, and the back of a duſky purpliſh hue, and breaſt and belly white; brown wings, with the tips of the feathers white; inſtead of a tail, a few black briſtles; and red legs. It is found on Pinguin iſle, near the Cape of Good Hope, is common all over the South Seas, and is about the ſize of a gooſe.

2. The ethereus, or tropic bird, is about the ſize of a partridge, and has very long wings. The bill is red, with an angle under the lower mandible. The eyes are encompaſſed with black, which ends in a point to-

wards the back of the head. Three or four of the larger quill-feathers, towards their ends are black, tipped with white; all the reſt of the bird is white, except the back, which is variegated with curved lines of black. The legs and feet are of a vermilion red. The toes are webbed. The tail conſiſts of two long ſtraight narrow feathers, almoſt of equal breadth from their quills to their points. See Plate CCCLXXXIX.

"The name *tropic bird* (ſays Latham), given to this genus ariſes from its being chiefly found within the tropic circles; but we are not to conclude, that they never ſtray voluntarily, or are driven beyond them; for we have met with a few inſtances to prove the contrary (A). It is, however ſo generally found within the tropical limits, that the ſight of this bird alone is ſufficient to inform the mariner of a very near approach to if not his entrance therein. It has alſo been thought to portend the contiguity of land (B); but this has often proved fallacious, as it is not unfrequently found at very great diſtances therefrom. The flight of this bird is often to a prodigious height; but at other times it is ſeen, along with the frigate pelican, booby, and other birds attending the flying fiſhes at their riſe from the water, driven from the native element into the air by their watery enemies, the ſhark (C), porpoiſe albicore bonito, and dolphin, which purſue them beneath and prey upon them. Theſe birds are ſometimes obſerved to reſt on the ſurface of the water, and have been now and then ſeen in calm weather upon the backs of the drowſy tortoiſes, ſupinely floating in the ſea, ſo that they have been eaſily taken by the long boat manned. On ſhore they will perch on trees; and are ſaid to breed in the woods, on the ground beneath them. They have been met with in plenty on the iſlands of St Helena, Aſcenſion, Mauritius, New Holland, and various places in the South Seas; but in no place ſo numerous as at Palmerſton Iſland, where theſe birds, as well as the frigates, were in ſuch plenty that the trees were abſolutely loaded with them, and ſo tame that they ſuffered themſelves to be taken of the boughs with the hand. At Otaheite, and in the Friendly iſles, the natives give them the names of *haingoo* and *toolaiee*.

"As the tropic bird ſheds the long tail feathers every year, the inhabitants of ſuch iſles as they frequent, collect and make uſe of them by way of ornament in various manners; they are worn in the caps of the Sandwich iſlanders, being in great plenty at Tahoora, as alſo in various parts of their dreſs; but in none more conſpicuous than in the mourning garment of Otaheite, in which iſland numbers are picked up in the mountainous parts, where it alſo breeds. The fleſh cannot be called good, but was found ſufficiently acceptable to thoſe who had long been confined to ſalt proviſions, and in which circumſtance the ſailors did not deſpiſe it."

There is a variety of this bird called by Latham the *white tropic bird*. It is leſs than the one we have already deſcribed, and is found in as many places as it. The plumage of this bird is in general of a ſilvery white. The yellow tropic bird is a further variety of the ſame ſpecies, the plumage being of a yellowiſh white. Theſe differences, Mr Latham thinks, ariſe merely from age, if they are not the diſtinguiſhing mark of ſex.

3. The black-billed tropic bird is ſmaller than any of the former. The bill is black; the plumage on the upper part of the body and wings is ſtriated, partly black and partly white; before the eye there is a large creſcent of black, behind it is a ſtreak of the ſame; the forehead and all the under parts of the body are of a pure white colour; the quills and tail are marked as the upper parts, but the ends of the firſt are white, and moſt of the feathers of the laſt are marked with duſky black at the tips; the ſides over the thighs are ſtriated with black and white; the legs are black. One of theſe was found at Turtle and Palmerſton iſlands, in the South Seas, and is in the poſſeſſion of Sir Joſeph Banks.

4. The red-tailed tropic bird is in length about two feet ten inches, of which the two tail-feathers alone meaſure one foot nine inches. The bill is red; the plumage white, tinged of an elegant pale roſe-colour; the creſcent over the eyes is ſomewhat abrupt in the middle; the ends of the ſcapulars are marked with black. This bird is diſtinguiſhed from others by two middle long tail feathers, which are of a beautiful deep red colour, except the ſhafts and baſe, which are black; the ſides over the thighs are duſky; and the legs are black.

"This ſpecies (ſays Latham) is met with frequently as large as the others, but does not ſeem to be ſo far ſpread. Our navigators met with them in various places, though they were ſeldom ſeen by them on ſhore except in the breeding ſeaſon, which is in September and October. They are found in great numbers in the iſland of Mauritius, where they make the neſt in hollows in the ground under the trees; the eggs are two in number, of a yellowiſh white marked with rufous ſpots

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(A) "Dr Forſter obſerves that they are never ſeen beyond 28 degrees of latitude; but others talk of their ſpreading far beyond it. In lat. 32. 45. *Ell. Narr.* ii. p. 64.—33. 10. N. *Cook's laſt Voy.* iii. p 178.—38. 34. S. *Park. Voy.* p. 132 —38. 29. S. *Hawkeſ. Voy.* iii. p 77. This is mentioned as not being common; but Kalm ſays he met with theſe in 40 degrees north. See *Trav.* i. p. 22.—And a friend of mine aſſured me, that he ſaw one in latitude 47½ north; but at the ſame time obſerved, that it was the firſt inſtance he had ever known of ſuch a circumſtance.

(B) "*Ulloa's Voy.* ii. p. 301. He obſerves, that they ſeldom are met with above eight or ten leagues from land.

(C) "*Squalus conductor, delphinus phocæna, ſcomber thynnus, ſcomber pelamis, delphinus coryphæna.* See *Phil. Tranſ.* vol. lxviii. p. 800. It is there obſerved, that the flying fiſh is able to fly 60 or more yards at one ſtretch, and repeat it a ſecond or even a third time, only the ſlighteſt momentary touch of the ſurface that can be conceived intervening; and it is common in theſe flights for them to fly againſt ſhips, or fall on the deck.

ſpots. The ſame author gives an account of the introduction of paradiſe grackles into the iſland of Bourbon, from whence they ſpread into that of Mauritius; at firſt intended for the very uſeful purpoſe of deſtroying the locuſts and graſhoppers, which ſwarmed there to a great degree; the reſult of their prodigious increaſe, and the unlooked for conſequences of it, he has likewiſe mentioned. Theſe birds, we are told, are great enemies to the tropic birds, ocular demonſtration of which was had by M. de Querhoent; for, being ſeated beneath a tree in which were perched a number of the grackles, he obſerved a tropic bird come to its hole, in order to go to the neſt; but the grackles attacked the bird all at once, and obliged it to fly off; it then returned with its conſort in company, but without effect, as they were both driven away, as the ſingle one had been before; when the grackles returned to their tree, and the ſpectator left them in that ſituation.

"This ſpecies of tropic bird has been met with in ſeveral places of the South Seas; very common at Palmerſton and Turtle iſlands; at Hervey's iſland in the greateſt plenty, and of which conſiderable numbers were killed for proviſions: and here alſo they make the neſts in the ſame manner as at Mauritius. The name it is known by at Otaheite and the Friendly iſles is *towagge* and *totto*." See Diomeda and Pinguin.

PHAGEDÆNA, in medicine, denotes a corroding ulcer.

PHAGEDENIC medicines, thoſe uſed to eat off proud or fungous fleſh; ſuch as are all the cauſtics.

Phagedenic Water, in chemiſtry, denotes a water made from quicklime and ſublimate; and is very efficacious in the cure of phagedenic ulcers. To prepare this water, put two pounds of freſh quicklime in a large earthen pan, and pour upon it about ten pounds of rain-water; let them ſtand together for two days, ſtirring them frequently: at laſt leave the lime to ſettle well, then pour off the water by inclination, filtrate it, and put it up in a glaſs bottle, adding to it an ounce of corroſive ſublimate in powder; which from white becomes yellow, and ſinks to the bottom of the veſſel. The water being ſettled, is fit for uſe in the cleanſing of wounds and ulcers, and to eat off ſuperfluous fleſh, and eſpecially in gangrenes; in which caſe may be added to it a third or fourth part of ſpirit of wine.

PHALÆNA, the Moth, in zoology, a genus of inſects belonging to the order of lepidoptera. The feelers are cetaceous, and taper gradually towards the points; the wings are often bent backwards.

Barbut divides this genus into eight families, and we are told that there are no leſs than 460 ſpecies. The names of the ſeveral families are given by Barbut as follows: 1. The attaci, whoſe wings incline downwards and are ſpread open: they have pectinated antennæ without a tongue, or pectinated antennæ with a ſpiral tongue, or cetaceous antennæ with a ſpiral tongue. 2. The bombyces, whoſe wings cover the body in a poſition nearly horizontal, and which have pectinated antennæ. They are either elingues, which want the tongue, or have it ſo ſhort as not to be manifeſtly ſpiral; their wings are either reverſed or deflected: or ſpirelingues, which have a ſpiral tongue; and are either leaves with ſmooth backs, or criſtate dorſo with a kind of creſt or tuft of hair on the back. 3. The noctuæ, whoſe wings are incumbent as in the bombyces, from which they differ chiefly in the formation of the antennæ, which are cetaceous. The noctuæ are either elingues, wanting tongues, or ſpirilingues having ſpiral tongues. 4. The geometræ, whoſe wings when at reſt are extended horizontally: the antennæ in one ſubdiviſion of this ſection are pectinated, in another cetaceous; the under wing in each of theſe diviſions are either angulated, or round with entire edges 5. The tortrices. The wings are exceedingly obtuſe, their exterior margin is curve, and declines towards the ſides of the body. They have ſhort palpi. 6. The pyralides. The inner margins of the wings in this ſection are laid one over the other: the wings themſelves decline a little towards the ſides of the body, and in ſhape reſemble a delta; they have conſiderable palpi of different forms. 7. The tineæ. The wings are wrapped up or folded round the body, ſo as to give the inſect a cylindrical form; the forehead is ſtretched out or advanced forwards. 8. The alucitæ. The wings of this diviſion are ſplit, or divided into branches almoſt to their baſe.

The caterpillars of this genus vary much as to ſize, and conſiderably as to their ſhape and number of feet. It is remarkable, that caterpillars of almoſt every ſpecies of this genus are found with 10, 12, 14, and 16 feet. The laſt are the moſt common and the largeſt; thoſe of 10 and 12 feet are called *geometræ*. "Amongſt the geometræ caterpillars (ſays Barbut) there are ſome very ſingular, whether for their colour, or the tubercula which they bear, or laſtly for the difference of their attitudes. Many reſemble ſmall branches or bits of dry wood; and that reſemblance may be a means of ſaving many of thoſe inſects from the voraciouſneſs of birds, who do not ſo eaſily diſcern them. Other caterpillars are very hairy, while ſeveral are quite ſmooth; the latter have a cleanlier look, whereas the hairy ones have ſomething hideous, and may even be hurtful when touched.

"All the caterpillars of phalænæ, after having ſeveral times caſt their ſlough, ſpin their cod, in which they are transformed to chryſalids. But the texture of the cod, the fineneſs of the thread of which it is compoſed, and the different matters joined to the threads, are infinitely various.

"The chryſalids of phalænæ are generally oblong ovals, not angulous as thoſe of butterflies, nor ſo ſoon transformed to perfect inſects. They remain a much longer time within the cod, the greateſt part not coming forth till the enſuing year. Some I have met with that remained in that ſtate during two or three years ſucceſſively. Heat or cold contribute greatly to forward or put back their final metamorphoſis; a fact which may be aſcertained by procuring them a certain degree of moderate heat, by which means one may ſee phalænæ brought forth upon one's mantle-piece in the depth of winter.

"The Phalænæ or perfect inſects ſprung from thoſe cods, are generally more clumſy and heavy than butterflies; their colours are likewiſe more brown, dim, and obſcure, though there are ſome phalænæ whoſe colours are very lively and brilliant. Several of them fly only in the evening, keeping quiet and cloſe underleaves in the day-time; and this has induced ſome authors to give them the name of *night butterflies*. In ſummer evenings they find their way into rooms, attracted by the lights round which they are ſeen to hover. And indeed a ſure method of catching a great number of phalænæ is to hunt them by night in a bower with a lantern. They all reſort to the light of the lantern, about which great numbers of them may be caught.

“ A remarkable circumſtance has been obſerved of theſe phalænæ, which is, that the females of ſome of them are without wings. By their looks they never would be taken for phalænæ. They have the appearance of a large ſhort, ſix-legged, creeping animal, while their male is winged and active. Yet this heavy creature is a real phalæna, eaſily diſtinguiſhed by its antennæ. It even has wings, but ſo ſhort that they are no more than ſmall protuberances placed at the extremity of the thorax, and that appear quite uſeleſs. Thoſe phalænæ whoſe females are deſtitute of wings are generally in the number of thoſe whoſe antennæ are pectinated. The unwinged females have antennæ ſimilar to thoſe of the males, but with ſhorter beards only. Their body is alſo charged with ſcales, the characteriſtic of inſects of this order.”

To deſcribe every ſpecies of this extenſive genus would be impoſſible; we ſhall therefore only take notice of a very few, of which we have given engravings.

The phalæna attacus pavonia minor. See N° 1. Plate CCCLXXXIX. The wings of this inſect, ſays Barbut, are brown undulated, and variegated, having ſome grey in the middle, and a margin one line broad; in its colour yellowiſh grey. The under part has more of the grey caſt, but the extremities of the wings before the margin have a broad band of brown. The four wings, as well above as beneath, have each a large eye, which eyes are black encompaſſed with a dun-coloured circle, and above that with a ſemicircle of white, then another of red, and laſtly the eye is terminated by a whole circle of black. Acroſs the middle of the eye is drawn tranſverſely a ſmall whitiſh line. The caterpillar is green, has 16 feet with roſe-colour tubercula, charged with long hairs terminated by a ſmall knob; beſides which, it has dun-colour or reddiſh rings. It is found upon fruit-trees.

Phalæna alucita pentadactyla, N° 2. The eyes of this ſpecies are black; the body is of a pale yellow. The wings are ſnow white, and the inſect keeps them ſtretched aſunder when at reſt. The ſuperior are divided in two, or rather appear compoſed of two ſtumps of bird's feathers united at the baſe. The inferior ones are likewiſe divided into three threads or briſtles, which are furniſhed on both ſides with fine fringes. The caterpillar is of a green colour, dotted with black, and charged with a few hairs. It feeds upon graſs, changes to a chryſalis in or about September, and appears a mouth in Auguſt, frequenting woods.

Phalæna noctua elinguis humuli, N° 3. In this ſpecies the wings of the male are of a ſnowy white; of the female yellowiſh, with ſtreaks of a deeper hue; the ſhoulders, abdomen, &c. in both ſexes, are deep yellow. The antennæ are pectinated and ſhorter than the thorax. The caterpillar feeds upon the roots of burdock, hops, &c. changes into a chryſalis in May, appears in the winged ſtate in June, frequenting low marſhy grounds where hops grow.

Phalæna noctua pronuba ſpirilinguis, N° 4. The thorax, head, antennæ, feet, and upper wings, are of a brown colour, more or leſs dark, ſometimes ſo deep as to be nearly black, but often a bluiſh caſt. The upper wings are moreover ſomewhat clouded, and have two black ſpots, one on the middle, the other towards the outward angle of the lower part of the wing. The under ones are of a beautiful orange colour, with a broad black band near the lower edge of the wing, of which it follows the direction. The caterpillar is ſmooth; to be found on ſeveral plants, but particularly upon the thlaſpi and ſome other cruciferous plants. It keeps in concealment during the day, and only feeds by night. Its metamorphoſis is performed underground, and ſome varieties of colour are obſervable amongſt theſe caterpillars: ſome being green, others brown; which latter yield males, the former females.

Phalæna tortrix praſinana. The ſuperior wings of this ſpecies are of a fine green colour, having two diagonal yellow bars on each, the body and inferior wings are whitiſh, ſhaded with yellowiſh green. The caterpillar is a pale yellowiſh green, ornamented with ſmall brown ſpecks or ſpots, the tail being forked and tipt with orange red colour; feeds on the oak, changes to a chryſalis in September, and aſſumes the fly-ſtate about May, frequenting woods.

PHALANGIUM, in zoology, a genus of inſects belonging to the order of aptera. They have eight feet, two eyes on the top of the head placed very near each other, and other two on the ſides of the head: the feelers reſemble legs, and the belly is round. There are nine ſpecies.

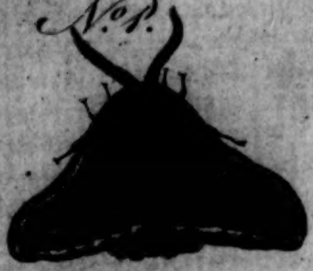
Mr Barbut only deſcribes one ſpecies, *viz.* the phalangium opilis of Linnæus. His deſcription is as follows: “ Its body is roundiſh, of a duſky brown on the back, with a duſkier ſpot of a rhomboidal figure near the middle of it. The belly is whitiſh; the legs are extremely long and ſlender. On the back part of the head there ſtands a little eminence, which has on it a kind of double creſt, formed as it were of a number of minute ſpines; the eyes are ſmall and black, and are two in number. It is commonly called the *ſhepherd ſpider*.

“ This ſpecies of ſpider multiplies ſingularly. They are great ſpinners. In autumn the ſtubble is quite covered with the threads of theſe ſpiders, by means of which they travel with eaſe, nnd enſnare their prey. However, thoſe threads are thought rather to be the produce of a ſpecies of tick called *autumnal weaver*. A ſmall degree of attention diſcovers an amazing multitude of thoſe ticks almoſt imperceptible, and that is their work. The threads, when united appear of a beautiful white, wave about in the air, and are known in the country by the name of *virgin's threads*. Some naturaliſts think that thoſe threads, floating in the air, ſerve the inſect as ſails to waft it through the air, and as a net to entrap inſects on the wing; for remnants of prey, ſay they, are diſcoverable in them. As to thoſe parcels in which nothing is ſeen, they are only eſſays rejected by thoſe travelling inſects. The analogy between the phalangium and the crab, and the facility with

Plate CCCLXXXIX.

Phalenæ

No. 1.



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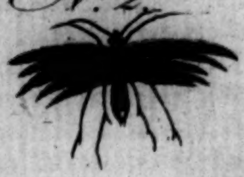

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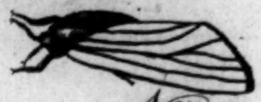

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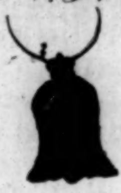

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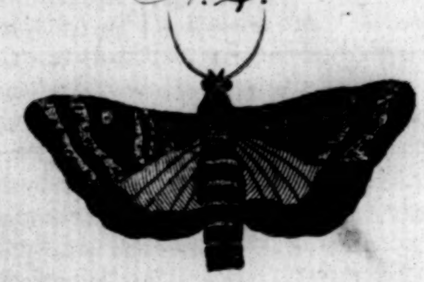
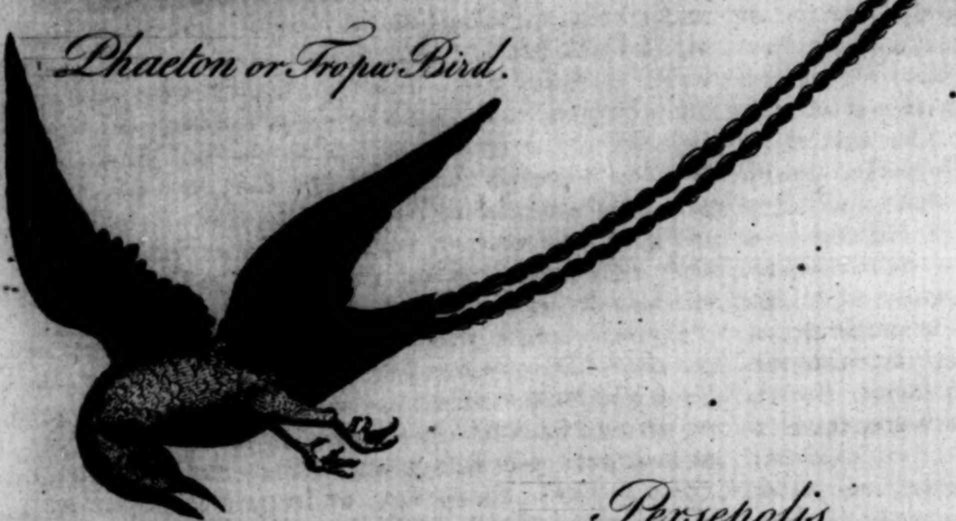
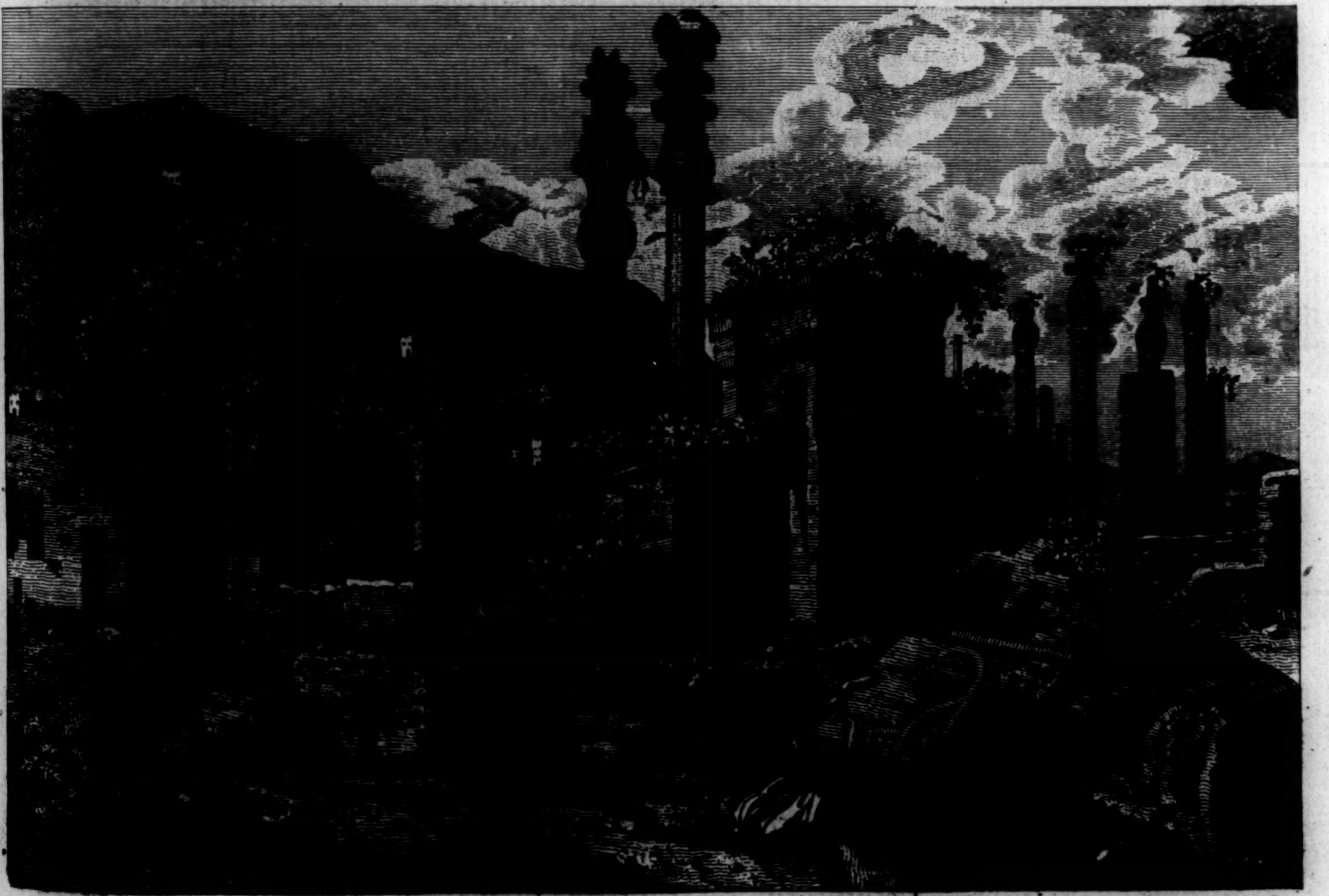


Phaeton or Tropic Bird.



Persepolis.



Smither sculpt.

BRITISH MUSEUM

with which it parts with its legs to ſave the reſt of the body, has raiſed a preſumption that its legs might grow again, as do thoſe of crabs and lobſters. Country people have an opportunity to endeavour at aſcertaining the truth of theſe obſervations."

PHALANGOSIS, in ſurgery, is a tumor and relaxation of the eye lids, often ſo great as to deform the eye, and conſiderably to impede viſion. Sometimes the eye-lid when in this ſtate ſubſides or ſinks down, occaſioned perhaps either by a palſy of the muſcle which ſuſtains and elevates the eye-lid, or elſe from a relaxation of the cutis above, from various cauſes. Sometimes an œdematous or aqueous tumour is formed on the eye-lids, ſo as almoſt entirely to exclude viſion; but this laſt caſe ſhould be diſtinguiſhed from the other, and may be eaſily remedied by the uſe of internal and topical medicines, ſuch as purges and diuretics given inwardly, and a compreſs dipped in warm ſpirit of wine and lime-water. But in the paralytic or relaxed caſe, the uſe of cordial and nervous medicines muſt be propoſed internally; and outwardly, balſam of Peru and Hungary water are to be employed. If all theſe fail, the remaining method of cure is to extirpate a ſufficient quantity of the relaxed cutis; and then, after healing up the wound, the remainder will be ſufficiently ſhortened.

PHALANX, in Grecian antiquity, a ſquare battalion of ſoldiers, with their ſhields joined and pikes croſſing each other; ſo that it was next to impoſſible to break it.

The Macedonian phalanx is ſuppoſed by ſome to have had the advantage, in valour and ſtrength, over the Roman legion. Its number was 8000 men. But the word *phalanx* is uſed for a party of 28, and ſeveral other numbers; and even ſometimes for the whole body of foot. See **Legion**.

Phalanx is applied, by anatomiſts, to the three rows of ſmall bones which form the fingers. In natural hiſtory it is a term which Dr Woodward and ſome other writers of foſſils have uſed to expreſs an arrangement of the columns of that ſort of foſſil corolloide body found frequently in Wales, and called *lithoſtrotion*. In the great variety of ſpecimens we find of this, ſome have the whole phalanx of columns cracked through, and others only a few of the external ones; but theſe cracks never remain empty, but are found filled up with a white ſpar, as the ſmaller cracks of ſtone uſually are. This is not wonderful, as there is much ſpar in the compoſition of this foſſil; and it is eaſily waſhed out of the general maſs to fill up theſe cracks, and is then always found pure, and therefore of its natural colour, white.

Woodward's Coll. of Foſſ. p. 11.

The lithoſtrotion, or general congeries of theſe phalanges of columns, is commonly found immerſed in a grey ſtone, and found on the tops of the rocky cliffs about Milford in Wales. It is uſually erect, though ſomewhat inclining in ſome ſpecimens, but never lies horizontal. It ſeems to have been all white at firſt, but to have been ſince gradually tinctured with the matter of the ſtone in which it lies. The ſingle columns, which form each phalanx, are uſually round or cylindric, though ſometimes flatted and bent; ſome of them are alſo naturally of an angular figure; theſe, however, are not regular in the number of their angles, ſome conſiſting of three ſides, ſome of five, and ſome of ſeven; ſome are hexangular alſo, but theſe are ſcarce. They are from five or ſix to ſixteen inches in length; and the largeſt are near half an inch over, the leaſt about a quarter of an inch; the greater number are very equal to one another in ſize; but the ſides of the columns being unequal, the ſame column meaſures of a different thickneſs when meaſured different ways; the phalanges or congeries of theſe are ſometimes of a foot or more in diameter.

The columns are often burſt, as if they had been affected by external injuries; and it is evident that they were not formed before ſeveral other of the extraneous foſſils; for there are found ſometimes ſhells of ſea-fiſhes and entrochi immerſed and bedded in the bodies of the columns. It appears plainly from hence, that when theſe bodies were waſhed out of the ſea, and toſſed about in the waters which then covered the tops of theſe cliffs, this elegant foſſil, together with the ſtony bed in which it is contained, were ſo ſoft, that thoſe other bodies found entrance into their very ſubſtance, and they were formed as it were upon them. This foſſil takes an elegant poliſh, and makes in that ſtate a very beautiful appearance, being of the hardneſs of the common white marble, and carrying the elegant ſtructure viſible in the ſmalleſt lineaments.

PHALARIS, a remarkable tyrant, born at Crete, where his ambitious deſigns occaſioned his baniſhment: he took refuge in Agrigentum, a free city of Sicily, and there obtained the ſupreme power by ſtratagem. The circumſtance which has chiefly contributed to preſerve his name in hiſtory is his cruelty; in one act of which he gave, however, an example of ſtrict juſtice. It is thus related: Perillus, a braſs-founder at Athens, knowing the cruel diſpoſition of Phalaris, contrived a new ſpecies of puniſhment for him to inflict on his ſubjects. He caſt a brazen bull, bigger than the life, with an opening in the ſide to admit the victims; who being ſhut up in the body, a fire was kindled under it to roaſt them to death; and the throat was ſo contrived, that their dying groans reſembled the roaring of a bull. The artiſt brought it to the tyrant, expecting a great reward. Phalaris admired the invention and workmanſhip, but ordered the inventor to be put into it to make the firſt trial. In alluſion to which, Ovid ſays,

———Neque enim lex æquior ulla,
Quam necis artifices arte perire ſua.

The end of this deteſtable tyrant is differently related; but it is very generally believed, with Cicero, that he fell by the hands of the Agrigentines; and, as ſome ſuppoſe, at the inſtigation of Pythagoras. Ovid tells us, that his tongue was cut out; and that he was then put into the bull to periſh by the ſame ſlow fire by which means he had murdered ſo many before. Others ſay that he was ſtoned to death; and all agree that his end was violent. He reigned, Euſebius ſays, 28 years; others ſay 16. After all, there is great uncertainty both as to his life, death, and hiſtory. Many of the circumſtances related of him, as they are collected by Mr Boyle, depend upon the authenticity of thoſe epiſtles which go under the name of the tyrant; and which have been juſtly queſtioned, and with great probability rejected, as the ſpurious production of ſome modern ſophiſt. See **Bentley**, p. 177. col. 2.

PHALARIS, or *Canary graſs*, in botany; a genus of the trigynia order, belonging to the triandria claſs of plants. The calyx is bivalved, carinated, and equal in length, containing the corolla. There are ten ſpecies, of which the moſt remarkable are the canarienſis, or manured Canary-graſs: and the arundinacea, or reed Canary graſs. Theſe are both natives of Britain. The firſt grows by the road-ſides; and is frequently cultivated for the ſake of the ſeeds, which are found to be the beſt food for the Canary and other ſmall birds. The ſecond grows on the banks of rivers. It is uſed for thatching ricks or cottages, and endures much longer than ſtraw. In Scandinavia they mow it twice a-year, and their cattle eat it. There is a variety of this cultivated in our gardens with beautifully ſtriped leaves. The ſtripes are generally green and white; but ſometimes they have a purpliſh caſt. This is commonly called *painted lady-graſs*, or *ladies treſſes*.

PHALERÆ, among the ancient Romans, were military rewards beſtowed for ſome ſignal act of bravery. Authors do not agree whether the Phaleræ were a ſuit of rich trappings for a horſe, or golden chains ſomething like the torques, but ſo formed as to hang down to the breaſt and diſplay a greater profuſion of ornament. The laſt opinion appears to have the greater prevalence, but perhaps both are true.

PHALEREUS (Nepos), a village and port of Athens; this laſt neither large nor commodious, for which reaſon Themiſtocles put the Athenians on building the Piræeus; both joined to Athens by long walls. The Phalereus lay nearer the city (Pauſanias). Demetrius Phalereus, the celebrated ſcholar of Theophraſtus, was of this place; to whom the Athenians erected above 300 ſtatues; which were afterwards deſtroyed by his enemies, on his flight to Ptolemy king of Egypt (Strabo). Here Demoſthenes was wont to declaim, to accuſtom his voice to ſurmount the noiſe and roaring of the ſea; a juſt and lively emblem of popular aſſemblies.

PHALEUCIAN VERSE, in ancient poetry, a kind of verſe conſiſting of five feet; the firſt of which is a ſpondee, the ſecond a dactyl, and the three laſt trochees.

PHALLUS, the MOREL, in botany; a genus of the order of fungi, belonging to the cryptogamia claſs of plants. The fungus is reticulated above and ſmooth below. There are two ſpecies.

1. The eſculentus, or eſculent morel, is a native of Britain, growing in woods, groves, meadows, paſtures, &c. The ſubſtance, when recent, is wax-like and friable; the colour a whitiſh yellow, turning browniſh in decay; the height of the whole fungus, about four or five inches. The ſtalk is thick and clumſy, ſomewhat tuberous at the baſe, and hollow in the middle. The pileus is either round or conical; at a medium about the ſize of an egg, often much larger; hollow within; its baſe united to the ſtalk; and its ſurface cellular, or latticed with irregular ſinuſes. The magnified ſeeds are oval. It is much eſteemed at table both recent and dried, being commonly uſed as an ingredient to heighten the flavour of ragouts. We are informed by Gleditſch, that morels are obſerved to grow in the woods of Germany in the greateſt plenty in thoſe places where charcoal has been made. Hence the good women who collect them to ſell, receiving a hint how to encourage their growth, have been accuſtomed to make fires in certain places of the woods, with heath, broom, vaccinium, and other materials, in order to obtain a more plentiful crop. This ſtrange method of cultivating morels being however ſometimes attended with dreadful conſequences, large woods having been ſet on fire and deſtroyed by it, the magiſtrate thought fit to interpoſe his authority, and the practice is now interdicted.

2. The impudicus, ſtinking morel, or ſtinkhorns, is alſo a native of Britain, and found in woods and on banks. It ariſes from the earth under a veil or volva, ſhaped exactly like a hen's egg, and of the ſame colour, having a long fibrous radicle at its baſe. This egg-like volva is compoſed of two coats or membranes, the ſpace between which is full of a thick, viſcid, tranſparent matter, which, when dry, glues the coats together, and ſhines like varniſh. In the next ſtage of growth, the volva ſuddenly burſts into ſeveral lacerated permanent ſegments, from the centre of which ariſes an erect, white, cellular, hollow ſtalk, about five or ſix inches high and one thick, of a wax-like friable ſubſtance, and moſt fetid cadaverous ſmell, conical at each end, the baſe inſerted in a white, concave, membranaceous turbinated cup, and the ſummit capped with a hollow, conical pileus, an inch long, having a reticulated cellular ſurface, its baſe detached from the ſtalk, and its ſummit umbilicated, the umbilicus ſometimes perforated and ſometimes cloſed. The under ſide of this pileus is covered with a clear, viſcid, gelatinous matter, ſimilar to that found between the membranes of the volva; and under this viſcid matter, concealed in reticulated receptacles, are found the ſeeds, which when magnified appear ſpherical. As ſoon as the volva burſts, the plant begins to diffuſe its intolerable odours, which are ſo powerful and widely expanded, that the fungus may be readily diſcovered by the ſcent only, before it appears to the ſight. At this time, the viſcid matter between the coats of the volva grows turbid and fuſcous; and when the plant attains its full maturity, the clear viſcid ſubſtance in the pileus becomes gradually diſcoloured, putrid, and extremely fetid, and ſoon afterwards turns blackiſh, and, together with the ſeeds and internal part of the pileus itſelf, melts away. The fetid ſmell then begins to remit, the fungus fades, and continues for a ſhort time ſapleſs and coriaceous, and at laſt becomes the food of worms. The cadaverous ſcent of this fungus greatly allures the flies; which, lighting upon the pileus, are entrapped in the viſcid matter and periſh. We are informed by Gleditſch, that the vulgar people in Thuringia call the unopened volvæ by the ridiculous name of *ghoſts* and *dæmon's eggs*; and that they collect and dry them either in the ſmoke or open air, and when reduced to powder, uſe them in a glaſs of ſpirits as an aphrodiſiac.

PHALLUS, among the Egyptians, was the emblem of fecundity. It was very fervently worſhipped by women, eſpecially by thoſe who were barren. This cuſtom was introduced among the Greeks, and feſtivals in honour of it were called *phaluca*. See MYSTERIES, n° 38, &c. Among the Hindoos a ſimilar emblem called *lingam* is uſed, and for ſimilar purpoſes. See HINDOOS, n° 4.

PHALTI, or PHALTIEL, ſon of Laiſh. He married Michal, after Saul had taken her from David; but David afterwards took her away from Phalti (1 Sam. xxv. 44. 2. Sam. iii. 15.) Some interpreters are of opinion Phalti did not meddle with Michal all the time ſhe continued in his houſe, for fear that both of them ſhould incur the penalty of death, to be inflicted on adulterers (Levit. xx. 10.), becauſe Michal had not been legally divorced; but theſe reaſons are frivolous. Saul looked upon David as a rebel to his king, and an outlaw, whoſe goods and wives belonged to him, and which he could abſolutely diſpoſe of. He would not have given Michal to Phalti, nor would he have received her, if he had not thought he might uſe her as his wife. If Michal had no children by Phalti, by whom then were thoſe children that the ſcripture ſays ſhe had, ſince it is known ſhe had none by David? See 2 Sam. xxi. 8. and vi. 23.

PHANATIC, or FANATIC, a viſionary; one who fancies he ſees ſpectres, ſpirits, apparations, or other imaginary objects, even when awake; and takes them to be real. See PHANTASY and FANATIC.

Such are phrenetics, necromancers, hypochondriac perſons, lycanthropi, &c. See PHRENETIC, HYPOCHONDRIAC, LYCANTHROPI.

Hence the word is alſo applied to enthuſiaſts, pretenders to revelation, new lights, prophecies, &c. See ENTHUSIAST, and SECOND *Sight*.

PHANTASIA, was the daughter of Nicharchus of Memphis in Egypt. It has been ſuppoſed that ſhe wrote a poem on the Trojan war, and another on the return of Ulyſſes to Ithaca, from which compoſitions Homer copied the greateſt part of his Iliad and Odyſſey, when he viſited Memphis, where they were depoſited.

PHANTASM, a term ſometimes uſed in a ſynonymous ſenſe with idea, or notion retained in the mind, of an external object.

PHANTASY, or FANCY, the *Imagination;* the ſecond of the powers or faculties of ſoul, by which the ſpecies of objects received by the external organs of ſenſe are retained, recalled, further examined, and either compounded or divided. See IMAGINATION; and METAPHYSICS, Part I. Chap. ii.

Others define the phantaſy to be that internal ſenſe or power, whereby the ideas of abſent things are formed, and repreſented to the mind as if they were preſent. In melancholics and madmen this faculty is very ſtrong, repreſenting many extravagant and monſtrous things, and framing its images as lively as thoſe of ſenſation; whence the viſions and deceptions thoſe perſons are liable to.

PHANUEL, of the tribe of Aſher, the father of a holy widow and propheteſs called Anna, who was in the temple when our Saviour was preſented there by his parents (Luke ii. 36, 37, 38.)

PHAON, a young man of Mytilene, in the iſland of Leſbos, received from Venus, as fable reports, an alabaſter vaſe filled with an eſſence which had the virtue of conferring beauty. He had no ſooner anointed his body with it, than he became the moſt beautiful of men. The ladies of Mytilene fell deſperately in love with him; and the celebrated Sappho threw herſelf down a precipice becauſe he would not encourage her paſſion. He is ſaid to have been killed by a huſband who ſurpriſed him with his wife. We have in Ovid a letter from Sappho to Phaon, which Mr Pope has tranſlated into Engliſh verſe.

PHARA (anc. geog.), a village between Egypt and Arabia Petræa; or, according to Ptolemy, at a promontory ſituated between the Sinus Heroopolites and Elaniticus of the Red Sea; where Iſmael is ſaid to have dwelt. In Hebrew it is *Paran*, and in moſt interpreters; *Pharan*, Septuagint and Vulgate. *Pharanitæ*, the people (Ptolemy.) *Paran* or *Pharan*, the name of the wilderneſs in its neighbourhood, adjoining to Kadeſh.

PHARÆ (anc. geog.) a town of Achaia in Peloponneſus, on the river Pierus, 70 ſtadia from the ſea, and to the ſouth of Patræ 150 ſtadia. Another, of Crete (Pliny); a colony from the *Pharæ* of Meſſenia, (Stephanus.) A third *Pharæ*, or *Pheræ* (Strabo, Ptolemy); *Pharæ, æ*, Polybius); a town of Meſſenia, on the river Nedo (Strabo); on the north ſide of the Sinus Meſſenius, and to the north-weſt of Abea. Anciently read *Pharis* in Homer (Pauſanias, Statius), though now read *Pharæ*. *Pharitæ* is the name of the people.

PHARAMOND is the name which is given by the generality of hiſtorians to the firſt king of France. He is ſaid to have reigned at Treves, and over a part of France, about the year 420; and to have been ſucceeded by his ſon Clodion: but the account which is given of theſe two princes is very uncertain. It is probable Pharamond was properly no more than a general of an army, the head of a military ſociety of Franks, who were maſters of their perſons and their fortunes. Gregory of Tours ſeems to have been of this opinion. "It is not generally known (ſays he) who was the firſt king of the French. Sulpitius Severus, who mentions ſeveral things reſpecting that nation, takes no notice of its firſt monarch; he only ſays that it had generals." Be that as it may, the inſtitution of the famous Salique law (ſo named from the Salians, the moſt illuſtrious of the Franks) is generally attributed to Pharamond. "This law fixed the puniſhment of crimes, and various points of police. There is no juſt ground for believing that it expreſsly ſettled the right of ſucceſſion to the crown: it only ſays, that, with relation to the Salic land, women have no ſhare of heritage, without reſtricting it to the royal family in particular; for all thoſe were generally called *Salic lands* which were held by right of conqueſt; and it is eaſy to conceive that a nation of ſoldiers, whoſe general was their king, would not ſubmit to be governed by a woman. A long cuſtom, ſupported by the principles of the nation, came in time to be the eſtabliſhed law of the kingdom." (See *M. Abbé Millot, Elm. de l'Hiſtoire de France*, tom. I.)

PHARAOH, a common name of the kings of Egypt. Joſephus ſays, that all the kings of Egypt, from Minæus the founder of Memphis, who lived ſeveral ages before Abraham, have always had the name of Pharaoh, down to the times of Solomon, for more than 3300 years. He adds, that in the Egyptian language the word *Pharoah* ſignifies a *king;* and that thoſe princes did not aſſume this name but when they aſcended the throne, at which time they quitted alſo their former name. From hence it comes to paſs, ſays Joſephus, that Herodotus names none of the kings of Egypt after Minæus the builder of Memphis, though he had 330 kings for his ſucceſſors, becauſe they had all the name of Pharoah; but becauſe this name did not paſs to women alſo, he names an Egyptian queen Nicaule who ſucceeded them. Laſtly, I find, adds Joſephus, from the ancient records of our nation, that from the age of Solomon no king of Egypt had any longer the name of Pharaoh.

But Joſephus is not very accurate in this paſſage. True it is, Herodotus ſays, that Mines, or Minæus, was the firſt king of Egppt, and founder of Memphis; that there were 330 kings after him in Egypt: that after them there was a queen called Nicotris, and not Nicaule, as Joſephus writes it; but it is not true that theſe kings had no other name but Pharaoh. Herodotus ſays expreſsly, that in the books of the Egyptian prieſts were read the names and the catalogue of 330 kings; that in this number of 330 there were 18 Ethiopians, and a woman that was a foreigner called Nicotris, and that all the others were Egyptians. Theſe princes therefore had every one his proper name mentioned in the catalogue of the Egyptian kings. So likewiſe we ſee in the fragments of Manetho, that every king of Egypt had a name peculiar to him; and we find the name Pharaoh only in Scripture.

What Joſephus adds concerning queen Nicaule, or Nicotris, whom he pretends to be the ſame as the queen of Sheba, of whom mention is made in Scripture (1 Kings x. 1. 2. &c.), is entirely fabulous; and as to what he ſays, that ſince the time of Solomon the kings of Egypt have no longer had the name of Pharaoh, is manifeſtly falſe, ſince we ſtill find this name in the ſecond book of Kings, under Hezekiah (2 Kings xviii. 21.); under Joſiah (xxiii. 29, 30, 33, &c.), where this name is joined to Necho, which was the proper name of this prince; under Jehoiakim (xxiii. 35); and in the prophets Iſaiah, Jeremiah, and Ezekiel, who are much later than Solomon. It is very probable that the Egyptians gave the name of Pharaoh to their kings as long as the Egyptian language was in common uſe, and as long as their kings were of their own nation: but after the conqueſt of Egypt by Alexander the Great, and that the Grecians introduced their language with their government, the name of Pharaoh was known no longer among them. The firſt prince known to us by the name of Pharaoh was he in whoſe time Abraham went down to Egypt, when Sarah, who paſſed only for Abraham's ſiſter, was by the command of Pharaoh brought to his palace in order to become his wife. See ABRAHAM. But the Lord ſmote Pharaoh and his family with great infirmities, and gave him to know that ſhe was Abraham's wife; whereupon Pharaoh ſent for Abraham, reſtored him his wife, and at the ſame time gave orders that he ſhould be conducted out of Egypt, with every thing that belonged to him. See SARAH.

The ſecond Pharaoh ſpoke of by the Scripture is he that reigned when Joſeph arrived there. This prince or his ſucceſſor had the myſterious dream of the fat and lean kine, and the ſeven full and barren ears of corn, which Joſeph explained ſo well to his ſatisfaction, that he made him governor of his houſe and of all Egypt, reſerving only to himſelf the name of a king. This is the ſame Pharaoh that ſent for and entertained the patriarch Jacob and his family in Egypt, and gave them the land of Goſhen for their habitation. See JOSEPH and JACOB.

The third Pharaoh known in holy writ is he that perſecuted the Iſraelites. Moſes tells us that he was a new king, and had no knowledge of Joſeph (Exod. i. 8.). This prince, obſerving that the Iſraelites were become very numerous and powerful, reſolved to depreſs them by hardſhip and labour; and ſet cruel and pitileſs taſkmaſters over them. But the more he oppreſſed them, the faſter they multiplied; inſomuch that he gave orders to the Egyptian midwives, who aſſiſted the Hebrew women in their labour, to put all the male children to death, and to ſave alive the females only. But this command was not ſtrictly executed. The midwives feared the Lord, and preſerved alive not only the female children, but the males alſo.

Pharaoh, ſeeing this project did not ſucceed to his wiſhes, publiſhed a decree (Exod. i. 22.) that all the male children born of Hebrew women ſhould be thrown into the Nile, and that only the females ſhould be ſpared. This order was rigorouſly executed; yet by the providence of God Moſes was preſerved, and even brought up in Pharaoh's own court, by his own daughter, who by chance had found the child, as he was expoſed upon the Nile.

Moſes being grown up, and having killed an Egyptian who had abuſed an Hebrew, was obliged to fly from Egypt to avoid that death that Pharaoh had threatened him with.

Several years after, being about 80 years old, he returned again by an order from God, and performed mighty miracles before Pharaoh. See MOSES. There is a good deal of probability that this Pharaoh before whom Moſes appeared, and in whoſe ſight he ſmote Egypt with ſo many plagues, was a different perſon from him who would have laid hands on him after he had ſlain the Egyptian. This ſame Pharaoh having at laſt been compelled to ſend away the Hebrews, and to ſuffer them to go out of Egypt, ſoon repented of the leave he had given, and purſued them at the head of his army with his chariots. But he was drowned in the Red Sea, wherein he had raſhly entered in the eagerneſs of his purſuit. Some hiſtorians pretend to give us the name of this Pharaoh; ſome, as Appion, call him Amoſis or Amaſis; Euſebius calls him Chenchris; Uſher calls him Amenophis; but we may aſſure ourſelves that there can be nothing certain in all this.

The fifth Pharaoh known to us is he that gave protection to Hadad ſon of the king of Edom, who gave him to wife the ſiſter of his own queen, enriched him with lands, and brought up his ſon Genubah in his own court. Hadad returned to Idumea after the death of David.

The ſixth Pharaoh is he that gave his daughter in marriage to Solomon king of the Hebrews (1 Kings iii. 1.); and having taken Gezar, he ſet it on fire, drove the Canaanites out of it, and gave it for a preſent to Solomon, in lieu of a dowry for his daughter, whom he had married to this prince (1 Kings ix. 16.)

The ſeventh is Shiſhak, who entertained Jeroboam in his dominions, a rebellious ſubject of Solomon, and offered him a refuge in oppoſition to the king his maſter. The ſame Shiſhak declared war againſt Rehoboam the ſon and ſucceſſor of Solomon, beſieged and

Pharaon.

took Jeruſalem, carried away all the king's treaſures, and thoſe of the houſe of God, and particularly the golden bucklers that Solomon had made. See Shishak.

The eighth is that Pharaoh with whom Hezekiah made a league againſt Sennacherib king of Aſſyria, in the year of the world 3290. See Sennacherib. This Pharaoh is probably the ſame whom Herodotus names Sethon, prieſt of Vulcan, who came to meet Sennacherib before Peluſium, and to whoſe aſſiſtance Vulcan ſent an army of rats, which knawed the bow-ſtrings and the thongs of the bucklers of Sennacherib's ſoldiers.

The ninth is Pharaoh-Necho, or Nechos, ſon of Pſammiticus, who made war with Joſiah, and ſubdued him. Herodotus alſo mentions this prince. See Necho, and Egypt, n° 11.

The tenth is Pharaoh Hophrah, who entered into an alliance with Zedekiah king of Judea, and attempted to come to his aſſiſtance againſt Nebuchadnezzer king of Chaldea. It was againſt this Pharaoh that Ezekiel pronounced ſeveral of his prophecies (ſee Ezek. xxix. xxx. xxxi. xxx.) He is called Apries in Herodotus, l. ii. c. 161. He is alſo mentioned in Habakkuk ii. 15, 16. See alſo Iſaiah xix. xx. and Jeremiah xlvi. 16. &c. See Apries, and Egypt, n° 13. &c.

PHARAON is the name of a game of chance, the principal rules of which are: the banker holds a pack conſiſting of 52 cards; he draws all the cards one after the other, and lays them down alternately at his right and left hand; then the ponte may at his pleaſure ſet one or more ſtakes upon one or more cards, either before the banker has begun to draw the cards, or after he has drawn any number of couples. The banker wins the ſtake of the ponte when the card of the ponte comes out in an odd place on his right hand but loſes as much to the ponte when it comes out in an even place on his left hand. The banker wins half the ponte's ſtake when it happens to be twice in one couple. When the card of the ponte being but once in the ſtock happens to be the laſt, the ponte neither wins nor loſes; and the card of the ponte being but twice in the ſtock, and the laſt couple containing his card twice, he then loſes his whole ſtake. De Moivre has ſhown how to find the gain of the banker in any circumſtance of cards remaining in the ſtock, and of the number of times that the ponte's cards is contained in it. Of this problem he enumerates four caſes, *viz.* when the ponte's card is once, twice, three, or four times in the ſtock. In the firſt caſe, the gain of the banker is $\frac{1}{n}$, n being the number of cards in the ſtock. In the ſecond caſe, his gain is $\frac{\overline{n-2}\times y}{n\times n-1}+\frac{2}{n\times n-1}$, or $\frac{\frac{1}{2}n+1}{n\times n-1}$, ſuppoſing $y=\frac{1}{2}$. In the third caſe, his gain is $\frac{3y}{2\times n-1}$, or $\frac{3}{n\times n-1}$, ſuppoſing $y=\frac{1}{2}$. In the fourth caſe, the gain of the banker, or the loſs of the ponte, is $\frac{2n-5}{n-1\times n-3}y$, or $\frac{2n-5}{2\times n-1\times n-3}$, ſuppoſing $y=\frac{1}{2}$. De Moivre has calculated a table exhibiting this gain or loſs for any particular circumſtance of the play; and he obſerves, that at this play the leaſt diſadvantage of the ponte, under the ſame circumſtances of cards remaining in the ſtock, is when the card of the ponte, is but twice in it, the next greater when three times, the next when once, and the greateſt when four times. He has alſo demonſtrated, that the whole gain *per cent.* of the banker, upon all the money that is adventured at this game, is 2l. 19s. 10d. See De Moivre's Doctrine of Chances, p. 77, &c. p. 105, &c.

Phares, Pharisees.

PHAREZ, ſon of Judah and Tamar (Gen. xxxviii. 21, 27, &c.) Tamar being juſt ready to lie in, found herſelf with child of twins. One of them appeared firſt, and putting his arm out, he immediately drew it back again. The midwife tied a ſcarlet thread upon his arm, to diſtinguiſh him for the firſt-born: but having withdrawn his hand, his brother got before him into the world: whereupon he was called by his mother *Pharez*, i. e. *one breaking forth*; as the other with the thread on his hand was called *Zarah*. The ſons of Pharez were Hezron and Hamul (Numb. xxvi. 20, 21.) F. Calmet, upon this article, explains the text as if Pharez, and not Zarah, had put out his hand, and drew it in again.

PHARISEES, a famous ſect of the Jews, who diſtinguiſhed themſelves by their zeal for the traditions of the elders, which they derived from the ſame fountain with the written word itſelf; pretending that both were delivered to Moſes from Mount Sinai, and were therefore both of equal authority. From their rigorous obſervance of theſe traditions, they looked upon themſelves as more holy than other men: and therefore ſeparated themſelves from thoſe whom they thought ſinners or profane, ſo as not to eat or drink with them; and hence, from the Hebrew word *pharis*, which ſignifies "to ſeparate," they had the name of *Phariſees* or *Separatiſts*.

This ſect was one of the moſt ancient and moſt conſiderable among the Jews; but its original is not very well known (A): however, it was in great repute in the

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(A) The Jeſuit Serrarius places their firſt riſe about the time of Eſdras; becauſe it was then that the Jews firſt began to have interpreters of their traditions. Maldonat, on the other hand, will not have this ſect to have ariſen among the Jews till a little before the time of Chriſt. Others, perhaps with more probability, refer the origin of the Phariſees to the time of the Maccabees.

Dr Lightfoot thinks, that Phariſaiſm roſe up gradually, from a period which he does not aſſign, to the maturity of a ſect. It is certain, from the account given by Joſephus, that in the time of John Hyrcanus, the high prieſt and prince of the Aſmonean line, about 108 years before Chriſt, the ſect was not only formed, but made a conſiderable figure; and that it had advanced to a high degree of popularity and power about 80 years before Chriſt. Joſ. Ant. lib. xiii. cap. 10. § 5, 6. cap. 15. § 5. & cap. 16. § 1. According to Baſnage, Hiſt. of the Jews, book ii. cap. 9. § 2. one Ariſtobulus, an Alexandrian Jew, and a Peripatetic philoſopher, who the time of our Saviour; and muſt have had its original at the ſame time with the traditions, and they grew up together, till at length they had gained ground ſo far, that the traditional law ſwallowed up the written, and theſe who were propagators of it the whole bulk of the Jewiſh nation.

The extraordinary pretences of the Phariſees to righteouſneſs drew after them the common people, who held them in the higheſt eſteem and veneration. Our Saviour frequently however, charges them with hypocriſy, and making the law of God of no effect through their traditions (Matt. ix. 2. xv. 1—6. xxiii. 13—33, and Luke xi. 39—52. Several of theſe traditions are particularly mentioned in the goſpel; but they had a vaſt number more, which may be ſeen in the Talmud, the whole ſubject whereof is to dictate and explain thoſe traditions which this ſect impoſed to be believed and obſerved.

The Phariſees, contrary to the opinion of the Sadducees, held a reſurrection from the dead, and the exiſtence of angels and ſpirits (Acts xxiii. 8.) But, according to Joſephus, this reſurrection of theirs was no more than a Pythagorean reſurrection, that is, of the ſoul only, by its tranſmigration into another body, and being born anew with it. From this reſurrection they excluded all that were notoriouſly wicked, being of opinion that the ſouls of ſuch perſons were tranſmitted into a ſtate of everlaſting woe. As to leſſer crimes, they held they were puniſhed in the bodies which the ſouls of thoſe who committed them were next ſent into.

Joſephus, however, either miſtook the faith of his countrymen, or, which is more probable, wilfully miſrepreſented it, to render their opinions more reſpected by the Roman philoſophers, whom he appears to have on every occaſion been deſirous to pleaſe. The Phariſees had many pagan notions reſpecting the ſoul; but Biſhop Bull, in his *Harmonia Apoſtolica*, has clearly proved, that they held a reſurrection of the body, and that they ſuppoſed a certain bone to remain uncorrupted, to furniſh the matter of which the reſurrection body was to be formed. They did not, however, believe that all mankind were to be raiſed from the dead. A reſurrection was the privilege of the children of Abraham alone, who were all to riſe on Mount Zion; their incorruptible bones, wherever they might be buried, being carried to that mountain below the ſurface of the earth. The ſtate of future felicity, in which the Phariſees believed, was very groſs: They imagined, that men in the next world, as well as in the preſent, were to eat and drink, and enjoy the pleaſures of love, each being reunited to his former wiſe. Hence the Sadducee, who believed in no reſurrection, and ſuppoſed our Saviour to teach it as a Phariſee, very ſhrewdly urged the difficulty of diſpoſing of the woman who had in this world been the wife of ſeven huſbands. Had the reſurrection of Chriſtianity been the Phariſaical reſurrection, this difficulty would have been inſurmountable; and accordingly we find the people, and even ſome of the Phariſees themſelves, ſtruck with the manner in which our Saviour removed it.

This ſect ſeems to have had ſome confuſed notions, probably derived from the Chaldeans and Perſians, reſpecting the pre exiſtence of ſouls; and hence it was that Chriſt's diſciples aſked him concerning the blind man (John ix. 2.), 'Who did ſin, this man or his parents, that he was born blind?" And when the diſciples told Chriſt, that ſome ſaid he was Elias, Jeremias, or one of the prophets (Mat. xvi. 14.), the meaning can only be, that they thought he was come into the world with the ſoul of Elias, Jeremias, or ſome other of the old prophets, tranſmigrated into him. With the Eſſenes, they held abſolute predeſtination; and with the Sadducees free-will: but how they reconciled theſe ſeemingly incompatible doctrines is nowhere ſufficiently explained. The ſect of the Phariſees was not extinguiſhed by the ruin of the Jewiſh commonwealth. The greateſt part of the modern Jews are ſtill of this ſect; being as much devoted to traditions or the oral law as their anceſtors were. See the articles CABBALISTS, CARAITES, ESSENES, SADDUCEES, &c.

PHARMACA, among the ancients, meant medicated or inchanted compoſitions of herbs, minerals, &c. ſome of which when taken inwardly, were ſuppoſed to cauſe blindneſs, madneſs, love, &c. others infected by touch; ſuch was the garment ſent by Medea to Creuſa, prepared *ſecundem artem;* and others operated upon perſons at a diſtance. *Pharmaca ſoteria* were employed as antidotes againſt theſe miſchievous compoſition: Thus the herb moly preſerved Ulyſſes from the magical influence of Circe. The laurel, the rhamnus, the flea-bane, the Jaſper-ſtone, were uſed for ſimilar purpoſes See *Potter's Grec. Ant.*

PHARMACI, were two perſons who were employed in the luſtration or purification of cities. Some ſay they were both men; but others maintain that a man to repreſent the males, and a woman to repreſent the females, performed this office. They performed ſacrifice, and wore figs about their necks called ολκαδες, thoſe of the man were blackiſh, and thoſe of the woman white. Figs were an emblem of fertility, which they doubtleſs prayed for on theſe ſolemn occaſions.

PHARMACOCHEMIA, means that part of the chemical art which treats of the preparation of medicines. It is ſo named by way of diſtinction from that chemiſtry which is wholly employed about the tranſmutation of metals by means of the philoſopher's ſtone; this being called *ſpagirico-chemia.*

PHARMACOLOGY, is a treatiſe of medicines, or the art of preparing them, judging of them, &c.

PHARMACOPŒIA (from φαρμακον *remedy*, and ποιειν *to make*), means a diſpenſatory, or a treatiſe deſcribing the preparations of the ſeveral kinds of medicines, with their uſes, manner of application, &c.

We have various pharmacopœias, as thoſe of Bauderon, Quercetan, Zwelfer, Charas, Bates, Salmon, Lemery

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who flouriſhed about 125 years before Chriſt, and wrote ſome allegorical commentaries on the ſcripture, was the author of thoſe traditions by an adherence to which the Phariſees were principally diſtinguiſhed from other ſects.

Lemery, Lewis, &c. The lateſt and moſt in eſteem are the Edinburgh and London diſpenſatories. See Pharmacy.

PHARMACOPOLA, or Pharmacopoeius, an *apothecary*; or a perſon who prepares and ſells medicines. (See Apothecary). The word is ſeldom uſed but by way of ridicule. It is formed from φαρμακον and πωλειν, *to ſell.* See Horace, Satire 2. lib. i. ver. 1.

PHARMACUM, φαρμακον, a medicament or medicine; whether of a ſalutary or poiſonous quality.

PHARMACY.

1 Definition and diviſion of pharmacy.

PHARMACY (A), is the art of preparing, preſerving, and compounding ſubſtances, for the purpoſes of medicine. This art has been commonly divided into two branches, *Galenical* and *Chemical* pharmacy. But for this diviſion there is no foundation in nature: and accordingly proceſſes in one pharmacopœia referred to the head of Chemical, are in another referred to the head of Galenical. There can be no doubt, that even the moſt ſimple pharmaceutical preparations are to a certain extent chemical. Hence this diviſion, founded on prejudice, and ſupported merely by a veneration for antiquity, is now baniſhed from almoſt every modern pharmacopœia.

Pharmacy has alſo been divided into *Theoretical* and *Practical*; the firſt, conſiſting not merely of ſpeculative opinions, but of a knowledge of facts and principles, tending to explain the *rationale* of proceſſes; the latter, comprehending the mere manual labour employed in proceſſes.

The former of theſe may therefore be juſtly ſtyled *Scientific Pharmacy*. And there can be no doubt that an acquaintance with it is eſſentially neceſſary to the phyſician as well as the apothecary: for without it he muſt often err in the forms of preparations and compoſitions which he employs; and muſt be often deceived in the effects reſulting from compoſitions, when he infers their properties from the known powers of the ingredients in their ſeparate ſtate.

2 Objects of pharmacy.

The theory of pharmacy therefore is the ſame with that of chemiſtry; as are alſo the operations, which remain to be diſcuſſed here only in as far as they are made ſubſervient to the medicinal art, diſtinct from that which is purely chemical. The objects of pharmacy, however, are much more limited than thoſe of chemiſtry; the latter comprehending, in the utmoſt latitude of the word, almoſt every ſubſtance in nature; while pharmacy regards only ſuch bodies in the vegetable, animal, and mineral kingdoms, as, by their effects on the human frame, tend to preſerve health, or to reſtore it when loſt.

Part I. ELEMENTS of PHARMACY.

Chap. I *A general View of the Properties and Relations of Medicinal Subſtances.*

Sect. I. *Vegetables.*

3 Analogy between vegetables and animals.

Vegetables are organized bodies, furniſhed with a variety of veſſels for reception, tranſmiſſion, and perſpiration of different fluids. Analogous to animals, they are produced from ſeeds and eggs, and are endowed with functions, by which the aliment they imbibe is changed into new forms, into ſolids and fluids, peculiar to particular plants, and to different parts of the ſame plant.

The analogy between the vegetable and animal kingdoms will appear ſtill more ſtriking, when we conſider that the former exhibit, though in a leſs degree, all the phenomena of ſenſibility and motion.

4 Pabulum of vegetables.

The *pabulum* of vegetables, like that of moſt animals, is of a mixed nature; and is compoſed of the neceſſary union of water, heat, and light, and leſs neceſſarily of air and earth: the office of theſe two laſt elements ſeems to be that of filtres, or vehicles for conveying the other principles in proper form.

5 Influence of ſoil, climate, heat, and light, on vegetables.

From varieties in the ſtate and proportion of theſe ſeveral agents, a very multiplied diverſity takes place in the external form, quantity, and quality, of one and the ſame vegetable: hence the difference of plants from the ſoil, climate, ſeaſon, and other ſimilar circumſtances. The influence of heat and light, or what is probably the ſame thing, the abſorption of the inflammable principle, is perhaps the moſt important article in the aliment of vegetables. This principle, whether derived from the ſolar rays, from putrid matters employed in manure, or from the putrefaction of the wild growth, aſſiſted by calcareous earths and other ſeptics, is found at all times to modify, in a peculiar manner, the form, the quantity, and even the ſenſible and inherent properties, of vegetables. It is of importance however to remark, that the ſoundneſs and ſpecific principles of vegetables are not invariably the more complete in proportion to the vigour of their growth; high health, which is always a dangerous ſtate in the conſtitution of animals, is often the means

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(A) For this article we are indebted to the liberality of Mr Creech bookſeller in Edinburgh, who, with his well known zeal for the cultivation of ſcience, and, regardleſs of the advantage to be expected from his copyright, has permitted us to inſert into this work the third and much improved edition of the Edinburgh New Diſpenſatory.

means of perverting or deſtroying the economy of vegetable life. Thus the finer aromatics, which naturally inhabit the dry and ſandy ſoils, when tranſplanted into a moiſt and rich one, or in other words, when placed in mould abounding with the *fomites* of inflammable principle, grow with rapidity and vigour, and have their bulk conſiderably increaſed; but loſe very much of their fragrance, as if their active principles were exhauſted by the luxuriance of their growth.

6 Plants differ in the different periods of their growth.

Plants are alſo found to differ conſiderably in the different periods of their growth. Thus, ſome herbs in their infancy abound moſt with odoriferous matter; others again yield little or none till they have attained to a more advanced age. Many fruits, in their immature ſtate, contain an auſtere acid juice, which by maturation is changed into a ſweet one: others, as the orange, are firſt warm and aromatic, and afterwards by degrees become filled with a ſtrong acid. The common grain, and ſundry other ſeeds, when beginning to vegetate, are in taſte remarkably ſweet: yet the kernels of certain fruits prove, at the ſame period, extremely acid. The roots of ſome of our indigenous plants, whoſe juice is, during the ſummer, thin and watery, if wounded early in the ſpring, yield rich balſamic juices, which, expoſed to a gentle warmth, ſoon concrete into ſolid gummy-reſins, ſuperior to many of thoſe brought from abroad. In open expoſures, dry ſoils, and fair warm ſeaſons, aromatic plants become ſtronger and more fragrant, while thoſe of an oppoſite nature become weaker. To theſe particulars, therefore, due regard ought to be had in collecting plants for medicinal uſes.

7 Different parts of the ſame plant of different qualities from each other.

It may be proper to obſerve alſo, that the different parts of one plant are often very different in quality from each other. Thus the bitter herb wormwood riſes from an aromatic root; and the narcotic poppyhead includes ſeeds which have no narcotic power. Theſe differences, though very obvious in the common culinary plants, do not ſeem to have been ſufficiently obſerved or attended to, in thoſe plants that have been admitted as articles of the materia medica.

8 Vegetables obnoxious to diſeaſe and death.

Without any obvious dependence on the circumſtances abovementioned, vegetables are, like animals, alſo obnoxious to diſeaſes and death; which, whether occaſioned by intenſe cold, by inſects, lightning, or other cauſes, always maintain a ſtriking analogy to the affections of animals. The principal difference between animals and vegetables is, that the ſeveral parts of vegetables do not conſtitute ſuch a mutually depending ſyſtem as thoſe of the more perfect animals: Hence it is, that a very conſiderable part of a plant may be diſeaſed or dead, while the reſt enjoys perfect good life and health. Though the phyſiology of vegetables is hitherto inſufficient for forming any complete doctrines of the cauſes and cure of their ſeveral diſeaſes; yet, in many caſes, it might be uſeful to attend to the formation of a pathology of the vegetable kingdom: in the ſtate even of our preſent knowledge, it is of importance in the ſtudy of pharmacy to be aware that ſuch diſeaſes really exiſt, and are capable of changing or deſtroying the active principles of many of our moſt valuable herbs. In the plants more evidently ſenſitive, the diſeaſes exhibit a very cloſe analogy to many of thoſe of animals: ſeveral of the remote cauſes are ſuch as are known to obſtruct perſpiration, to induce general debility, or otherwiſe diſorder the animal economy. The diſeaſes alſo are evidently marked by a diminution of their ſenſitive and moving principle; and perhaps, in conſequence of this diminution, their ſolids, their ſap, and other fluids, ſhrivel and decay, and the whole plant aſſumes new forms, and is impregnated with inert, or fraught with noxious principles. Analogous alſo to animals, the plant when deprived of the living principle, runs into all thoſe changes common to what is called *inanimate matter*. We ſhall now proceed to examine the changes to which vegetables are ſubject.

I. *Productions from Vegetables by* FERMENTATION.

9 Fermentation.

Fermentation is a ſpontaneous motion excited in dead vegetables and animals, which is peculiar to thoſe organic ſubſtances in conſequence of the principle of vegetable or animal life. See FERMENTATION.

The circumſtances favouring fermentation are in general, a certain degree of fluidity, a certain degree of heat, and the contact of the air.

There are, however, ſeveral ſubſtances, of themſelves not ſuſceptible of fermentation, which nevertheleſs may be brought into that ſtate by the admixture of thoſe that are; as by adding to them, along with a proper quantity of water, a portion of the yeſt or head thrown up to the ſurface of fermenting liquors. Without this expedient many vegetables would run immediately into the acetous, and ſome of them into the putrefactive, fermentations. It is alſo found, that though acetous and putrefactive ferments are unable to ſtop the vinous fermentation, they are however capable of aſſimilating the liquor to their own nature in a more perfect form: and hence it is, that in the manufactures of wine, rum, and vinegar, it is found uſeful to keep the veſſels well ſeaſoned with the liquor intended to be prepared.

10 Three different ſtages of fermentation.

Three different kinds or ſtages of fermentation have been generally diſtinguiſhed by chemiſts. The vinous, which furniſhes alcohol, or what is commonly called *ſpirit;* the acetous, which affords vinegar; and the putrefactive, which yields volatile alkali. Being generally conſtant in ſucceſſion to each other, the whole proceſs will be beſt underſtood by conſidering each of them apart. All vegetable ſubſtances are not capable of the vinous fermentation: the conditions neceſſary to its production are, a ſaccharo-mucilaginous matter; a fluidity ſome what viſcous, the proper degree of which is beſt learned from experience; a heat from 40 to 96 of Fahrenheit's thermometer; a conſiderable maſs of matter; and the acceſs of the external air.

11 Vinous fermentation.

The phenomena exhibited in the vinous fermentation are, a briſk tumultuary motion, the liquor loſes its tranſparency and homogeneous appearance, its bulk and heat are conſiderably increaſed, the ſolid parts are buoyed up to the top, and a great quantity of a permanently elaſtic fluid is diſengaged. This fluid or gas being heavier than atmoſpheric air, floats in ſeparate maſſes near the ſurface of the liquor; and is eaſily diſtinguiſhable from common air by extinguiſhing flame and animal life, precipitating lime from limewater, cryſtalliſing and rendering mild the cauſtic

12 Carbonic acid.

cauſtic alkali: is the gas ſylveſtre of Helmont, and the fixed air, aerial acid, or carbonic acid of modern chemiſts. After ſome time the tumultuary motion in the liquor is ſuddenly checked, perhaps from the generation of the alcohol; a fine ley is alſo precipitated; and the floating matter, if not purpoſely prevented, ſubſides to the bottom of the veſſel. In the wines produced from the grape, a large quantity of ſaline concrete is incruſted on the ſides and bottom of the caſks; and this is commonly known by the name of *tartar*, the properties of which we ſhall afterwards examine. At the termination of theſe phenomena, the vegetable matter has aſſumed new properties; and from being a mild, ſweet, or gently acidulous infuſion, is now become the briſk, pungent, and inebriating liquor, called *wine* or *vinous liquor*.

13 Wines, various kinds of.

Fermented or vinous liquors are prepared from a great variety of ſubſtances: the ſaccharine ſubſtances, or thoſe rendered ſo by a beginning vegetation, are in general fitteſt for the purpoſe; a multitude of collateral circumſtances are alſo neceſſary for the proper management of the proceſs; and in vinous liquors great diverſities are obſervable. Theſe differences are not only obſervable in wines produced from different ſubſtances, but alſo in thoſe prepared from one and the ſame vegetable. Theſe diverſities may be referred to the different conditions of the ſubſtance to be fermented, to the ſtates of fluidity and heat, and to the degree of fermentation to which the ſubject has been carried. This laſt is principally modified by the preceding cauſes, and not unfrequently by very minute and apparently trifling circumſtances in the conduct of the operator. Hence the numerous varieties in the vinous liquors produced from the grape, which have been more peculiarly denominated *wines*. It is an important part of pharmacy to inquire into theſe differences with care and attention.

The diverſity in vinous liquors is ſtill more obvious in thoſe produced from different vegetables. Many of the native qualities of the ſubſtances, as colour, taſte, flavour, &c. often remain in the wine; not being totally ſubdued by that degree of fermentation neceſſary for rendering the liquor vinous. Hence the remarkable difference of wines produced from the grape and the graminous ſeeds: the wine produced from theſe laſt has been more ſtrictly called *beer*; and is well known to differ from wines produced from apples, pears, apricots, or any other fruit.

1. Of the product of the VINOUS Fermentation.

14 Product of vinous fermentation.

The product of all theſe fermented vegetables is, as we have juſt now mentioned, the pungent and intoxicating liquor called *wine*. It is proper, however, in pharmacy, to inquire into the different principles which enter its compoſition. As the wine furniſhed by grapes is the moſt valuable and generally known, we ſhall take it as an example: Grape-wine, then, is compoſed of a large quantity of water, of alcohol, of tartar, and of a colouring matter. It is proper, however, that we ſhould lay down the proofs of ſuch a combination in wine, and explain the methods by which it may be decompoſed and ſeparated into the conſtituent parts abovementioned.

For this purpoſe, recourſe is generally had to the aſſiſtance of the fire. The liquor is put into an alembic; and as ſoon as it boils, a white milky fluid, of a pungent ſmell and taſte, diſtils into the recipient. This fluid is called *aquavitæ*, or, in common language, *ſpirit*: it is compounded of water and certain matters capable of ſuſpenſion in water, of alcohol, and of a ſmall proportion of oil; which laſt communicates to it a milky colour: the yellow colour, afterwards aſſumed, is partly owing to the ſame oil, and partly to a ſolution of the extractive matter of the wooden caſks in which the aquavitæ has been kept. This aquavitæ, like wine, always partakes more or leſs of the flavour of the vegetable from whence it has been prepared; but by farther diſtillation, and other proceſſes, it is freed of its water, and of the native principles of the vegetable matter which the watery parts had kept in ſolution; when thus prepared, it is a pure *alcohol* or *inflammable ſpirit*, which is always the ſame from whatever vegetable the wine was produced.

After all the Aquavitæ has been drawn off, the reſiduum now ceaſes to be wine; it is of a chocolate colour, of an acid and auſtere taſte; it has now aſſumed a heterogeneous appearance, and a great quantity of ſaline cryſtals is obſerved in the liquor: theſe cryſtals are the *tartar*. By the above proceſſes, then, we have fully decompoſed *wine*: but it is to be obſerved, that by this analyſis we have not ſeparated the different parts of wine in their original and entire ſtate; nor are we hitherto acquainted with any method of regenerating the wine by recombining the aquivitæ with the reſiduum; ſome product of the fermentation is therefore changed or deſtroyed; and this product is probably ſome peculiar modification of fixed air or aerial acid. The reſiduum, when evaporated, aſſumes the form and conſiſtence of an extract; the colouring part may be abſtracted by rectified ſpirit of wine, but is not ſeparable from it by the addition of water: it ſeems therefore to be of a gummi reſinous nature, and extracted from the grape by means of the alcohol generated during the fermentation.

15 Water, colouring matter, alcohol, &c.

From this analyſis, then, it is obvious, that wine is compoſed of water, colouring matter, alcohol, and a ſomething that is changed or loſt. We ſhall refer the particular examination of alcohol and tartar to the proper places aſſigned them in this work; and we hope that from this general ſurvey of the ſubject, the properties of wine, as a ſolvent of ſeveral medicinal ſubſtances to be afterwards examined, will be much more readily underſtood. Before we go farther, it is proper to add, that the *ley* precipitated from wine during fermentation, is a compound of ſtones, pieces of grape, tartar, and vitriolated tartar: the two firſt are inert bodies; the two laſt we ſhall particularly examine in their proper order. We are now prepared to conſider the nature and product of the next kind or ſtage of fermentation, viz. the

2. ACETOUS Fermentation.

16 Proceſs of acetous fermentation.

To underſtand the proceſs of the acetous fermentation, we muſt leave for the preſent our analyſis of the product of the vinous fermentation, and return to the wine in its moſt perfect and entire ſtate. It is proper to obſerve, that though after the liquor has become vinous, a partial ceſſation of the more obvious

phenomena takes place, yet the wine ſtill ſuffers a ſlow and imperceptible degree of fermentation. We are not then to conſider the liquor as being in a quieſcent ſtate, but as conſtantly approaching to the next ſtage, viz. the *acetous fermentation*, which we are now to conſider. This kind of inſenſible fermentation, or what we may call the intermediate change, ſeems to be neceſſary to the perfection of the wine. Its degree, however, is to be regulated under certain limitations: when too much checked, as by cold, thunder, or ſuch like cauſes, the wine becomes vapid: when too much encouraged by heat, contact of air, &c. it approaches too far to the acetous change: but in order that the vinous ſhall proceed fully to the acetous fermentation, ſeveral circumſtances are required: and theſe are in general the ſame that were before neceſſary to the vinous ſtage. Theſe conditions are, a temperate degree of heat, a quantity of unfermented mucilage, an acid matter, ſuch as tartar, and the free acceſs of external air. When thus ſituated, the liquor ſoon paſſes into the acetous fermentation: but during this ſtage the phenomena are not ſo remarkable as in the vinous; the motion of air is now leſs conſiderable, a groſs unctuous matter ſeparates to the bottom, the liquor loſes its vinous taſte and flavour,
17 Vinegar.
becomes ſour, and on diſtillation affords no inflammable ſpirit. It is now the acetous acid or vinegar; and when ſeparated by diſtillation from the unctuous ley, may be preſerved a conſiderable length of time without undergoing the putrid change: to this laſt, however, it always approaches in the ſame manner as the vinous conſtantly verges to the acetous fermentation; and this will much more readily happen if the acid be allowed to remain with the unctuous feculent matter abovementioned. When thus ſituated, the vinegar quickly loſes its tranſparency, aſſumes a blackiſh colour, loſes its ſourneſs and agreeable odour, has an offenſive taſte and ſmell, and, when diſtilled at a certain period of the proceſs, yields volatile alkali.

The liquor is now arrived to the laſt ſtage, viz.

3. The PUTREFACTIVE Fermentation.

From the preceding phenomena, it is obvious, that the ſame ſubſtance which is capable of the vinous and acetous, is alſo capable of the putrefactive, fermentation. It is perhaps impoſſible to induce the firſt without a mixture of the ſecond; or the ſecond without a mixture of the third. Hence every wine is a
18 Phenomena of putrefactive fermentation.
little acid; and there are few vinegars without ſome diſpoſition towards putrefaction, or without volatile alkali, neutralized by the acid which predominates. Notwithſtanding this ſeeming continuation of one and the ſame proceſs, the putrefaction of vegetables has its particular phenomena. The vegetable matter, if in a fluid ſtate, becomes turbid, and depoſits a large quantity of feculent matter; a conſiderable number of air-bubbles are raiſed to the top; but their motion is not ſo briſk in the putrefactive as in the vinous, or even the acetous fermentation: neither the bulk nor heat of the liquor ſeems to be increaſed; but an acrid pungent vapour is perceived by the ſmell, and which, by chemical trials, is found to be the volatile alkali; by degrees this pungent odour is changed into one leſs pungent, but much more nauſeous. If the ſame train of phenomena have taken place in a vegetable conſiſting of parts ſomewhat ſolid, its coheſion is broke down into a ſoft pulpy maſs; this maſs, on drying, entirely loſes its odour, leaving a black cherry like reſiduum, containing nothing but earthy and ſaline ſubſtances.

It is proper to obſerve, that though the circumſtances favouring the putrefactive are the ſame with thoſe requiſite to the vinous and acetous fermentations, yet theſe ſeveral conditions are not ſo indiſpenſable to the former as to the two latter ſtages. All vegetables have more or leſs tendency to putrefaction, and a great number of them are capable of the acetous fermentation; but the proportion of thoſe capable of the vinous is not conſiderable; and theſe laſt will run into the putrid in circumſtances in which they cannot undergo the vinous or even the acetous fermentations. Thus flour made into a ſoft paſte will become ſour; but it muſt be perfectly diſſolved in water to make it fit for the vinous ſtage; whereas mere dampneſs is ſufficient to make it paſs to the putrid fermentation: beſides the condition of fluidity, a leſs degree of heat, and a more limited acceſs of air, are ſufficient for producing the putrefactive fermentation.

It is therefore probable, that all vegetables, in whatever ſtate they may be, are liable to a kind of putrefaction; in ſome the change is ſlow and gradual, but never fails at length to break down the texture and coheſion of the moſt ſolid.

We formerly obſerved, that the vapours ſeparated during the vinous fermentation were fixed air or aerial acid; and it is indeed true, that in the incipient ſtate of this fermentation a quantity of gas is ſtill evolved, and along with it a quantity of alkaline air: in the advanced ſtate, however, we find theſe vapours of a different nature; they now tarniſh ſilver, and render combinations of lead with the vegetable acids black. When produced in large quantity, and much confined, as happens in ſtacks of hay put up wet, they burſt into actual flame, conſuming the hay to aſhes; on other occaſions, the eſcape of theſe vapours diſcovers itſelf by an emiſſion of light, as in the luminous appearance of rotten wood when placed in the dark. From the above phenomena it is evident, that theſe vapours abound with the principle of inflammability; and their odour probably depends on this principle looſely combined with the water, or
19 Hydrogen.
ſome other parts of the volatiliſed matter. This gas is therefore different from that ſeparated during the vinous fermentation; it is the phlogiſticated, and ſometimes the inflammable air of Dr Prieſtley, or the hydrogen of Lavoiſier. See table of chemical nomenclature, &c. CHEMISTRY, page 598.

We have thus, for the ſake of clearneſs, and in order to comprehend the whole of the ſubject, traced the phenomena of fermentation through its different ſtages: it is proper, however, to obſerve, that though every vegetable that has ſuffered the vinous will proceed to the acetous and putrefactive fermentations, yet the ſecond ſtage is not neceſſarily preceded by the firſt, nor the third by the ſecond; or in other words, the acetous fermentation is not neceſſarily confined to thoſe ſubſtances which have undergone the vinous, nor the putrefactive to thoſe which have undergone the acetous fermentation. Thus it is, that gums diſſolved in water paſs to the acetous without undergoing the vinous fermentation; and glutinous matter ſeems to run into putrefaction without ſhowing any previous aceſcence: and farther, theſe changes frequently happen although the matter be under thoſe conditions which are favourable to the preceding ſtages.

From the foregoing ſketch, the importance of this ſubject in the ſtudy of Pharmacy will be obvious at firſt ſight: it cannot, however, afford us any uſeful information on the native principles of vegetables; but it preſents to us new products, the importance of which is well known in chemiſtry, in medicine, and in arts. The neceſſity of being well acquainted with the ſeveral facts (for of theory we know none ſatisfactory), will appear in the pharmaceutical hiſtory and preparation of many of our moſt valuable drugs. We are next to conſider a ſet of no leſs complicated operations, viz.

II. *Productions from vegetables by* Fire.

20
Productions by fire.

In order to analyſe, or rather to decompoſe, vegetables by the naked fire, any given quantity of dry vegetable matter is put into a retort of glaſs or earth. Having filled the veſſel about one half or two thirds, we place it in a reverberatory furnace, adapting it to a proper receiver. To collect the elaſtic fluids, which, if confined, would burſt the veſſels (and which, too, it is proper to preſerve, as being real products of the analyſis), we uſe a perforated receiver with a crooked tube, the extremity of which is received into a veſſel full of water, or of mercury, and inverted in a baſon containing the ſame fluid: by this contrivance, the liquid matters are collected in the receiver, and the aeriform fluids paſs into the inverted veſſel. If the vegetable is capable of yielding any ſaline matter in a concrete ſtate, we interpoſe between the retort and the receiver another veſſel, upon whoſe ſides the ſalt ſublimes. Theſe things being properly adjuſted, we apply at firſt a gentle heat, and increaſe it gradually, that we may obſerve the different products in proper order. At firſt an inſipid watery liquor paſſes over, which is chiefly compoſed of the water of vegetation; on the heat being a little farther increaſed, this watery liquor, or phlegm, becomes charged with an oily matter, having the odour of the vegetable, if it poſſeſſed any in its entire ſtate; along with this oil we alſo obtain an acid reſembling vinegar, and which communicates to the oil ſomewhat of a ſaponaceous nature; on the heat being carried ſtill farther, we procure more acid, with an oil of a dark colour, and the colour gradually deepens as the diſtillation advances. The oil now ceaſes to retain the peculiar odour of the vegetable; and being ſcorched by the heat, ſends forth a ſtrong diſagreeable ſmell like tar: it is then called *empyreumatic oil*. About this time alſo ſome elaſtic vapours ruſh into the inverted veſſel; theſe generally conſiſt of inflammable or fixed airs, and very often of a mixture of both; the volatile ſalt now alſo ſublimes, if the vegetable was of a nature to furniſh it. By the time the matter in the retort has acquired a dull red heat, nothing further will ariſe: we then ſtop; and allowing the veſſel to cool, we find a maſs of charcoal, retaining more or leſs the form and appearance of the vegetable before its decompoſition.

We have thus deſcribed, in the order of their ſucceſſion, the ſeveral products obtained from the generality of vegetables when analyſed in cloſe veſſels and in a naked fire.

21
Different in different vegetables, though

It is, however, to be underſtood, that the proportion of theſe principles turns out very various; the more ſucculent yield more water, and the more ſolid afford a greater quantity of the other principles. Independently alſo of this difference, the nature of the products themſelves are found to differ in different vegetables: thus in the cruciform plants, and in the emulſive and farinaceous ſeeds, the ſaline matter which comes over with the water and oil is found to be alkaline; ſometimes it is ammoniacal, from the combination of the acid with the volatile alkali paſſing over at the end of the proceſs; it is alſo probable, that the acids of vegetables are not all of the ſame nature, though they exhibit the ſame external marks. When volatile alkali is obtained, it is always found in the mild efferveſcing ſtate; it is procured, however, from a few vegetables only; it is ſeldom in a concrete form, being generally diſſolved in the phlegm; and as it ordinarily makes its appearance about the end of the proceſs, it is probable that its formation is owing to ſome peculiar combination of the oil and fixed alkali. The plants containing much oily combuſtible matter ſeem to be thoſe which more peculiarly yield inflammable air, while the mucilages appear to be as peculiarly fitted for affording the fixed air or aerial acid. The chemical properties of charcoal ſeem to be always the ſame from whatever vegetable it has been produced: on a minute examination (which however, is not the buſineſs of pharmacy), it is found to conſiſt of fixed air, the principle of inflammability, a ſmall quantity of earth, ſaline, matter, and a little water. The whole of the analyſis then amounts to air, water, earth, and the principle of inflammability; for by repeated diſtillations the oil is reſolved into water, the principle of inflammability, and a little earth; the ſaline matter alſo is a product ariſing from a combination of the earthy matter with water or the principle of inflammability, in ſome ſhape or other, or perhaps with both. That theſe combinations take place, has at leaſt been the opinion of the chemiſts.

22
all compoſed of air, water, earth, &c.

We formerly ſaid that charcoal was partly compoſed of ſaline matter; it therefore remains that we ſhould next decompoſe the charcoal, in order to obtain or ſeparate the articles next to be mentioned.

The fixed Salts of Vegetables.

When vegetable charcoal has been burnt, there remains a quantity of aſhes or cinders of a blackiſh grey or white colour: theſe, when boiled or infuſed in water, communicate to it a pungent ſaline taſte; the ſalt thus held in ſolution may, by evaporation, be reduced to a concrete ſtate: this ſaline matter, however, is generally found to be mixed with ferruginous earthy and other impurities, and likewiſe with a number of neutral ſalts of different kinds. In this mixed condition it is the

Potaſhes uſed in Commerce.

23
Potaſh, how procured.

This ſalt, or rather compound of different ſalts, is procured by burning large quantities of wood of any kind; and this proceſs is called *incineration*; the predominating ſalt, however, is alkaline; and as the neutral ſalts are obtained to better advantage by other means, they are generally neglected in the purification of potaſhes. Potaſhes, then, freed from its impurities, and ſeparated from the other ſalts by proceſſes to be hereafter mentioned, is now

The fixed vegetable Alkali.

24 Fixed vegetable alkali, characters of.

Alkalis in general are diſtinguiſhed by a pungent taſte, the very reverſe of that of ſourneſs; by their deſtroying the acidity of every ſour liquor; and by their changing the blue and red colours of vegetables to a green, they attract more or leſs the moiſture of the air, and ſome of them deliquate. The fixed alkalis, which we ſhall at preſent conſider more particularly, are fuſible by a gentle heat: by a greater degree of heat they are diſſipated; their fixity, therefore, is only relative to the other kind of alkalis, *viz.* the volatile: they diſſolve and form glaſs with earths: and, laſtly, when joined with acids to the point of ſaturation, they form what are called *Neutral Salts.*

Theſe characters will afford ſome neceſſary and preliminary knowledge of theſe ſubſtances in general; and we ſhall afterwards find that they are ſufficient to diſtinguiſh them from all other ſaline bodies: it is neceſſary, however, to examine them more minutely, for our analyſis has not yet reached ſo far as to preſent them in their ſimpleſt ſtate. Previous to the diſcoveries of Dr Black, the vegetable fixed alkali (which we at preſent ſpeak of particularly, when ſeparated from the foreign matters with which it is mixed in the aſhes, was conſidered to be in its pureſt ſtate; we ſhall afterwards find that it is ſtill a compound body, and is really a neutral ſalt, compounded of pure alkali, and fixed air or the aerial acid. We preſume, then, that the particular hiſtory of its chemical and medicinal properties will be better underſtood when we come to thoſe proceſſes by which it is brought to its moſt pure and ſimple ſtate: See CHEMISTRY. We ſhall only therefore obſerve for the preſent, that fixed vegetable alkali, not only in its pureſt ſtate, but alſo when neutraliſed by aerial acid, ſeems always to be one and the ſame thing, from whatever vegetable it has been produced. Thoſe of ſome ſea-plants muſt, however, be excepted: the ſaline matter obtained from theſe laſt is, like the former, in a mixed and impure ſtate; it differs, however, from potaſhes, in containing an alkali of ſomewhat different properties. The cinder of ſea-plants containing this alkali is called

Soda.

25 Soda, or natron, whence produced.

Soda, then, as we have juſt now hinted, is produced by the incineration of the kali and other ſea plants: And from this impure and mixed maſs of cinder, is obtained the marine, mineral, or muriatic alkali, or natron, as it is now denominated by the London College. This alkali has acquired theſe names, becauſe it is the baſe of the common marine or ſea-ſalt; it differs from the vegetable alkali in being more eaſily cryſtallizable; when dried, it does not like the former attract humidity ſufficient to form a liquid; it is ſomewhat leſs pungent to the taſte, and, according to Bergman, has leſs attraction for acids than the vegetable alkali.

It is, however, to be obſerved, that this alkali, when deprived of fixed air, that is to ſay, when brought to its pureſt ſtate, can ſcarcely, if at all, be diſtinguiſhed from the vegetable alkali; and indeed the true diſtinction can only be formed from their combinations, each of them affording with the ſame acid very different neutral ſalts. It belonged to this place to mention ſome of the characters of alkalis in general, and alſo ſome of thoſe marks by which the vegetable and mineral alkalis are diſtinguiſhed from each other: but for a more particular hiſtory of their chemical and medicinal properties, we refer to an account of the pharmaceutical preparations. As the volatile alkali is rarely produced from vegetables, but is generally obtained from animal matter, we ſhall conſider that kind of alkali when we come to analyſe the animal kingdom.

Of Vegetable Earth.

26 Vegetable earth, what it is.

After all the ſaline matter contained in the aſhes of vegetables has been waſhed off by the proceſſes before mentioned, there yet remains one inſipid earthy-like powder, generally of a whitiſh colour, inſoluble in water, and from which ſome iron may be attracted by the magnet. It is ſaid to have formed alum with the vitriolic acid; a kind of ſelenite has alſo been obtained, but ſomewhat different from that produced by the union of the ſame acid with calcareous earth; this reſiduum of burnt vegetables differs alſo from calcareous earth, in not being ſuſceptible of becoming quicklime by calcination. It has been found that this reſiduum, inſtead of an earth, is a calcareous phoſphoric ſalt, ſimilar to that obtained from the bones of animals.

WE have thus finiſhed our analyſis of vegetables by the naked fire; and have only to obſerve, that, like the analyſis by fermentation, it can afford us no uſeful information on the native principles of the vegetable itſelf.

When chemiſtry began firſt to be formed into a rational ſcience, and to examine the component parts and internal conſtitution of bodies, it was imagined, that this reſolution of vegetables by fire, diſcovering to us all their active principles, unclogged and unmixed with each other, would afford the ſureſt means of judging of their medicinal powers. But on proſecuting theſe experiments, it was ſoon found that they were inſufficient for that end: that the analyſes of poiſonous and eſculent plants agreed often as nearly as the analyſes of one plant: that by the action of a burning heat, two principles of vegetables are not barely ſeparated, but altered, tranſpoſed, and combined into new forms; inſomuch that it was impoſſible to know in what form they exiſted, and with what qualities they were endowed, before theſe changes and tranſpoſitions happened. If, for example, 32 ounces of a certain vegetable ſubſtance are found to yield ten ounces and a half of acid liquor, above one ounce and five drams of oil, and three drams and a half of fixed alkaline ſalt: what idea can this analyſis give of the medicinal qualities of *gum Arabic?*

III. *SUBSTANCES naturally contained in vegetables, and ſeparable by Art without Alteration of their native Qualities.*

27 IT has been ſuppoſed, that there is one general fluid or blood which is common to all vegetables, and from which the fluids peculiar to particular plants and their parts are prepared by a kind of ſecretion: To this ſuppoſed

28 Sap or blood of vegetables.

poſed general fluid botaniſts have given the name of *ſap*. This opinion is rendered plauſible from the analogy in many other reſpects between vegetable and animal ſubſtances: and indeed if we conſider the water of vegetation as this general fluid, the opinion is perhaps not very far from the truth; but the notion has been carried much farther than ſuppoſing it to be mere water; and the opinion of naturaliſts on this ſubject does not ſeem to be well ſupported by experience. It is difficult to extract this ſap without any mixture of their conſtituent parts. But in a few vegetables, from which it diſtils by wounding their bark, we find this ſuppoſed general blood poſſeſſing properties not a little various: Thus the juice effuſed from a wounded birch is conſiderably different from that poured out from an inciſion in the vine.

1. Groſs Oils.

Vegetables, like animals, contain an oil in two different ſtates. That is, in ſeveral vegetables a certain quantity of oil is ſuperabundant to their conſtitution, is often lodged in diſtinct reſervoirs, and does not enter into the compoſition of their other principles: in moſt vegetables, again, another quantity of oil is combined, and makes a conſtituent part of their principles. Of this laſt we formerly ſpoke in our analyſis of vegetables by fire; and it is the former we mean to conſider, under the three following heads.

29 Groſs or expreſſed oils, properties of.

Groſs oils abound chiefly in the kernels of fruits, and in certain ſeeds; from which they are commonly extracted by expreſſion, and are hence diſtinguiſhed by the name of *expreſſed oils*. They are contained alſo in all the parts of all vegetables that have been examined, and may be forced out by vehemence of fire; but here their qualities are much altered in the proceſs by which they are extracted or diſcovered, as we have ſeen under the foregoing head.

Theſe oils, in their common ſtate, are not diſſoluble either in vinous ſpirits or in water, though by means of certain intermedia they may be united both with the one and the other. Thus a ſkilful interpoſition of ſugar renders them miſcible with water into what are called *lohochs* and *oily draughts*; by the intervention of gum or mucilage they unite with water into a milky fluid: by alkaline ſalts they are changed into a ſoap, which is miſcible both with water and ſpiritous liquors, and is perfectly diſſolved by the latter into an uniform tranſparent fluid. The addition of any acid to the ſoapy ſolution abſorbs the alkaline ſalt; and the oil, which of courſe ſeparates, is found to have undergone this remarkable change, that it now diſſolves without any intermedium in pure ſpirit of wine.

Expreſſed oils expoſed to the cold loſe their fluidity greatly: ſome of them, in a ſmall degree of cold, congeal into a conſiſtent maſs. Kept for ſome time in a warm air, they become thin and highly rancid: their ſoft, lubricating, and relaxing quality is changed into a ſharp acrimonious one: and in this ſtate, inſtead of allaying, they occaſion irritation; inſtead of obtunding corroſive humours, they corrode and inflame. Theſe oils are liable to the ſame noxious alteration while contained in the original ſubject: hence ariſes the rancidity which the oily ſeeds and kernels, as almonds and thoſe called the *cold ſeeds*, are ſo liable to contract in keeping. Nevertheleſs, on triturating theſe ſeeds or kernels with water, the oil, by the intervention of the other matter of the ſubject, unites with the water, into an emulſion or milky liquor, which, inſtead of growing rancid, turns ſour on ſtanding.

It appears then that ſome kind of fermentation goes on in the progreſs of oils in the rancid ſtate; and it would ſeem from ſome experiments by Mr Macquer, that an acid is evolved, which renders them more ſoluble in ſpirit of wine than before.

In the heat of boiling water, and even in a degree of heat as much exceeding this as the heat of boiling water does that of the human body, theſe oils ſuffer little diſſipation of their parts. In a greater heat they emit a pungent vapour, ſeemingly of the acid kind; and when ſuffered to grow cold again, they are found to have acquired a greater degree of conſiſtence than they had before, together with an acrid taſte. In a heat approaching to ignition, in cloſe veſſels, the greateſt part of the oil ariſes in an empyreumatic ſtate, a black coal remaining behind.

2. Groſs ſebaceous matter.

30 Properties of ſebaceous matter.

From the kernels of ſome fruits, as that of the chocolate nut, we obtain, inſtead of a fluid oil, a ſubſtance of a butyraceous conſiſtence; and from others, as the nutmeg, a ſolid matter as firm as tallow. Theſe concretes are moſt commodiouſly extracted by boiling the ſubſtance in water: the ſebaceous matter, liquefied by the heat, ſeparates and ariſes to the ſurface, and reſumes its proper conſiſtence as the liquor cools.

The ſubſtances of this claſs have the ſame general properties with expreſſed oils, but are leſs diſpoſed to become rancid in keeping than moſt of the common fluid oils. It is ſuppoſed by the chemiſts, that their thick conſiſtence is owing to a larger admixture of an acid principle: for, in their reſolution by fire, they yield a vapour more ſenſibly acid than the fluid oils; and fluid oils, by the admixture of concentrated acids, are reduced to a thick or ſolid maſs.

3. Eſſential Oils.

31 Eſſential oils, whence obtained.

Eſſential oils are obtained only from thoſe vegetables, or parts of vegetables, that are conſiderably odorous. They are the direct principle in which the odour, and oftentimes the warmth, pungency, and other active powers of the ſubject, reſide; whence their name of *eſſences* or *eſſential oils*.

Eſſential oils are ſecreted fluids; and are often lodged in one part of the plant, while the reſt are entirely void of them. Sometimes they are found in ſeparate ſpaces or receptacles; and are there viſible by the naked eye: thus, in the rind of lemons, oranges, citrons, and many others, there are placed everywhere ſmall pellucid veſicles, which, by preſſing the peel near to the flame of a candle, ſquirt out a quantity of eſſential oil, forming a ſtream of lambent flame: hence, too, an oleoſaccharum may be made, by rubbing the exterior ſurface of theſe peels with a piece of lump ſugar, which at once tears open theſe veſicles, and abſorbs their contained oil.

Eſſential oils unite with rectified ſpirit of wine, and compoſe with it one homogeneous tranſparent fluid; though ſome of them require for this purpoſe a much

larger

32 Their properties.

larger proportion of the ſpirit than others. The difference of their ſolubility perhaps depends on the quantity of diſengaged acid; that being found by Mr Macquer not only to promote the ſolution of eſſential oils, but even of thoſe of the unctuous kind. Water alſo, though it does not diſſolve their whole ſubſtance, may be made to imbibe ſome portion of their more ſubtile matter, ſo as to become conſiderably impregnated with their flavour; by the admixture of ſugar, gum, the yolk of an egg, or alkaline ſalts, they are made totally diſſoluble in water. Digeſted with volatile alkali, they undergo various changes of colour, and ſome of the leſs odorous acquire conſiderable degrees of fragrance; while fixed alkali univerſally impairs their odour.

The ſpecific gravity of moſt of theſe oils is leſs than that of water: ſome of them, however, are ſo heavy as to ſink in water; but theſe varieties ſhall be noticed when we come to their preparation.

In the heat of boiling water, theſe oils totally exhale; and on this principle they are commonly extracted from ſubjects that contain them; for no other fluid, which naturally exiſts in vegetables, is exhalable by that degree of heat, excepting the aqueous moiſture, from which the greateſt part of the oil is eaſily ſeparated. Some of theſe oils ariſe with a much leſs heat, a heat little greater than that in which water begins viſibly to evaporate. In their reſolution by a burning heat, they differ little from expreſſed oils.

Eſſential oils, expoſed for ſome time to a warm air, ſuffer an alteration very different from that which the expreſſed undergo. Inſtead of growing thin, rancid, and acrimonious, they gradually become thick, and at length harden into a ſolid brittle concrete; with a remarkable diminution of their volatility, fragrancy, pungency, and warm ſtimulating quality. In this ſtate, they are found to conſiſt of two kinds of matter; a fluid oil, volatile in the heat of boiling water, and nearly of the ſame quality with the original oil; and of a groſſer ſubſtance which remains behind, not exhalable without a burning heat, or ſuch as changes its nature, and reſolves it into an acid, an empyreumatic oil, and a black coal.

The admixture of a concentrated acid inſtantly produces, in eſſential oils, a change nearly ſimilar to that which time effects. In making theſe kinds of mixtures, the operator ought to be on his guard; for when a ſtrong acid, particularly that of nitre, is poured haſtily into an eſſential oil, a great heat and ebullition enſue, and often an exploſion happens, or the mixture burſts into flame. The union of expreſſed oils with acids is accompanied with much leſs conflict.

4. Concrete eſſential oil.

33 Concrete eſſential oil.

Some vegetables, as roſes and elecampane root, inſtead of a fluid eſſential oil, yield a ſubſtance poſſeſſing the ſame general properties, but of a thick or ſebaceous conſiſtence. This ſubſtance appears to be of as great volatility and ſubtility of parts as the fluid oils: it equally exhales in the heat of boiling water, and concretes upon the ſurface of the collected vapour. The total exhalation of this matter, and its concreting again into its original conſiſtent ſtate, without any ſeparation of it into a fluid and a ſolid part, diſtinguiſhes it from eſſential oils that have been thickened or indurated by age or by acids.

5. Camphor.

34 Camphor, diſtinguiſhing characters of.

Camphor is a ſolid concrete, obtained chiefly from the woody parts of certain Indian trees. See CAMPHORA (B). It is volatile like eſſential oils, and ſoluble both in oils and inflammable ſpirits: it unites freely with water by the intervention of gum, but very ſparingly and imperfectly by the other intermedia that render oils miſcible with watery liquors. It differs from the ſebaceous as well as fluid eſſential oils, in ſuffering no ſenſible alteration from long keeping; in being totally exhalable, not only by the heat of boiling water, but in a warm air, without any change or ſeparation of its parts, the laſt particle that remains unexhaled appearing to be of the ſame nature with the original camphor; in its receiving no empyreumatic impreſſion, and ſuffering no reſolution, from any degree of fire to which it can be expoſed in cloſe veſſels, though readily combuſtible in the open air; in being diſſolved by concentrated acids into a liquid form; and in ſeveral other properties which it is needleſs to ſpecify in this place.

6. Aroma.

35 Odorous principle.

Or ſpiritus rector, is the name given to the odorous principle of vegetables. Theſe bodies differ greatly from one another in the quantity, ſtrength, and volatility of the odorous principle which they contain. It is generally found united with volatile oils; but it is ſoluble in alcohol and water as well as in theſe. The ſlighteſt degree of heat is ſufficient to diſengage the aroma of plants. To obtain it, the plant muſt be diſtilled in a balneum mariæ, and its vapours received into a cold capital, which may condenſe and afterwards conduct them in a fluid ſtate into the receiver. The product is pure odoriferous water, and is known by the name of eſſential or diſtilled water. This liquor is to be conſidered as a ſolution of the aroma or odorous principle in water. When aromatic water is heated, it loſes its ſmell in conſequence of the odorous principle being more volatile than the fluid in which it was diſſolved. This principle is alſo diſſipated by expoſure to the air. Many facts would induce us to believe, that the principle of ſmell is one of the elementary principles of volatile oils; but we are as yet almoſt completely ignorant of its chemical nature, properties, and combinations.

7. Reſin.

36 Characters of reſin.

Eſſential oils, indurated by age or acids, are called *reſins*. When the indurated maſs has been expoſed to the heat of boiling water, till its more ſubtile part, or the pure eſſential oil that remained in it, has exhaled, the groſs matter left behind is likewiſe called *reſin*. We find,

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(B) It may likewiſe be procured from moſt of the volatile oils, by volatilizing the oil in a temperature a few degrees below that which is ſufficient to elevate the camphor.

find, in many vegetables, reſins analogous both to one and the other of theſe concretes; ſome containing a ſubtile oil, ſeparable by the heat of boiling water; others containing nothing that is capable of exhaling in that heat.

Reſins in general diſſolve in rectified ſpirit of wine, though ſome of them much leſs eaſily than others: it is chiefly by means of this diſſolvent that they are extracted from the ſubjects in which they are contained. They diſſolve alſo in oils both expreſſed and eſſential; and may be united with watery liquors by means of the ſame intermedia which render the fluid oils miſcible with water. In a heat leſs than that of boiling water, they melt into an oily fluid; and in this ſtate they may be incorporated one with another. In their reſolution by fire, in cloſe veſſels, they yield a manifeſt acid, and a large quantity of empyreumatic oil.

8. Gum.

37 Gum, diſtinguiſhing characters of.

Gum differs from the foregoing ſubſtances in being uninflammable; for though it may be burnt to a coal, and thence to aſhes, it never yields any flame. It differs remarkably alſo in the proportion of the principles into which it is reſolved by fire; the quantity of empyreumatic oil being far leſs, and that of an acid far greater. In the heat of boiling water, it ſuffers no diſſipation: nor does it liqueſy like reſins; but continues unchanged, till the heat be ſo far increaſed as to ſcorch or turn it to a coal.

By a little quantity of water, it is ſoftened into a viſcous adheſive maſs, called *mucilage:* by a larger quantity it is diſſolved into a fluid, which proves more or leſs glutinous according to the proportion of gum. It does not diſſolve in vinous ſpirits, or in any kind of oil: nevertheleſs, when ſoftened with water into a mucilage, it is eaſily miſcible both with the fluid oils and with reſins; which by this means become ſoluble in watery liquors along with the gum, and are thus excellently fitted for medicinal purpoſes.

This elegant method of uniting oils with aqueous liquors, which has been kept a ſecret in few hands, appears to have been known to Dr Grew. "I took (ſays he) oil of aniſeeds, and pouring it upon *another body*, I ſo ordered it, that it was thereby turned into a perfect milk-white balſam or butter; by which means the oil became mingleable with any vinous or watery liquor, eaſily and inſtantaneouſly diſſolving therein in the form of a milk. And note, this is done without the leaſt alteration of the ſmell, taſte, nature, or operation of the ſaid oil. By ſomewhat the ſame means any other ſtillatitious oil may be transformed into a milk-white butter, and in like manner be mingled with water or any other liquor: which is of various uſe in medicine, and what I find oftentimes very convenient and advantageous to be done." (*Grew of Mixture, chap.* v. *inſt.* i. § 7.) This inquiry has lately been further proſecuted in the firſt volume of the Medical Obſervations publiſhed by a ſociety of phyſicians in London; where various experiments are related, for rendering oils, both eſſential and expreſſed, and different unctuous and reſinous bodies, ſoluble in water by the mediation of gum. Mucilages have alſo been uſed for ſuſpending crude mercury, and ſome other ponderous and inſoluble ſubſtances: the mercury is by this means not a little divided; but it is found that the particles are very apt to run together or ſubſide, if a pretty conſtant agitation be not kept up.

As oily and reſinous ſubſtances are thus united to water by the means of gum, ſo gums may in like manner be united to ſpirit of wine by the intervention of reſins and eſſential oils; though the ſpirit does not take up near ſo much of the gum as water does of the oil or reſin.

Acid liquors, though they thicken pure oils, or render them conſiſtent, do not impede the diſſolution of gum, or of oils blended with gum. Alkaline ſalts, on the contrary, both fixed and volatile, though they render pure oils ſoluble in water, prevent the ſolution of gum, and of mixtures of gum and oil. If any pure gum be diſſolved in water, the addition of any alkali will occaſion the gum to ſeparate, and fall to the bottom in a conſiſtent form; if any oily or reſinous body was previouſly blended with the gum, this alſo ſeparates, and either ſinks to the bottom, or riſes to the top, according to its gravity.

9. Gum-reſin.

38 Gum-reſin, of what compounded.

By gum-reſin is underſtood a mixture of gum and reſin. Many vegetables contain mixtures of this kind, in which the component parts are ſo intimately united, with the interpoſition perhaps of ſome other matter, that the compound, in a pharmaceutical view, may be conſidered as a diſtinct kind of principle; the whole maſs diſſolving almoſt equally in aqueous and in ſpirituous liquors; and the ſolutions being not turbid or milky, like thoſe of the groſſer mixtures of gum and reſin, but perfectly tranſparent. Such is the aſtringent matter of biſtort-root, and the bitter matter of gentian. It were to be wiſhed that we had ſome particular name for this kind of matter; as the term *gum reſin* is appropriated to the groſſeſt mixtures, in which the gummy and reſinous parts are but looſely joined, and eaſily ſeparable from each other.

We ſhall afterwards find that it will be convenient to imitate this natural combination by art. As the effects of medicines very generally depend on their ſolubility in the ſtomach, it is often neceſſary to bring their more inſoluble parts, ſuch as reſinous and oily matters, into the ſtate of gum-reſin: this is done, as we have mentioned in the former article, by the mediation of mucilage. By this management theſe matters become much more ſoluble in the ſtomach; and the liquor thus prepared is called an emulſion, from its whitiſh colour, reſembling that of milk.

10. Saline Matter.

Of the ſaline juices of vegetables there are different kinds, which have hitherto been but little examined: the ſweet and the acid ones are the moſt plentiful and the beſt known.

39 Various ſalts in vegetables.

There have lately, however, been diſcovered a conſiderable variety of ſalts in different vegetables. The mild fixed alkali, which was formerly conſidered as a product of the fire, has been obtained from almoſt all plants by macerating them in acids; the vegetable alkali is the moſt common, but the mineral is alſo found in the marine plants. Beſides the fixed alkali, ſeveral other ſalts have been detected in different vegetables; ſuch as vitriolated tartar, common ſalt, Glauber's ſalt, nitre, febrifuge ſalt, and ſelenite. From ſome experiments, too, the volatile alkali has been ſuppoſed to exiſt ready formed in many plants of the cruciform or tetradynamian tribe.

It is, however, to be underſtood, that though ſome of theſe ſalts are really products of vegetation, others of them are not unfrequently adventitious, being imbibed from the ſoil without any change produced by the functions of the vegetable.

The juices of vegetables, expoſed to a heat equal to that of boiling water, ſuffer generally no other change than the evaporation of their watery parts; the ſaline matter remaining behind, with ſuch of the other fixed parts as were blended with it in the juice. From many plants, after the exhalation of great part of the water, the ſaline matter gradually ſeparates in keeping, and concretes into little ſolid maſſes, leaving the other ſubſtances diſſolved or in a moiſt ſtate; from others, no means have yet been found of obtaining a pure concrete ſalt.

40
Particularly the ſweet and the ſour.

The ſalts more peculiarly native and eſſential to vegetables are the ſweet and the ſour; theſe two are frequently blended together in the ſame vegetable, and ſometimes paſs into each other at different ages of the plant. Of the ſour ſalts ſeveral kinds are known in pharmacy and in the arts; ſuch as thoſe of ſorrel, of lemons, oranges, citrons, &c. The ſaccharine ſalts are alſo obtained from a great number of vegetables; they may in general be eaſily diſcovered by their ſweet taſte: the ſugar cane is the vegetable from which this ſaline matter is procured in greateſt quantity, and with moſt profit in commerce. For its medicinal and chemical properties, ſee MATERIA MEDICA, Art. VII. I.

The ſweet and ſour ſalts abovementioned diſſolve not only in water, like other ſaline bodies, but many of them, particularly the ſweet, in rectified ſpirit alſo. The groſs oily and gummy matter, with which they are almoſt always accompanied in the ſubject, diſſolves freely along with them in water, but is by ſpirit in great meaſure left behind. Such heterogeneous matters as the ſpirit takes up, are almoſt completely retained by it, while the ſalt concretes; but of thoſe which water takes up, a conſiderable part always adheres to the ſalt. Hence eſſential ſalts, as they are called, prepared in the common manner from the watery juices of vegetables, are always found to partake largely of the other ſoluble principles of the ſubject; while thoſe extracted by ſpirit of wine are more pure. By means of rectified ſpirit, ſome productions of this kind may be freed from their impurities. Perfect ſaccharine concretions obtained from many of our indigenous ſweets may be thus purified.

41
Saline matter of benzoin.

There is another kind of ſaline matter obtained from ſome reſinous bodies, particularly from benzoin, which is of a different nature from the foregoing, and ſuppoſed by ſome of the chemiſts to be a part of the eſſential oil of the reſin, coagulated by an acid, with the acid more predominant or more diſengaged than in the other kinds of coagulated or indurated oils. Theſe concretes diſſolve both in water and in vinous ſpirits, though difficultly and ſparingly in both: they ſhow ſeveral evident marks of acidity, have a ſmell like that of the reſin from which they are obtained, exhale in a heat equal to that of boiling water, or a little greater, and are inflammable in the fire.

11. Farina or flour.

This ſubſtance partakes of the nature of gum, but has more taſte, is more fermentable, and much more nutritive. It abounds in very many vegetables, and is generally depoſited in certain parts, ſeemingly for the purpoſe of its being more advantageouſly accommodated to their nouriſhment and growth. Several of the bulbous and other roots, ſuch as thoſe of potatoes, briony, thoſe from which caſſava is extracted, ſalep, and many others, contain a great quantity of white *feculæ* reſembling and really poſſeſſing the properties of farina. The plants of the leguminous tribe, ſuch as peas and beans, are found alſo to abound with this matter. But the largeſt quantity of farina reſides in grains, which are therefore called *farinaceous*. Of this kind are wheat, rye, barley, oats, rice, and other ſimilar plants.

42
Farina, of what compounded,

At firſt ſight farina appears to be one homogeneous ſubſtance: it is, however, found to be a compound of three different and ſeparable parts. To illuſtrate this, we ſhall take as an example the farina of wheat, being the vegetable which affords it in greateſt quantity, and in its moſt perfect ſtate. To ſeparate theſe different parts we form a paſte with any quantity of flour and cold water; we ſuſpend this paſte in a bag of muſlin or ſuch like cloth; we next let fall on it a ſtream of cold water from ſome height, and the bag may now and then be very gently ſqueezed; the water in its deſcent carries down with it a very fine white powder, which is received along with the water in a veſſel placed below the bag: the proceſs muſt be continued till no more of this white powder comes off, which is known by the water that paſſes through the bag ceaſing to be of a milky colour. The proceſs being now finiſhed, the farina is found to be ſeparated into three different ſubſtances: the glutinous or vegeto-animal part remains in the bag; the amylum or ſtarch is depoſited from the water which has been received in the veſſel placed below the bag; and, laſtly, a mucous matter is held diſſolved in the ſame water from which the ſtarch has been depoſited: this mucous part may be brought to the conſiſtence of honey, by evaporating the water in which it is kept in ſolution.

Theſe ſeveral parts are found alſo to differ remarkably in their ſenſible and chemical properties. The vegeto-animal part is of a whitiſh grey colour, is a tenacious, ductile, and elaſtic matter, partly poſſeſſing the texture of animal membranes. Diſtilled in a retort, it yields, like all animal matters, a true volatile alkali; and its coal affords no fixed alkali. It is not only inſoluble, but even indiffuſible, in water; both which appear from its remaining in the bag after long-continued lotions. Like gums, it is inſoluble in alcohol, in oils, or ether; but it is alſo inſoluble in water, and yields on diſtillation products very different from thoſe afforded by gums: it is therefore of an animal nature, and approaches perhaps nearer to the coagulable lymph of animals than to any other ſubſtance.

The fixed alkali, by means of heat, diſſolves the gluten vegeto-animale; but when it is precipitated from this ſolution by means of acids, it is found to have loſt its elaſticity. The mineral acids, and eſpecially the nitrous, are alſo capable of diſolving the vegeto-animal part of the farina.

The ſtarch, amylum, or the amylaceous matter, makes the principal part of the farina. As we before noticed, it is that fine powder depoſited from the water which has pervaded the entire farina: it is of a greyiſh white colour, but can be rendered much whiter by making it undergo a certain degree of fermentation. Starch is inſoluble in cold water; but in hot water it forms a tranſparent glue: hence the neceſſity of employing cold water in ſeparating it from the vegeto-animal part. Diſtilled in a retort, it yields an acid phlegm; and its coal affords, like other vegetables, a fixed alkaline ſalt. As ſtarch forms the greateſt part of the farina, it is probably the principal nutritive conſtituent in bread.

The mucous or rather the mucoſo-ſaccharine matter, is only in a very ſmall quantity in bread. This ſubſtance on diſtillation is found to exhibit the phenomena of ſugar. The uſe of this matter ſeems to be that of producing the vinous fermentation: and we may obſerve once for all, that the preparation of good bread probably depends on a proper proportion of the three different parts above deſcribed; viz. that the vinous fermentation is promoted by the mucoſo-ſaccharine part, the acetous by the ſtarch, and the putrid by the gluten vegeto-animale. From different ſtates or degrees of theſe ſeveral ſtages of fermentation the qualities of good bread are probably derived.

12. Of the Colouring Matter of Vegetables.

43 Of the nature of the colouring matter of vegetables.

THE colouring matter of vegetables ſeems to be of an intermediate nature between the gummy and reſinous parts. It is in many plants equally well extracted by water, and by rectified ſpirit: it is alſo, however, procurable in the form of a lake, not at all ſoluble in either of theſe menſtrua. It would ſeem that the colouring matter, ſtrictly ſo called, has hitherto eluded the reſearches of chemiſts. It is only the *baſe* or *nidus*, in which the real colouring matter is embodied, that chemiſtry has as yet reached; and on the chemical properties of this *baſe*, colours are capable of being extracted by different menſtrua, and of being variouſly accommodated to the purpoſes of dyeing. The ſubſtance from which the colours of vegetables are immediately derived, is without doubt a very ſubtile body. Since plants are known to loſe their colour when excluded from the light of the ſun, there is reaſon to think that the immediately colouring ſubſtance is primarily derived from the matter of the ſun, ſomewhat elaborated by vegetable life.

Many of theſe dyes are evolved or variouſly modified by chemical operations. Thus a colouring matter is ſomewhat depoſited in the form of a *fæcula* during the putrefaction of the vegetable; in others it is evolved or changed by alum, by acids, or by alkali. We may alſo obſerve, that any part of the vegetable may be the baſe of the colouring matter. This appears from the ſolubility of the different dyes in their proper menſtrua; and in theſe ſolutions we have not been able to ſeparate the real colouring matter from the baſe in which it is inviſcated. After all, then, we muſt conclude, that a full inveſtigation of this ſubject more properly belongs to the ſublimer parts of CHEMISTRY, than to the buſineſs in which we are at preſent engaged.

The colouring drugs are conſidered in their proper places.

In finiſhing our hiſtory of the vegetable kingdom, it only remains that we ſhould offer ſome

General Obſervations on the foregoing Principles.

44 Practical obſervations on vegetables,

1. ESSENTIAL oils, as already obſerved, are obtainable only from a few vegetables: but groſs oil, reſin, gum, and ſaline matter, appear to be common, in greater or leſs proportion, to all; ſome abounding more with one and others with another.

2. The ſeveral principles are in many caſes intimately combined; ſo as to be extracted together from the ſubject, by thoſe diſſolvents, in which ſome of them ſeparately could not be diſſolved. Hence water infuſions and ſpirituous tinctures of a plant, contain reſpectively more ſubſtances than thoſe of which water or ſpirit is the proper diſſolvent.

3. After a plant has been ſufficiently infuſed in water, all that ſpirit extracts from the reſiduum may be conſidered as conſiſting wholly of ſuch matter as directly belongs to the action of ſpirit. And, on the contrary when ſpirit is applied firſt, all that water extracts afterwards may be conſidered as conſiſting only of that matter of which water is the direct diſſolvent.

4. If a vegetable ſubſtance, containing all the principles we have enumerated, be boiled in water, the eſſential oil, whether fluid or concrete, and the camphor, and volatile eſſential ſalt, will gradually exhale with the ſteam of the water, and may be collected by receiving the ſteam in proper veſſels placed beyond the action of the heat. The other principles not being volatile in this degree of heat, remain behind: the groſs oil and ſebaceous matter float on the top: the gummy and ſaline ſubſtance, and a part of the reſin, are diſſolved by the water, and may be obtained in a ſolid form by ſtraining the liquor, and expoſing it to a gentle heat till the water has exhaled. The reſt of the reſin, ſtill retained by the ſubject, may be extracted by ſpirit of wine, and ſeparated in its proper form by exhaling the ſpirit. On theſe foundations moſt of the ſubſtances contained in vegetables may be extracted, and obtained in a pure ſtate, however they may be compounded together in the ſubject.

5. Sometimes one or more of the principles is found naturally diſengaged from the others, lying in diſtinct receptacles within the ſubject, or extravaſated and accumulated on the ſurface. Thus, in the dried roots of angelica, cut longitudinally, the microſcope diſcovers veins of reſin. In the flower cups of hypericum, and the leaves of the orange-tree, tranſparent points are diſtinguiſhed by the naked eye: which, at firſt view, ſeem to be holes, but on a cloſer conſideration are found to be little veſicles filled with eſſential oil. In the bark of the fir, pine, larch, and ſome other trees, the oily receptacles are extremely numerous, and ſo copiouſly ſupplied with the oily and reſinous fluid, that they frequently burſt, eſpecially in the warm climates, and diſcharge their contents in great quantities. The acacia tree in Egypt, and the plum and cherry among ourſelves, yield almoſt pure gummy exudations. From

a ſpecies of aſh is ſecreted the ſaline ſweet ſubſtance manna; and the only kind of ſugar with which the ancients were acquainted, appears to have been a natural exudation from the cane.

6. The foregoing principles are, as far as is known, all that naturally exiſt in vegetables; and all that art can extract from them, without ſuch operations as change their nature, and deſtroy their original qualities. In one or more of theſe principles, the colour, ſmell, taſte, and medicinal virtues, of the ſubject, are almoſt always found concentrated.

7. In ſome vegetables the whole medicinal activity reſides in one principle. Thus, in ſweet almonds, the only medicinal principle is a groſs oil; in horſe-radiſh root, an eſſential oil; in jalap root, a reſin; in marſh mallow root, a gum; in the leaves of ſorrel, a ſaline acid ſubſtance.

8. Others have one kind of virtue reſiding in one principle, and another in another. Thus Peruvian bark has an aſtringent reſin and a bitter gum; wormwood a ſtrong flavoured eſſential oil and a bitter gum reſin.

9. The groſs inſipid oils and ſebacious matters, the ſimple inſipid gums, and the ſweet and acid ſaline ſubſtances, ſeem to agree both in their medicinal qualities and in their pharmaceutic properties.

10. But eſſential oils, reſins, and gum-reſins, differ much in different ſubjects. As eſſential oils are univerſally the principle of odour in vegetables, it is obvious that they muſt differ in this reſpect as much as the ſubjects from which they are obtained. Reſins frequently partake of the oil, and conſequently of the differences depending on it; with this further diverſity, that the groſs reſinous part often contains other powers than thoſe which reſide in oils. Thus from wormwood a reſin may be prepared, containing not only the ſtrong ſmell and flavour but likewiſe the whole bitterneſs of the herb; from which laſt quality the oil is entirely free. The bitter, aſtringent, purgative, and emetic virtue of vegetables, reſide generally in different ſorts of reſinous matter, either pure or blended with gummy and ſaline parts; of which kind of combinations there are many ſo intimate, that the component parts can ſcarcely be ſeparated from each other, the whole compound diſſolving almoſt equally in aqueous and ſpirituous menſtrua.

11. There are ſome ſubſtances alſo, which, from their being totally ſoluble in water, and not in ſpirit, may be eſteemed to be mere gums; but which, nevertheleſs, poſſeſs virtues never to be found in the ſimple gums. Such are the aſtringent gum called *acacia*, and the purgative gum extracted from aloes.

12. It is ſuppoſed that vegetables contain certain ſubtile principles different in different plants, of too great tenuity to be collected in their pure ſtate, and of which oils, gums, and reſins, are only the matrices or vehicles. This inquiry is foreign to the purpoſes of pharmacy, which is concerned only about groſſer and more ſenſible objects. When we obtain from an odoriferous plant an eſſential oil, containing in a ſmall compaſs the whole fragrance of a large quantity of the ſubject, our intentions are equally anſwered, whether the ſubſtance of the oil be the direct odorous matter, or whether it has diffuſed through it a fragrant principle more ſubtile than itſelf. And when this oil in long keeping loſes its odour, and becames a reſin, it is equal in regard to the preſent conſiderations, whether the effect happens from the avolation of a ſubtile principle, or from a change produced in the ſubſtance of the oil itſelf.

SECT. II. *Animals.*

45 The nature of animal ſubſtances.

FROM the hiſtory we have already given of the vegetable kingdom, our details on animal ſubſtances may in many particulars be conſiderably abridged. All animals are fed on vegetables, either directly or by the intervention of other animals. No part of their ſubſtances is derived from any other ſource except water. The ſmall quantity of ſalt uſed by man and ſome other animals, is only neceſſary as a ſeaſoning or ſtimulus to the ſtomach. As the animal then is derived from the vegetable matter, we accordingly find that the former is capable of being reſolved into the ſame principles as thoſe of the latter. Thus, by repeated diſtillations, we obtain from animal ſubſtances, water, oil, air, an eaſily deſtructible ſalt, and charcoal. Theſe ſecondary principles are by farther proceſſes at length reſoluble into the ſame proximate principles which we found in vegetables, *viz.* water, air, earth, and the principle of inflammability. But though the principles of vegetable and animal ſubſtances are fundamentally the ſame, yet theſe principles are combined in a very different manner. It is exceedingly rare that animal ſubſtances are capable of the vinous or acetous fermentations; and the putrefactive, into which they run remarkably faſt, is alſo different in ſome particulars from the putrefaction of vegetables; the eſcape of the phlogiſton in the form of light is more evident, and the ſmell is much more offenſive, in the putrefaction of animal than of vegetable ſubſtances. The putrefaction of urine is indeed accompanied with a peculiar fetor, by no means ſo intolerable as that of other animal matters: this we ſuppoſe to be owing to the pungency derived from the volatile alkali, and alſo to the urine containing leſs inflammable matter than the blood and many other fluids. When analyſed by a deſtructive heat, animals afford products very different from thoſe of vegetables: the empyreumatic oil has a particular and much more fetid odour; and the volatile ſalt, inſtead of being an acid, as it is in moſt vegetables, is found in animals to be a volatile alkali. Chemiſts have ſpoken of an acid procurable from animal ſubſtances; and indeed certain parts of animal bodies are found to yield a ſalt of this kind; but it by no means holds with animal ſubſtances in general; and though the proofs to the contrary were even concluſive, it is confeſſedly in ſo ſmall a quantity as not to deſerve any particular regard. In ſome animals, however, an acid exiſts, uncombined and ready formed in their bodies. This is particularly manifeſt in ſome inſects, eſpecially ants, from which an acid reſembling the acetous has been procured by boiling them in water. The ſolid parts of animal bodies, as the muſcles, teguments, tendons, cartilages, and even the bones, when boiled with water, give a gelatinous matter or glue reſembling the vegetable gums, but much more adheſive. We muſt, however, except the horney parts and the hair, which ſeem to be little ſoluble either in water or in the liquors of the ſtomach. The acids, the alkalis, and quicklime, are alſo found to be powerful ſolvents of animal matters. It is from the ſolid parts that the greateſt quantity of volatile alkali is obtained; it ariſes along with a very fetid empyreumatic oil, from which it is in ſome meaſure ſeparated by repeated rectifications. This ſalt is partly in a fluid, and partly in a concrete ſtate; and from its having been anciently prepared in the greateſt quantity from the horns of the hart, it has been called *ſalt* or *ſpirit of hartſhorn*. Volatile alkali is however, procurable from all animals, and from almoſt every part of animal bodies except fat. Though we are ſometimes able to procure fixed alkali from an animal cinder, yet it is probable that this ſalt did not make any part of the living animal, but rather proceeded from the introduction of ſome ſaline matter, incapable of being aſſimilated by the functions of the living creature.

46
Of the fluid parts of animals.

In ſpeaking of the fluid parts of animals, we ſhould firſt examine the general fluid, or blood, from whence the reſt are ſecreted. The blood, which at firſt ſight appears to be an homogeneous fluid, is compoſed of ſeveral parts, eaſily ſeparable from each other, and which the microſcope can even perceive in its uncoagulated ſtate. On allowing it to ſtand at reſt, and to be expoſed to the air, it ſeparates into what are called the *craſſamentum* and the *ſerum*. The craſſamentum, or cruor, chiefly conſiſts of the red globules, joined together by another ſubſtance, called the *coagulable lymph*: the chemical properties of theſe globules are not as yet underſtood; but they ſeem to contain the greateſt quantity of the iron found in the blood. The ſerum is a yellowiſh ſubviſcid liquor, having little ſenſible taſte or ſmell: at a heat of 160 of Fahrenheit, it is converted into a jelly.. This coagulation of the ſerum is alſo owing to its containing a matter of the ſame nature with that in the craſſamentum, viz. the coagulable lymph: whatever then coagulates animal blood, produces that effect on this concreſible part. Several cauſes, and many different ſubſtances, are capable of effecting this coagulation; ſuch as contact of air, heat, alcohol, mineral acids, and their combinations with earths, as alum, and ſome of the metallic ſalts. The more perfect neutral ſalts are found to prevent the coagulation, ſuch as common ſalt and nitre.

Of the fluids ſecreted from the blood, there are a great variety in men and other animals. The excrementitious and redundant fluids are thoſe which afford in general the greateſt quantity of volatile alkali and empyreumatic oil: there are alſo ſome of the ſecreted fluids, which, on a chemical analyſis, yield products in ſome degree peculiar to themſelves. Of this kind is the urine, which is found to contain in the greateſt abundance the noted ſalt formed from the phoſphoric acid and volatile alkali. The fat, too, has been ſaid to differ from the other animal matters, in yielding by diſtillation a ſtrong acid, but no volatile alkali. There is alſo much variety in the quantity and ſtate of the combination of the ſaline and other matters in different ſecreted fluids. But for a fuller inveſtigation of this and other parts of the ſubject, we refer to ANATOMY, CHEMISTRY, and PHYSIOLOGY; with which it is more immediately connected than with the elements of pharmacy.

47
Oils and fats of animals.

Animal oils and fats, like the groſs oils of vegetables, are not of themſelves ſoluble either in water or vinous ſpirits: but they may be united with water by the intervention of gum or mucilage. Moſt of them may be changed into ſoap, by fixed alkaline ſalts; and be thus rendered miſcible with ſpirit as well as water.

48
Miſcellaneous obſervations on ſeveral animal ſubſtances.

The odorous matter of ſome odoriferous animal ſubſtances, as muſk, civet, caſtor, is, like eſſential oil, ſoluble in ſpirit of wine, and volatile in the heat of boiling water. Carthuſer relates, that from caſtor an actual eſſential oil has been obtained in a very ſmall quantity, but of an exceedingly ſtrong diffuſive ſmell.

The veſicating matter of cantharides, and thoſe parts of ſundry animal ſubſtances in which their peculiar taſte reſides, are diſſolved by rectified ſpirit, and ſeem to have ſome analogy with reſins and gummy reſins.

The gelatinous principle of animals, like the gum of vegetables, diſſolves in water, but not in ſpirit or in oils: like gums alſo, it renders oils and fats miſcible with water into a milky liquor.

Some inſects, particularly the ant, are found to contain an acid juice, which approaches nearly to the nature of vegetable acids.

There are, however, ſundry animal juices, which differ greatly, even in theſe general kinds of properties, from the correſponding ones of vegetables. Thus animal ſerum, which appears analogous to vegetable gummy juices, has this remarkable difference, that though it mingles uniformly with cold or warm water, yet on conſiderably heating the mixture, the animal-matter ſeparates from the watery fluid, and concretes into a ſolid maſs. Some phyſicians have been apprehenſive, that the heat of the body, in certain diſeaſes, might riſe to ſuch a degree, as to produce this dangerous or mortal concretion of the ſerous humours: but the heat requiſite for this effect is greater than the human body appears capable of ſuſtaining, being nearly about the middle point between the greateſt human heat commonly obſerved and that of boiling water.

The ſoft and fluid part of animals are ſtrongly diſpoſed to run into putrefaction; they putrefy much ſooner than vegetable matters; and when corrupted, prove more offenſive.

This proceſs takes place, in ſome degree, in the bodies of living animals, as often as the juices ſtagnate long, or are prevented, by an obſtruction of the natural emunctories, from throwing off their more volatile and corruptible parts.

During putrefaction, a quantity of air is generated; all the humours become gradually thinner, and the fibrous parts more lax and tender. Hence the tympany, which ſucceeds the corruption of any of the viſcera, or the imprudent ſuppreſſion of dyſenteries by aſtringents; and the weakneſs and laxity of the veſſels obſervable in ſcurvies, &c.

The craſſamentum of human blood changes by putrefaction into a dark livid-coloured liquor; a few drops of which tinge the ſerum with a tawny hue, like the ichor of ſores and dyſenteric fluxes, as alſo the white of the eye, the ſaliva, the ſerum of blood drawn from a vein, and the liquor that oozes from a bliſter in deep ſcurvies and the advanced ſtate of malignant fevers.

The putrid craſſamentum changes a large quantity of recent urine to a flame-coloured water, ſo common in fevers and in the ſcurvy. This mixture, after ſtanding an hour or two, gathers a cloud reſembling what is ſeen in the crude water of acute diſtempers, with ſome oily matter on the ſurface like the ſcum which floats on ſcorbutic urine.

The ſerum of the blood depoſites, in putrefaction, a ſediment reſembling well-digeſted pus, and changes to a faint olive-green. A ſerum ſo far putrefied as to become green, is perhaps never to be ſeen in the veſſels of living animals; but in dead bodies this ſerum is to be diſtinguiſhed by the green colour which the fleſh acquires in corrupting. In ſalted meats, this is commonly aſcribed to the brine, but erroneouſly; for that has no power of giving this colour but only of qualifying the taſte, and in ſome degree, the ill effects of corrupted aliments. In foul ulcers and other ſores, where the ſerum is left to ſtagnate long, the matter is likewiſe found of this colour, and is then always acrimonious.

The putrefaction of animal ſubſtances is prevented or retarded by moſt ſaline matters, even by the fixed and volatile alkaline ſalts, which have generally been ſuppoſed to produce a contrary effect. Of all the ſalts that have been made trial of, ſea-ſalt ſeems to reſiſt putrefaction the leaſt; in ſmall quantities it even accelerates the proceſs. The vegetable bitters, as chamomile flowers, are much ſtronger antiſeptics, not only preſerving fleſh long uncorrupted, but likewiſe ſomewhat correcting it when putrid: the mineral acids have this laſt effect in a more remarkable degree. Vinous ſpirits, aromatic and warm ſubſtances, and the acrid plants, falſely called *alkaleſcent*, as ſcurvy-graſs and horſe-radiſh, are found alſo to reſiſt putrefaction. Sugar and camphor are found to be powerfully antiſeptic. Fixed air, or the aerial acid, is likewiſe thought to reſiſt putrefaction; but above all the vapours of nitrous acid, in the form of air (the nitrous air of Dr Prieſtley), is found to be the moſt effectual in preſerving animal bodies from corruption. The liſt of the ſeptics, or of thoſe ſubſtances that promote putrefaction, is very ſhort; and ſuch a property has only been diſcovered in calcareous earths and magneſia, and a very few ſalts, whoſe baſes are of theſe earths.

It is obſervable, that notwithſtanding the ſtrong tendency of animal matters to putrefaction, yet broths made from them, with the admixture of vegetables, inſtead of putrefying turn ſour. Sir John Pringle has found, that when animal fleſh in ſubſtance is beaten up with bread or other farinaceous vegetables, and a proper quantity of water, into the conſiſtence of a pap, this mixture likewiſe, kept in a heat equal to that of the human body, grows in a little time ſour; while the vegetable matters, without the fleſh, ſuffer no ſuch change.

It was obſerved in the preceding ſection, that ſome few vegetables, in the reſolution of them by fire, diſcover ſome agreement in the matter with bodies of the animal kingdom; yielding a volatile alkaline ſalt in conſiderable quantity, with little or nothing of the acid or fixed alkali, which the generality of vegetables afford. In animal ſubſtances alſo, there are ſome exceptions to the general analyſis: from animal fats, as we before obſerved, inſtead of a volatile alkali, an acid liquor is obtained; and their empyreumatic oil wants the peculiar offenſiveneſs of the other animal oils.

SECT. III. *MINERALS*.

I. OILS *and* BITUMENS.

49 Oils of the mineral kingdom.

In the mineral kingdom is found a fluid oil called *naphtha* or *petroleum*, floating on the ſurface of waters, or iſſuing from clefts of rocks, particularly in the eaſtern countries, of a ſtrong ſmell, very different from that of vegetable or animal oils, limpid almoſt as water, highly inflammable, not ſoluble in ſpirit of wine, and more averſe to union with water than any other oils.

There are different ſorts of theſe mineral oils, more or leſs tinged, of a more or leſs agreeable, and a ſtronger or weaker, ſmell. By the admixture of concentrated acids, which raiſe no great heat or conflict with them, they become thick, and at length conſiſtent; and in theſe ſtates are called *bitumens*.

Theſe thickened or concreted oils, like the correſponding products of the vegetable kingdom, are generally ſoluble in ſpirit of wine, but much more difficultly, more ſparingly, and for the moſt part only partially; they liquefy by heat, but require the heat to be conſiderably ſtronger than vegetable products. Their ſmells are various; but all of them, either in the natural ſtate, when melted or ſet on fire, yield a peculiar kind of ſtrong ſcent, called from them *bituminous*.

50 Bitumens.

The ſolid bitumens are, amber, jet, aſphaltum, or bitumen of Judea, and foſſil or pit coal. All theſe bitumens, when diſtilled, give out an odorous phlegm, or water, more or leſs coloured and ſaline; an acid, frequently in a concrete ſtate; an oil, at firſt reſembling the native petroles, but ſoon becoming heavier and thicker; and, laſtly, a quantity of volatile alkali is obtained: the reſiduum is a charry matter, differing in its appearances according to the nature of the bitumen which had been analyſed.

From the obſervations of ſeveral naturaliſts, it is probable that all bitumens are of vegetable and animal origin; that the circumſtances by which they differ from the reſinous and other oily matters of vegetables and animals, are the natural effects of time, or of an alteration produced on them by mineral acids; or perhaps they are the effect of both theſe cauſes combined. This opinion is the more probable, ſince bitumens, on a chemical analyſis, yield oil and volatile alkali; neither of which are found in any other minerals.

II. EARTHS.

51 Of vegetable, animal, and mineral earths.

The little impropriety of joining the vegetable and animal earths to the mineral, muſt be overlooked for the ſake of bringing both under one ſynoptical view. Under the mineral earths are included ſtones; theſe being no other than earths in an indurated ſtate.—The different kinds of theſe bodies hitherto taken notice of are the following.

1ſt, *Earths ſoluble in the nitrous, marine, and vegetable acids, but not at all, or exceeding ſparingly, in the vitriolic acid. When previouſly diſſolved in other acids, they are precipitated by the addition of this laſt, which thus unites with them into inſipid, or nearly inſipid concretes, not diſſoluble in any liquor.*

Of this kind are,

1. The mineral calcareous earth: *diſtinguiſhed by its being convertible in a ſtrong fire, without addition, into an acrimonious calx called quicklime.* This earth occurs in a variety of forms in the mineral kingdom: the fine ſoft chalk, the coarſer limeſtones, the hard marbles; the tranſparent ſpars, the earthy matter contained in waters, and which ſeparating from them incruſtates the ſides of the caverns, or hangs in iſicles from the top, receiving from its different appearances different appellations. How ſtrongly ſoever ſome of theſe bodies have been recommended for particular medicinal purpoſes, they are fundamentally no other than different forms of this calcareous earth; ſimple pulverization depriving them of the ſuperficial characters by which they were diſtinguiſhed in the maſs. Moſt of them generally contain a greater or leſs admixture of ſome of the indiſſoluble kinds of earth; which, however, affects their medicinal qualities no otherwiſe than by the addition which it makes to their bulk. Chalk appears to be one of the pureſt; and is therefore in general preferred. They all burn into a ſtrong quicklime: in this ſtate a part of them diſſolves in water, which thus becomes impregnated with the aſtringent and lithontriptic powers that have been erroneouſly aſcribed to ſome of the earths in their natural ſtate.

During the calcination of calcareous earths, a large quantity of elaſtic vapour is diſcharged: the abſence of this fluid is the cauſe of the cauſticity of quicklime, and of its ſolubility in water in the form of lime-water. For a more full inquiry into this ſubject, ſee Fixed Air, &c.

2. The animal calcareous earth: *burning into quicklime like the mineral.* Of this kind are oyſter-ſhells and all the marine ſhells that have been examined; though with ſome variation in the ſtrength of the quicklime produced from them.

3. The earth of bones and horns: *not at all burning into quicklime.* This kind of earth is more difficult of ſolution in acids than either of the preceding. It is accompanied in the ſubjects with a quantity of gelatinous matter, which may be ſeparated by long boiling in water, and more perfectly by burning in the open air. The earth may be extracted alſo from the bone or horn, though difficultly, by means of acids; whereas vegetables and the ſoft parts of animals yield their pure earth by burning only.

2d, Earths ſoluble with eaſe in the vitriolic as well as other acids, and yielding, in all other combinations therewith, ſaline concretes ſoluble in water.

1. Magneſia alba: *compoſing with the vitriolic acid a bitter purgative ſalt.* This earth has not yet been found naturally in a pure ſtate. It is obtained from the purging mineral waters and their ſalts; from the bitter liquor which remains after the cryſtallization of ſea-ſalt from ſea-water; and from the fluid which remains uncryſtallized in the putrefaction of ſome ſorts of rough nitre. The aſhes of vegetables appear to be nearly the ſame kind of earth.

2. Aluminous earth: *compoſing with the vitriolic acid a very aſtringent ſalt.* This earth alſo has not been found naturally pure. It is obtained from alum; which is no other than a combination of it with the vitriolic acid; it may likewiſe be extracted, by ſtrong boiling in that acid, from clays and boles.

3d, Earths which by digeſting in acids, either in the cold or in a moderate warmth, are not at all diſſolved.

1. Argillaceous earth: *becoming hard, or acquiring an additional hardneſs, in the fire.* Of this kind of earth there are ſeveral varieties, differing in ſome particular properties: as the purer *clays*, which when moiſtened with water form a very viſcous maſs, difficultly diffuſible through a larger quantity of the fluid, and ſlowly ſubſiding from it; *boles*, leſs viſcous, more readily miſcible with water, and more readily ſubſiding; and *ochres*, which having little or nothing of the viſcoſity of the two foregoing, and are commonly impregnated with a yellow or red ferruginous calx.

2. Cryſtalline earth: *naturally hard ſo as to ſtrike ſparks with ſteel; becoming friable in a ſtrong fire.* Of this kind are flints, cryſtals, &c. which appear to conſiſt of one and the ſame earth, differing in the purity, hardneſs, and tranſparency of the maſs.

3. Gypſeous earth: *reducible by a gentle heat into a ſoft powder, which unites with water into a maſs, ſomewhat viſcous and tenacious while moiſt, but quickly drying and becoming hard. A greater heat deprives the powder of this property, without occaſioning any other alteration.* Such are the tranſparent *ſelenites*; the fibrous ſtony maſſes improperly called *Engliſh talc*; and the granulated *gypſa* or *plaſter of Paris* ſtones. Though theſe bodies, however, have been commonly thought to be mere earths, of a diſtinct kind from the reſt, they appear, both from analytical and ſynthetical experiments, to be no other than combinations of the mineral calcareous earth with vitriolic acid.

4. Talky earth: *ſcarcely alterable in a vehement fire.* The maſſes of this earth are generally of a fibrous or leafy texture; more or leſs pellucid, bright or glittering, ſmooth and unctuous to the touch; too flexible and elaſtic to be eaſily pulveriſed; ſoft ſo as to be cut with a knife. In theſe reſpects ſome of the gypſeous earths nearly reſemble them, but the difference is readily diſcovered by fire; a weak heat reducing the gypſeous to powder, while the ſtrongeſt makes no other alteration in the talky, than ſomewhat diminiſhing their flexibility, brightneſs, and unctuoſity.

III. Metals.

52 Metals, perfect and imperfect.

Of metals, the next diviſion of mineral bodies, the moſt obvious characters are, their peculiar bright aſpect, perfect opacity, and great weight; the lighteſt of them is ſix, and the heavieſt upwards of 19 times heavier than an equal bulk of water.

To underſtand the writers in chemiſtry, it is proper to be informed, that metals are ſubdivided into the *perfect*, the *imperfect*, and the *ſemimetals*.

Thoſe poſſeſſed of ductility and malleability, and which are not ſenſibly altered by very violent degrees of heat, are called *perfect metals*: Of theſe there are three; gold, ſilver, and platina. It is, however, probable, that the mark of their indeſtructibility by fire is only relative: and indeed modern chemiſts have been able, by a very intenſe degree of heat, to bring gold into the ſtate of a *calx*, or ſomething very nearly reſembling it.

Thoſe metallic ſubſtances which poſſeſs the diſtinctive properties of the perfect metals, but in a leſs degree, are called the *imperfect metals:* Theſe are, copper, iron, tin, lead.

Laſtly, thoſe bodies having the metallic characters in the moſt imperfect ſtate, that is to ſay, thoſe which have no ductility and the leaſt fixity in the fire, are diſtinguiſhed by the name of *ſemi-metals:* Theſe are, regulus of antimony, biſmuth, zinc, regulus of cobalt, nickel, and regulus of arſenic; which laſt might be rather conſidered as the boundary between the metallic and the ſaline bodies.

Mercury has been generally ranked in a claſs by itſelf.

All metallic bodies, when heated in cloſe veſſels, melt or *fuſe*. This *fuſion* takes place at different degrees of heat in different metals; and it does not appear that this proceſs produces any change in the metals, provided it be conducted in cloſe veſſels. Metals, expoſed to the combined action of air and fire, are converted into an earth like ſubſtance called *calx:* by this proceſs, which we call *calcination*, the metal ſuffers remarkable changes. From the diſtinctive marks we have before given of the metallic bodies, it will be obvious, that the perfect metals are moſt ſlowly, the imperfect more quickly, and the ſemi-metals moſt eaſily and ſooneſt, affected in this operation. This earth-like powder, or *calx*, is found to poſſeſs no metallic aſpect, but is conſiderably heavier than the metal before its calculation: it has no longer any affinity with metallic bodies, nor even with the metal from which it has been produced.

Beſides this method of calcining metals by air and fire, they may likewiſe be brought into the ſtate of a calx, by diſſolving them in acids, from which they may be afterwards freed by evaporating the acid, or by adding to the ſolution an alkaline ſalt. Metals are alſo ſometimes dephlogiſticated by detonation with nitre. This change in their obvious properties is generally acompanied with a remarkable alteration in their medicinal virtues: thus quickſilver, which taken into the body in its crude ſtate and undivided, ſeems inactive; proves, when calcined by fire, even in ſmall doſes, a ſtrong emetic and cathartic, and in ſmaller ones, a powerful alterative in chronical diſorders; while regulus of antimony, on the contrary, is changed by the ſame treatment, from a high degree of virulence to a ſtate of inactivity.

Calces of mercury and arſenic exhale in a heat below ignition: thoſe of lead and biſmuth, in a red or low white heat, run into a tranſparent glaſs; the others are not at all vitreſcible, or not without extreme vehemence of fire. Both the calces and glaſſes recover their metallic form and qualities again by the ſkilful addition of any kind of inflammable ſubſtance that does not contain a mineral acid. This recovery of the metallic calces into the metallic form is called *reduction*. During this proceſs an elaſtic aerial fluid eſcapes, which is found to be *pure air*.

Is the converſion of metals into calces owing to the diſcharge of phlogiſton, or to the abſorption of pure air? And is the reduction to be aſcribed to the abſorption of phlogiſton, or to the eſcape of pure air? And again, Is the calcination to be explained by the diſcharge of phlogiſtion and conſequent precipitation of pure air? And is the reduction effected by the abſorption of phlogiſton, either furniſhed by inflammable bodies or precipitated in conſequence of the diſcharge of pure air? On theſe queſtions there is much diſpute among modern chemiſts: We thought it only neceſſary to ſtate them here, as a full inquiry into the ſubject is by no means the province of pharmacy. We, however, think it prudent to retain the doctrine of Stahl: and we do this the more readily, becauſe it has been followed in our article CHEMISTRY, and becauſe it is abundantly clear in its illuſtration of the pharmaceutical proceſſes. We do not mean, however, to reject any modern diſcovery which may ſerve to illuſtrate our ſubjects.

All metallic bodies diſſolve in acids; ſome only in particular acids, as ſilver and lead in the nitrous: ſome only in compoſitions of acids, as gold in a mixture of the nitrous and marine: and others, as iron and zinc, in all acids. Some likewiſe diſſolve in alkaline liquors, as copper: and others, as lead, in expreſſed oils. Fuſed with a compoſition of ſulphur and fixed alkaline ſalt, they are all except zinc, made ſoluble in water.

All metallic ſubſtances, diſſolved in ſaline liquors, have powerful effects in the human body, though many of them appear in their pure ſtate to be inactive. their activity is generally in proportion to the quantity of acid combined with them: Thus lead, which in its crude form has no ſenſible effect, when united with a ſmall portion of vegetable acid into ceruſs, diſcovers a low degree of the ſtyptic and malignant quality, which it ſo ſtrongly exerts when blended with a larger quantity of the ſame acid into what was called *ſaccharum ſaturni*, but now more properly *ſal plumbi*, or *plumbum acetatum:* and thus mercury, with a certain quantity of the marine acid, forms the violent corroſive ſublimate, which by diminiſhing the proportion of acid becomes the mild medicine called *mercurius dulcis*.

IV. ACIDS.

53 Obſervations on the various acids.

The ſalts of this order are very numerous; but as we are at preſent treating of *Minerals*, it is only therefore the *mineral* or *foſſil* acids we mean to ſpeak of in this place.

Theſe are diſtinguiſhed by the names of the concretes from which they have been principally extracted; the *vitriolic* from vitriol, the *nitrous* from nitre or ſaltpetre; and the *marine* or *muriatic* from common ſea-ſalt. The form they are generally in, is that of a watery fluid: They have all a remarkable attraction for water: They imbibe the humidity of the air with rapidity and the generation of heat. Although heat be produced by their union with water, yet when mixed with ice in a certain manner, they generate a prodigious degree of cold. Acids change the purple and blue colours of vegetables to a red: they reſiſt fermentation; and laſtly, they impreſs that peculiar ſenſation on the tongue called *ſourneſs*, and which their name imports. But it is to be obſerved, that they are all highly corroſive, inſomuch as not to be ſafely touched, unleſs largely diluted with water, or united with ſuch ſubſtances as obtund or ſuppreſs their acidity. Mixed haſtily with vinous ſpirits, they raiſe a violent ebullition and heat accompanied with a copious diſcharge of noxious fumes: a part of the acid unites intimately with the vinous ſpirit into a new compound, void of acidity, called *dulcified ſpirit*. It is obſervable, that the marine acid is much leſs diſpoſed to this union with ſpirit of wine than either of the other two; nevertheleſs, many of the compound ſalts reſulting from the combination of earthy and metallic bodies with this acid, are ſoluble in that ſpirit, while thoſe with the other acids are not. All theſe acids effervеſce ſtrongly with alkaline ſalts both fixed and volatile, and form with them neutral ſalts; that is, ſuch as diſcover no marks either of an acid or alkaline quality.

The nitrous and marine acids are obtained in the form of a thin liquor; the acid part being blended with a large proportion of water, without which it would be diffuſed into an incoercible vapour: the vitriolic ſtands in need of ſo much leſs water for its condenſation as to aſſume commonly an oily conſiſtence (whence it is called *oil of vitriol*), and in ſome circumſtances even a ſolid one. Alkaline ſalts, and the ſoluble earths and metals, abſorb from the acid liquors only the pure acid part: ſo that the water may now be evaporated by heat, and the compound ſalt left in a dry form.

From the coalition of the different acids with the three different alkalis, and with the ſeveral ſoluble earths and metallic bodies, reſult a variety of ſaline compounds; the principal of which ſhall be particulariſed in the ſequel of this article.

The vitriolic acid, in its concentrated liquid ſtate, is much more ponderous than the other two; it emits no viſible vapour in the heat of the atmoſphere, but imbibes moiſture which increaſes its weight: the nitrous and marine emit copious corroſive fumes, the nitrous yellowiſh red, and the marine white ones. If bottles containing the three acids be ſtopt with cork, the cork is found in a little time tinged black with the vitriolic, corroded into a yellow ſubſtance by the nitrous, and into a whitiſh one by the marine.

It is above laid down as a character of one of the claſſes of earths, that the vitriolic acid precipitates them when they are previouſly diſſolved in any other acid: it is obvious, that on the ſame principle this particular acid may be diſtinguiſhed from all others. This character ſerves not only for the acid in its pure ſtate, but likewiſe for all its combinations that are ſoluble in water. If a ſolution of any compound ſalt, whoſe acid is the vitriolic, be added to a ſolution of chalk in any other acid, the vitriolic acid will part from the ſubſtance with which it was before combined, and join itſelf to the chalk, forming therewith a compound; which, being no longer ſoluble in the liquor, renders the whole milky for a time, and then gradually ſubſides.

This acid may be diſtinguiſhed alſo, in compound ſalts, by another criterion not leſs ſtrongly marked: If any ſalt containing it be mixed with powdered charcoal, and the mixture expoſed in a cloſe veſſel to a moderately ſtrong fire, the acid will unite with the directly inflammable part of the charcoal, and compoſe therewith a genuine ſulphur. Common brimſtone is no other than a combination of the vitriolic acid with a ſmall proportion of inflammable matter. With any kind of inflammable matter which is not volatile in cloſe veſſels, as the coal of vegetables, of animals, or of bitumens, this acid compoſes always the ſame identical ſulphur.

The nitrous acid alſo, with whatever kind of body it be combined, is both diſtinguiſhed and extricated by means of any inflammable ſubſtance being brought to a ſtate of ignition with it. If the ſubject be mixed with a little powdered charcoal and made red hot, a deflagration or fulmination enſues, that is, a bright flame with a hiſſing noiſe; and the inflammable matter and the acid being thus conſumed or diſſipated together, there remains only the ſubſtance which was before combined with the acid, and the ſmall quantity of aſhes afforded by the coal.

Theſe properties of the nitrous acid deflagrating with inflammable ſubſtances, and of the vitriolic forming ſulphur with them, ſerve not only as criteria of the reſpective acids in the various forms and diſguiſes, but likewiſe for diſcovering inflammable matter in bodies, when its quantity is too ſmall to be ſenſible on other trials.

All theſe acids will be more particularly examined when we come to treat of each of them apart. There are, however, a few other mineral acids which are of importance to be known: theſe are, *aqua regia; acid of borax; ſparry acid;* and, laſtly, *fixed air*, which has of late been called *aërial acid*, or *acid of chalk*.

Aqua regia has been generally prepared by a mixture of certain proportions of the nitrous and muriatic acids. It is of little avail in pharmacy whether we conſider it as a diſtinct acid, or only as a modification of the muriatic. It has been found, that the muriatic acid when diſtilled with *mangane*ſ*e* (a peculiar foſſile ſubſtance, ſhowing a remarkable attraction to phlogiſton), ſuffers a change which renders it capable of diſſolving gold and platina. Whether this change be produced by the acid acquiring a redundance of pure air, or by its being deprived of phlogiſton, it is not our buſineſs to decide. This experiment, however, renders it probable, that the nitrous acid in the common aqua regia is only ſubſervient to accompliſhing the ſame change in the muriatic acid which is produced by diſtilling that acid with mangane*ſ*e.

As aqua regia has been only uſed in the nicer operations in chemiſtry, and in the art of eſſaying, we think it unneceſſary to ſay more of it in this place.

The *acid of borax*, or *ſedative ſalt of Homberg*, may be extracted from borax, a neutral ſalt, whoſe baſe is mineral alkali. It has alſo been found native in the waters of ſeveral lakes in Tuſcany. It is a light, cryſtalliſed, concrete ſalt; its taſte is ſenſibly acid; it is difficultly ſoluble in water; but the ſolution changes blue vegetable colours to a red. With vitreſcent earths it fuſes into a white glaſs; it unites with the other alkalis, with magneſia, and with quicklime. The ſalts reſulting from theſe combinations are very imperfectly known. The ſalt has been called *ſedative*, from its ſuppoſed virtues as an anodyne and refrigerant remedy; but modern phyſicians have very little faith in this once celebrated drug.

The *ſparry acid* is ſo called from its being extracted from a foſſil called *ſparry fluor*, or *vitreous ſpar*. It is not yet determined whether it be a diſtinct acid; and as it has not yet been employed for any purpoſe in pharmacy, we think it would be improper to attempt any farther account of it here.

Beſides the acids abovementioned, there have alſo been diſcovered acids ſeemingly of a particular nature, in amber, in arſenic, and in black-lead: but as theſe have not hitherto been applied to any uſe in pharmacy, they cannot properly have a place in this article.

We now come to the laſt, but perhaps the moſt generally diffuſed, acid in nature: this is the aerial acid, or

Fixed Air.

54 Nature of fixed air, &c.

In our pharmaceutical hiſtory of this body, we ſhall only make uſe of the two names *fixed air* and *aerial acid*, being thoſe moſt generally uſed, and which in our opinion are moſt applicable to our own ſubject. Fixed air is a permanently elaſtic fluid, being only *fixed* when in a ſtate of combination with calcareous earth or other ſubſtances from which it may be extricated. It has received many different names, according to the ſubſtances from which it is diſengaged, and to the different opinions concerning its nature: it is the *gas ſilveſtre* of Helmot, the *fixed air* of Dr Black, the *acid of chalk*, *calcareous gas*, *mephitic gas*, *mephitic acid*, and *aerial acid*, of many modern chemiſts. In accommodating our account of it to the purpoſes of pharmacy, it is moſt convenient to conſider it as an acid. The aerial acid may be extricated by heat, or by other acids, from all calcareous earths; that is, from all thoſe earths which by calcination are converted into quicklime; ſuch as chalk, marble, limeſtone, ſea-ſhells, &c. It is likewiſe extricated from mild, fixed, and volatile alkalis, and from magneſia alba. Thus, if the vitriolic, or almoſt any other acid, be added to a quantity of calcareous earth or mild alkali, a briſk efferveſcence immediately enſues; the fixed air, or aerial acid, is diſcharged in bubbles; and the other acid takes its place. If this proceſs be conducted with an apparatus to be afterwards deſcribed, the aerial acid, now ſeparated from the calcareous earth, may be received and preſerved in cloſe veſſels. When thus diſengaged, it aſſumes its real character, viz. that of a *permanently elaſtic fluid*. Fixed air is alſo ſeparated in great quantity during the vinous fermentation of vegetable matters. When a calcareous earth is deprived of this acid by heat, it is converted into the cauſtic ſubſtance *quicklime*. When alkalis, fixed or volatile, are deprived by any means of their aerial acid, they are rendered much more cauſtic, incapable of cryſtallization, or of efferveſcing with other acids. They are alſo in this *deaerated* ſtate much more powerful in diſſolving other bodies. By recombining this acid with quicklime, calcined magneſia, or alkali, any of which had been deprived of it, theſe ſubſtances again aſſume their former weight and properties. Theſe bodies, then, when combined with aerial acid, are called *mild*; as *mild calcareous earth*, *mild alkali*, &c.: and when deprived of this acid they are called *cauſtic*; as *cauſtic calcareous earths*, *cauſtic alkali*, &c.: but as magneſia is not rendered cauſtic by calcination, there would perhaps be leſs danger in calling them *aerated* and *deaerated*. The aerial acid is more diſpoſed to unite with cauſtic calcareous earth (quicklime) than with any other ſubſtance; next to that, its attraction is for fixed alkali, then for magneſia, and laſtly for volatile alkali. We ſhall afterwards find that theſe relative powers of the different ſubſtances to unite with this acid, lay the foundation of many important proceſſes in pharmacy.

When we pour a ſmall quantity of the aerial acid into lime-water, the liquor inſtantly aſſumes a white colour, and the lime gradually precipitates, leaving the water clear and taſteleſs: the lime in this experiment has abſorbed the acid, and has therefore become *mild* or *aerated* earth. The aerial acid is capable of being abſorbed by water, and the water thus impregnated precipitates lime in lime-water; but if a certain larger quantity of this impregnated water be added, the lime is rediſſolved, and the liquor recovers its tranſparency. Water impregnated with aerial acid is capable of diſſolving iron; and in this way are formed native and artificial chalybeate waters. Zinc is alſo ſoluble in the ſame liquor. This acid is eaſily expelled from the water by removing the preſſure of the atmoſphere, by boiling, and even by time alone, if the veſſel be not kept cloſe ſhut. Fixed air extinguiſhes flame, vegetable and animal life, and ought therefore to be cautiouſly managed: like other acids it changes the blue colours of vegetables to a red, and communicates an acidulous taſte to the water impregnated with it. The attraction of the aerial acid, even to quicklime, is but feeble; as we know of no other acids whatever that are not able to diſengage it.

From theſe ſeveral facts it will appear obvious, that *mild* or *efferveſcing alkalis*, whether fixed or volatile, are really neutral ſalts, compounded of the aerial acid and pure alkali: like other acids, it unites with theſe bodies, diminiſhes their cauſticity, and effects their cryſtallization. In ſpeaking, therefore, of *pure alkali*, we ought to confine ourſelves to thoſe in the *cauſtic* or *deaerated* ſtate; or, in other words, to thoſe which are deprived of their fixed air or aerial acid, with which they formed a compound ſalt. Many other properties of this acid might be mentioned, but we have now noticed all thoſe which we thought were concerned in the buſineſs of pharmacy. We ſhall have occaſion to recur to the ſubject when we come to the preparation of ſeveral compound drugs.

Let us next take a view of what paſſes in the combinations of acids with different ſubſtances.

If a fixed alkaline ſalt be united with a vegetable acid, as vinegar, and formed into a neutral ſalt, on adding to this compound ſome marine acid, the acetous acid will be diſengaged, ſo as to exhale totally in a moderate heat, leaving the marine in poſſeſſion of the alkali: the addition of the nitrous will in like manner diſpoſſeſs the marine, which now ariſes in its proper white fumes, though without ſuch an addition it could not be extricated from the alkali by any degree of heat: on the addition of the vitriolic acid, the nitrous gives way in its turn, exhaling in red fumes, and leaving only the vitriolic acid and the alkali united together.

Again, if any metallic body be diſſolved in an acid, the addition of any earthy body that is diſſoluble in that acid will precipitate the metal: a volatile alkaline ſalt will in like manner precipitate the earth: and a fixed alkali will diſlodge the volatile; which laſt being readily exhaled by heat, the remaining ſalt will be the ſame as if the acid and fixed alkali had been joined together at firſt, without the intervention of any of the other bodies.

55 Theſe tranſpoſitions, &c. of bodies the chemiſts call affinity or elective attraction.

The power in bodies on which theſe various tranſpoſitions and combinations depend, is called by the chemiſts *affinity* or *elective attraction*; a term, like the Newtonian *attraction*, deſigned to expreſs not the cauſe, but the effect. When an acid ſpontaneouſly quits a metal to unite with an alkali, they ſay *it has a greater affinity* or *attraction* to the alkali than to the metal: and when, on the contrary, they ſay it has a greater affinity to fixed alkali than to the volatile, they mean only that it will unite with the fixed in preference to the volatile; and that if previouſly united with a volatile alkali, it will forſake this for a fixed one.

The doctrine of the affinities of bodies is of a very extenſive uſe in chemical pharmacy: many of the officinal proceſſes, as we ſhall ſee hereafter, are founded on it: ſeveral of the preparations turn out very different from what would be expected by a perſon unacquainted with theſe properties of bodies; and ſeveral of them, if, from an error in the proceſs, or other cauſes, they prove unfit for the uſe intended, may be rendered applicable to other purpoſes, by ſuch tranſpoſitions of their component parts as are pointed out by the knowledge of their affinities.

We ſhall therefore ſubjoin a table of the principal affinities obſerved in pharmaceutical operations, formed from that of the famous Bergman. See other tables for more general purpoſes in the article CHEMISTRY.

56 Explanation of the table of ſingle attractions.

The table is to be thus underſtood. The ſubſtance printed in capitals, on the top of each ſeries, has the greateſt affinity with that immediately under it, a leſs affinity with the next, and ſo on to the end of the ſeries: that is, if any of the remote bodies has been combined with the top one, the addition of any of the intermediate bodies will diſunite them; the intermediate body uniting with the uppermoſt body of the ſeries, and throwing out the remote one. Thus, in the firſt ſeries of the affinities of the vitriolic acid, a fixed alkali being placed between the acid and iron, it is to be concluded, that wherever vitriolic acid and iron are mixed together, the addition of any fixed alkaline ſalt will unite with the acid, and occaſion the iron to be ſeparated. Where ſeveral ſubſtances are expreſſed in one ſeries, it is to be underſtood, that any of thoſe bodies which are nearer to the uppermoſt, will in like manner diſengage from it any of thoſe which are more remote.

TABLE OF SINGLE ATTRACTIONS.

By WATER.

VITRIOLIC ACID.	NITROUS ACID.	MARINE ACID.	AQUA REGIA.	ACID OF BORAX.	ACID OF SUGAR.	ACID OF TARTAR.	ACID OF SORREL.	ACID OF LEMON.
Terra ponderoſa,	Vegetable alkali,	Vegetable alkali,	Vegetable alkali,	Lime,	Lime,	Lime.	Lime,	Lime,
Vegetable alkali,	Foſſil alkali,	Foſſil alkali,	Foſſil alkali,	Terra ponderoſa,	Terra ponderoſa,	Terra ponderoſa,	Terra ponderoſa,	Terra ponderoſa,
Foſſil alkali,	Terra ponderoſa,	Terra ponderoſa,	Terra ponderoſa,	Magneſia,	Magneſia,	Magneſia,	Magneſia,	Magneſia,
Lime,	Lime,	Lime,	Lime,	Vegetable alkali,	Vegetable alkali,	Vegetable alkali,	Vegetable alkali,	Vegetable alkali,
Magneſia,	Magneſia,	Magneſia,	Magneſia,	Foſſil alkali,	Foſſil alkali,	Foſſil alkali,	Foſſil alkali,	Foſſil alkali,
Volatile alkali,	Volatile alkali,	Volatile alkali,	Volatile alkali,	Volatile alkali,	Volatile alkali,	Volatile alkali,	Volatile alkali,	Volatile alkali,
Clay,	Clay,	Clay,	Clay,	Clay,	Clay,	Clay,	Clay,	Clay,
Zinc,	Zinc,	Zinc,	Zinc,	Zinc,	Zinc,	Zinc,	Zinc,	Zinc,
Iron,	Iron,	Iron,	Iron,	Iron,	Iron,	Iron,	Iron,	Iron,
Lead,	Lead,	Lead,	Lead,	Lead,	Lead,	Lead,	Lead,	Lead,
Tin,	Tin,	Tin,	Tin,	Tin,	Tin,	Tin,	Tin,	Tin,
Copper,	Copper,	Copper,	Copper,	Copper,	Copper,	Copper,	Copper,	Copper,
Antimony,	Antimony,	Antimony,	Antimony,	Antimony,	Antimony,	Antimony,	Antimony,	Antimony,
Arſenic,	Arſenic,	Arſenic,	Arſenic,	Arſenic,	Arſenic,	Arſenic,	Arſenic,	Arſenic,
Mercury,	Mercury,	Mercury,	Mercury,	Mercury,	Mercury,	Mercury,	Mercury,	Mercury,
Silver,	Silver,	Silver,	Silver,	Silver,	Silver,	Silver,	Silver,	Silver,
Gold,	Gold,	Gold,	Gold,	Gold,	Gold,	Gold,	Gold,	Gold,
Water,	Water,	Water,	Water,	Water,	Water,	Water,	Water,	Water,
Alcohol.	Alcohol.	Alcohol.	Alcohol.	Alcohol.	Alcohol.	Alcohol.	Alcohol.	Alcohol.

By FIRE.

VITRIOLIC ACID.	NITROUS ACID.	MARINE ACID.	AQUA REGIA.	ACID OF BORAX.	ACID OF SUGAR.	ACID OF TARTAR.	ACID OF SORREL.	ACID OF LEMON.
Vegetable alkali,	Terra ponderoſa,	Terra ponderoſa,	Terra ponderoſa,	Lime,				
Foſſil alkali,	Vegetable alkali,	Vegetable alkali,	Vegetable alkali,	Terra ponderoſa,				
Terra ponderoſa,	Foſſil alkali,	Foſſil alkali,	Foſſil alkali,	Magneſia,				
Lime,	Lime,	Lime,	Lime,	Vegetable alkali,				
Magneſia,	Magneſia,	Magneſia,	Magneſia,	Foſſil alkali,				
Metals,	Metals,	Metals,	Metals,	Metals,				
Volatile alkali,	Volatile alkali,	Volatile alkali,	Volatile alkali,	Volatile alkali,				
Clay.	Clay.	Clay.	Clay.	Clay.				

TABLE *of* SINGLE ATTRACTIONS *continued.*

BY WATER.

ACETOUS ACID.	ACID OF PHOSPHORUS.	AERIAL ACID.	VEGETABLE ALKALI.	FOSSIL ALKALI.	VOLATILE ALKALI.	TERRA PONDEROSA.	LIME.	MAGNESIA.
Terra ponderoſa,	Lime,	Terra ponderoſa,	Vitriolic acid,	Vitriolic acid,	Vitriolic acid,	Vitriolic acid,	Acid of ſugar,	Acid of ſugar,
Vegetable alkali,	Terra ponderoſa,	Lime,	Nitrous acid,	Nitrous acid,	Nitrous acid,	Acid of ſugar,	Acid of ſorrel,	Phoſphoric acid,
Foſſil alkali,	Magneſia,	Vegetable alkali,	Marine acid,	Marine acid,	Marine acid,	Acid of ſorrel,	Vitriolic acid,	Vitriolic acid,
Volatile alkali,	Vegetable alkali,	Foſſil alkali,	Phoſphoric acid,	Phoſphoric acid,	Phoſphoric acid,	Phoſphoric acid,	Acid of tartar,	Nitrous acid,
Lime,	Foſſil alkali,	Magneſia,	Acid of ſugar,	Acid of ſugar,	Acid of ſugar,	Nitrous acid,	Phoſphoric acid,	Marine acid,
Magneſia,	Volatile alkali,	Volatile alkali,	Acid of tartar,	Acid of tartar,	Acid of tartar,	Marine acid,	Nitrous acid,	Acid of ſorrel,
Clay,	Clay,	Clay,	Acid of ſorrel,	Acid of ſorrel,	Acid of ſorrel,	Acid of lemon,	Marine acid,	Acid of tartar,
Zinc,	Zinc,	Zinc,	Acid of lemon,	Acid of lemon,	Acid of lemon,	Acid of tartar,	Acid of lemon,	Acid of lemon,
Iron,	Iron,	Iron,	Acid of benzoin,	Acid of benzoin,	Acid of benzoin,	Acid of benzoin,	Acid of benzoin,	Acid of benzoin,
Lead,	Lead,	Lead,	Acetous acid,	Acetous acid,	Acetous acid,	Acetous acid,	Acetous acid,	Acetous acid,
Tin,	Tin,	Tin,	Acid of borax,	Acid of borax,	Acid of borax,	Acid of borax,	Acid of borax,	Acid of borax,
Copper,	Copper,	Copper,	Aerial acid,	Aerial acid,	Aerial acid,	Aerial acid,	Aerial acid,	Aerial acid,
Antimony,	Antimony,	Antimony,	Water,	Water,	Water,	Water,	Water,	Sulphur.
Arſenic,	Arſenic,	Arſenic,	Unctuous oils,	Unctuous oils,	Unctuous oils,	Unctuous oils	Unctuous oil.	
Mercury,	Mercury,	Mercury,	Sulphur,	Sulphur,	Sulphur,	Sulphur.	Sulphur.	
Silver,	Silver,	Silver,	Metals.	Metals.	Metals.			
Gold,	Gold,	Gold,						
Water,	Water.	Water.						
Alcohol.								

BY FIRE.

ACETOUS ACID.	ACID OF PHOSPHORUS.	AERIAL ACID.	VEGETABLE ALKALI.	FOSSIL ALKALI.	VOLATILE ALKALI.	TERRA PONDEROSA.	LIME.	MAGNESIA.
Terra ponderoſa,	Lime,		Phoſphoric acid,	Phoſphoric acid,	Vitriolic acid,	Phoſphoric acid,	Phoſphoric acid,	Phoſphoric acid,
Vegetable alkali,	Terra ponderoſa,		Acid of borax,	Acid of borax,	Nitrous acid,	Acid of borax,	Acid of borax,	Acid of borax,
Foſſil alkali,	Magneſia,		Vitriolic acid,	Vitriolic acid,	Marine acid,	Vitriolic acid,	Vitriolic acid,	Vitriolic acid,
Lime,	Vegetable alkali,		Nitrous acid,	Nitrous acid,	Acetous acid,	Nitrous acid,	Nitrous acid,	Nitrous acid,
Magneſia,	Foſſil alkali,		Marine acid,	Marine acid,	Terra ponderoſa,	Marine acid,	Marine acid,	Marine acid,
Metals,	Metals,		Acetous acid,	Acetous acid.	Lime,	Acid of benzoin,	Fixed alkali,	Fixed alkali,
Volatile alkali,	Volatile alkali,		Terra ponderoſa,	Terra ponderoſa,	Magneſia,	Acetous acid,	Sulphur,	Sulphur,
Clay.	Clay.		Lime,	Lime,	Clay,	Fixed alkali,	Lead.	Lead.
			Magneſia,	Magneſia.	Sulphur.	Sulphur,		
			Clay,	Clay,		Lead.		
			Sulphur.	Sulphur.				

TABLE *of* SINGLE ATTRACTIONS *continued.*

BY WATER.

CLAY.	WATER.	SULPHUR.	HEPAR SULPHURIS.	ALCOHOL.	ÆTHER.	ESSENTIAL OILS.	EXPRESSED OILS,	GOLD.
Vitriolic acid, Nitrous acid, Marine acid, Acid of ſugar, Acid of ſorrel, Acid of tartar, Acid of lemon, Acid of phoſphorus, Acid of benzoin, Acetous acid, Acid of borax, Aerial acid.	Vegetable alkali, Foſſil alkali, Volatile alkali, Alcohol, Æther, Vitriolic acid, Vitriolated tartar, Alum, Green Vitriol, Corroſive sublimate.	Lead, Tin, Silver, Mercury, Arſenic, Antimony, Iron, Vegetable alkali, Volatile alkali, Terra ponderoſa, Lime, Magneſia, Unctuous oils, Eſſential oils, Æther, Alcohol.	Gold, Silver, Mercury, Arſenic, Antimony, Copper, Tin, Lead, Iron, Alcohol, Water.	Water, Æther, Eſſential oils, Volatile alkali, Fixed alkali, Hepar ſulphuris, Sulphur.	Alcohol, Eſſential oils, Expreſſed oils, Water, Sulphur.	Æther, Alcohol, Expreſſed oils, Fixed alkali, Sulphur.	Æther, Eſſential oils, Fixed alkali, Volatile alkali, Sulphur.	Æther, Marine acid, Aqua-regia, Nitrous acid, Vitriolic acid, Acid of tartar, Phoſphoric acid, Fixed alkali, Volatile alkali.

BY FIRE.

Phoſphoric acid, Acid of borax, Vitriolic acid, Nitrous acid, Marine acid, Fixed alkali, Sulphur, Lead.		Fixed alkali, Iron, Copper, Tin, Lead, Silver, Antimony, Mercury, Arſenic.	Iron, Copper, Tin, Lead, Silver, Antimony, Mercury, Arſenic.					Mercury, Copper, Silver, Lead, Tin, Antimony, Iron, Zinc, Arſenic, Hepar ſulphuris,

TABLE

TABLE *of* SINGLE ATTRACTIONS *continued.*

BY WATER.

SILVER.	MERCURY.	LEAD.	IRON.	COPPER.	TIN.	ARSENIC.	ZINC.	ANTIMONY.
Marine acid,	Marine acid,	Vitriolic acid,	Acid of ſugar,	Acid of ſugar,	Acid of tartar,	Marine acid,	Acid of ſugar,	Marine acid,
Acid of ſugar,	Acid of ſugar,	Acid of ſugar,	Acid of tartar,	Acid of tartar,	Marine acid,	Acid of ſugar,	Vitriolic acid,	Acid of ſugar,
Vitriolic acid,	Phoſphoric acid,	Acid of tartar,	Vitriolic acid,	Marine acid,	Vitriolic acid,	Vitriolic acid,	Marine acid,	Vitriolic acid,
Phoſphoric acid,	Vitriolic acid,	Phoſphoric acid,	Marine acid,	Vitriolic acid,	Acid of ſugar,	Nitrous acid,	Nitrous acid,	Nitrous acid,
Nitrous acid,	Acid of tartar,	Acid of ſorrel,	Nitrous acid,	Nitrous acid,	Phoſphoric acid,	Acid of tartar,	Acid of ſorrel,	Acid of tartar,
Acid of tartar,	Acid of lemon,	Marine acid,	Phoſphoric acid,	Phoſphoric acid,	Nitrous acid,	Phoſphoric acid,	Acid of tartar,	Acid of ſorrel,
Acid of ſorrel,	Nitrous acid.	Nitrous acid,	Acid of ſorrel,	Acid of ſorrel,	Acid of ſorrel,	Acid of ſorrel,	Phoſphoric acid,	Phoſphoric acid,
Acid of lemon,	Acetous acid,	Acid of lemon,	Acid of lemon,	Acid of lemon,	Acid of lemon,	Acid of lemon,	Acid of lemon,	Acid of lemon,
Acetous acid,	Acid of borax,	Acetous acid,	Acetous acid,	Acetous acid,	Acetous acid,	Acetous acid,	Acetous acid,	Acetous acid,
Aerial acid,	Aerial acid.	Acid of borax,	Acid of borax,	Acid of borax,	Acid of borax,	Volatile alkali,	Acid of borax,	Acid of borax,
Volatile acid.		Aerial acid,	Aerial acid.	Aerial acid,	Fixed alkali,	Unctuous oils.	Aerial acid,	Aerial acid.
		Fixed alkali.		Fixed alkali,	Volatile alkali.		Volatile alkali.	
				Volatile alkali,				
				Expreſſed oils.				

BY FIRE.

Lead,	Gold,	Gold,	Arſenic,	Gold,	Zinc,	Copper,	Copper,	Iron,
Copper,	Silver,	Silver,	Copper,	Silver,	Mercury,	Iron,	Antimony,	Copper,
Mercury,	Lead,	Copper,	Gold,	Arſenic,	Copper,	Silver,	Tin,	Tin,
Tin,	Tin,	Mercury,	Silver,	Iron,	Antimony,	Tin,	Mercury,	Lead,
Gold,	Zinc,	Tin,	Tin,	Zinc,	Gold,	Lead,	Silver,	Silver,
Antimony,	Copper,	Antimony,	Antimony,	Antimony,	Siver,	Gold,	Gold,	Zinc,
Iron,	Antimony,	Arſenic	Lead,	Tin,	Lead,	Zinc,	Arſenic,	Gold,
Zinc,	Arſenic	Zinc	Mercury,	Lead,	Iron,	Antimony,	Lead,	Mercury,
Arſenic,	Iron,	Iron	Hepar ſulphuris,	Mercury,	Arſenic,	Hepar ſulphuris,	Iron.	Arſenic,
Hepar ſulphuris,	Hepar ſulphuris,	Hepar ſulphuris,	Sulphur.	Hepar ſulphuris,	Hepar ſulphuris,	Sulphur.		Hepar ſulphuris,
Sulphur.	Sulphur.	Sulphur.		Sulphur.	Sulphur.			Sulphur.

CASES of DOUBLE ELECTIVE ATTRACTIONS.

BY WATER.

1. Epſom ſalt with Mild vegetable alkali,	Give	1. Vitriolated tartar and Common magneſia.
2. Vitriolic ammoniac with Mild mineral alkali,		2. Glauber's ſalt and Mild volatile alkali.
3. Vitriolated tartar with Nitrous ſelenite,		3. Vitriolic ſelenite and Saltpetre.
4. Vitriolated tartar with Mercurial nitre,		4. Vitriol of mercury and Saltpetre.
5. Saltpetre with Luna cornea,		5. Lunar cauſtic and Cubic nitre.
6. Vitriolated tartar with Luna cornea,		6. Vitriol of ſilver and Febrifugal ſalt.
7. Regenerated tartar with Mercurial nitre,		7. Acetous mercurial ſalt and Saltpetre.

BY HEAT.

1. Vitriolic ammoniac with Common ſalt,	Give	1. Common ſal ammoniac, and Glauber's ſalt.
2. Vitriolic ammoniac with Regenerated tartar,		2. Acetous ammoniacal ſalt, and Vitriolated tartar.
3. Vitriol of mercury with Common ſalt,		3. Glauber's ſalt and Corroſive ſublimate.
4. Crude antimony with Corroſive ſublimate,		4. Butter of antimony and Factitious cinnabar.

CHAP. II. *Of the Pharmaceutical Apparatus.*

57 The application of fire of great importance in pharmaceutical preparations.

ONE of the principal arts of the pharmaceutical apparatus conſiſts in contrivances for containing and applying fire, and for directing and regulating its power. Of theſe contrivances called *furnaces*, there are different kinds according to the conveniency of the place, and the particular purpoſes they are intended to anſwer. We will here endeavour to give a general idea of their ſtructure, and of the principles on which they are built; and for particulars refer the reader to FURNACE; and CHEMISTRY, page 450.

FURNACES.

58 Furnace for open fire.

The moſt ſimple furnace in the common ſtove, otherwiſe called the *furnace for open fire*. This is uſually made of an iron hoop, five or ſix inches deep; with a grate or ſome iron bars acroſs the bottom for ſupporting the fuel. It either ſtands upon feet, ſo as to be moveable from place to place; or is fixed in brick-work. In this laſt caſe, a cavity is left under the grate, for receiving the aſhes that drop through it; and an aperture or door, in the forepart of this aſh-pit, ſerves both for allowing the aſhes to be occaſionally raked out, and for admitting air to paſs up through the fuel. This furnace is deſigned for ſuch operations as require only a moderate heat; as infuſion, decoction, and the evaporation of liquids.

59 Wind furnace.

A deeper hoop or body, cylindrical, parallelopipedal, widening upwards, elliptical, or of other figures; formed of, or lined with, ſuch materials as are capable of ſuſtaining a ſtrong fire; with a grate and aſh-pit beneath, as in the preceding; and communicating at the top with a perpendicular pipe, or chimney; makes a *wind furnace*.

60 The heat of the fire increaſed in theſe furnaces by the perpendicular height of the chimney.

The greater the perpendicular height of the chimney, the greater will be the draught of air through the furnace, and the more intenſely will the fire burn; provided the width of the chimney is ſufficient to allow a free paſſage to all the air that the furnace can receive through the grate; for which purpoſe, the area of the aperture of the chimney ſhould be nearly equal to the area of the interſtices of the grate.

Hence, where the chimney conſiſts of moveable pipes, made to fit upon each other at the ends, ſo that the length can be occaſionally increaſed or diminiſhed, the vehemence of the fire will be increaſed or diminiſhed in the ſame proportion.

61 Another method of increaſing the heat.

In furnaces whoſe chimney is fixed, the ſame advantage may be procured on another principle. As the intenſity of the fire depends wholy upon the quantity of air ſucceſſively paſſing through and animating the burning fuel, it is obvious, that the moſt vehement fire may be ſuppreſſed or reſtrained at pleaſure, by cloſing more or leſs either the aſh-pit door by which the air is admitted, or the chimney by which it paſſes off; and that the fire may be more or leſs raiſed again, by more or leſs opening thoſe paſſages. A moveable plate, or regiſter, in any convenient part of the chimney, affords commodious means of varying the width of the paſſage, and conſequently of regulating the heat. This is moſt conveniently accompliſhed by keeping the aſh-pit door entirely ſhut, and regulating the heat by a range of holes in a damping plate; each hole is provided with a proper pin, whereby we may ſhut it at pleaſure. Theſe holes may be made to bear a certain proportion to each other; the ſmalleſt being conſidered as one, the next to it in ſize muſt have twice the opening, the next to that double of the ſecond, &c.; and ſo on to the number of ſeven or eight; and by combining theſe holes variouſly together, we can admit any quantity of air from 1 to 128; as 1. 2. 4. 8. 16. 32. 64. 128. See FURNACE, p. 507.

There are two general kinds of theſe wind-furnaces; one, with the chimney on the top, over the middle of the furnace; the other with the chimney on one ſide, and the mouth clear.

In

62
Obſervations on two different kinds of wind furnaces.

In the firſt, either the upper part of the furnace is contracted to ſuch an aperture, that the chimney may ſit upon it; or it is covered with an arched dome, or with a flat plate, having a like aperture in the middle. As in this diſpoſition of the chimney, the inſide of the furnace cannot be come at from above, a door is made in the ſide, a little above the grate, for ſupplying the fuel, inſpecting the matter in the fire, &c.

For performing fuſions in this furnace, the crucible, or melting veſſel, is placed immediately among the fuel, with a ſlip of brick, or ſome other like ſupport, between it and the grate, to keep the cold air, which enters underneath, from ſtriking on its bottom.

When deſigned as a reverberatory, that is for diſtillation in long-necked coated glaſs retorts, two iron bars are placed acroſs, above the fire, for ſupporting the veſſel, whoſe neck comes out at an aperture made for that purpoſe in the ſide. This aperture ſhould be made in the ſide oppoſite to the door abovementioned; or at leaſt ſo remote from it, that the receiver, fitted on the neck of the diſtilling veſſel without the furnace, may not lie in the operator's way when he wants to ſtir the fire or throw in freſh fuel.

The other kind of wind-furnace communicates, by an aperture in its back part near the top, either with an upright pipe of its own, or with the chimney of the room; in which laſt caſe, all other paſſages into the chimney muſt be cloſed. Here the mouth of the furnace ſerves for a door, which may be occaſionally covered with a plate or tile. Of this kind is the furnace moſt commonly uſed for fuſion in a crucible.

This laſt conſtruction, by leaving the mouth of the furnace clear, affords the conveniency of letting into it a boiling or evaporating pan, a copper ſtill, an iron pot, for diſtilling hartſhorn, an iron ſand-pot, or other like veſſels, of ſuch a ſize that they may be ſupported on the furnace by their rims. The mouth being thus occupied by the veſſels, a door muſt be made in the ſide for ſupplying and ſtirring the fuel.

When a furnace of this kind is deſigned only for a ſand-bath, it is moſt commodious to have the ſand placed on a long iron plate, furniſhed with a ledge of freeſtone or brick work at each ſide. The mouth of the furnace is to be cloſely covered by one end of this plate; and the canal by which the furnace communicates with its chimney, is to be lengthened and carried along under the plate, the plate forming the upper ſide of the canal. In this kind of ſand-bath, digeſtions, &c. requiring different degrees of heat, may be carried on at once; for the heat decreaſes gradually from the end over the furnace to the other.

When large veſſels, as ſtills and iron pots for diſtilling hartſhorn and aquafortis, are fixed in furnaces, a conſiderable part of the bottom of the veſſel is commonly made to reſt upon ſolid brick-work.

The large ſtill, whoſe bottom is narrow in proportion to its height, and whoſe weight, when charged with liquor, requires great part of it to be thus ſupported, expoſes but a ſmall ſurface to the action of the fire underneath. To make up for this diſadvantage, the heat, which riſes at the further end of a long narrow grate, is conveyed all round the ſides of the veſſel by a ſpiral canal, which communicates at top with a common chimney.

The pots for diſtilling hartſhorn and aquafortis in the larger way, have part of their great weight borne up by three ſtrong pins or trunions at equal diſtances round the pot towards the middle reaching into a brick-work: ſo that leſs ſupport being neceſſary underneath, a greater ſurface of the wide bottom lies expoſed to the immediate action of the fire.

If a furnace, communicating with its chimney by a lateral canal, as in the ſand-furnace abovementioned, be carried to a conſiderable height above the part where this canal enters it, and if it be filled with fuel to the top, and cloſely covered, the fuel will burn no higher than up to the upper ſide of the canal through which the air paſſes off; and in proportion as this lower part of the fuel conſumes, it will be ſupplied by that above, which falls down in its place. Hence in this furnace, called an *athanor*, a conſtant heat may be kept up for a conſiderable length of time without attendance.

The tower of the athanor, or that part which receives the fuel, is commonly made to widen a little downwards, that the coals may fall the more freely; but not ſo much as that the part on fire at bottom may be too ſtrongly preſſed. A ſmall aperture is made oppoſite to the canal or flue, or a number of openings according to the ſize of the furnace and the degree of heat required, for ſupplying the air, which is more conveniently admitted in this manner than through the grate, as the interſtices of the grate are in time choaked up by the aſhes.

This furnace is deſigned only for heating bodies exterior to it. Its canal or flue, as in the ſand-furnace already deſcribed, paſſes under a ſand-bath or water-bath; at the farther end of which it riſes perpendicularly to ſuch a height, as may occaſion a ſufficient draught of air through the fire.

The flue may be ſo wide as to correſpond to the whole height of the fire-place. A regiſter or ſliding plate, placed between the flue and the furnace, enable us to increaſe or diminiſh this height, and conſequently the quantity of fire, at pleaſure. If the ſpace beneath the flue be incloſed to the ground, the heat in this cavity will be conſiderable enough to be applicable to ſome uſeful purpoſes.

63
Of the materials of which furnaces are made.

With regard to the materials of furnaces, the fixed ones are built of bricks, cemented together by ſome good loam or clay. Any kind of loam or clayey compoſition that is of a proper degree of tenacity, which, when made into a paſte with water and well-worked, does not ſtick to the fingers, and which, when thoroughly dried, neither cracks nor melts in a vehement fire, is fit for uſe. The purer and more tenacious clays require to have their tenacity leſſened by an admixture of ſand, or rather of the ſame kind of clay burnt and groſsly powdered.

Smaller portable furnaces are made of ſtrong iron or copper plates, lined, to the thickneſs of an inch or more, with the ſame kind of clayey compoſition; which for this uſe may be beaten with ſome horſe-dung, chopped ſtraw, or cut hair or tow.

Very commodious portable furnaces, for a buſineſs of moderate extent, may be formed of the larger kind of common black-lead melting-pots, by cutting a door at the bottom of the pot for the aſh-pit, another above this for the fire-place, and introducing a circular iron grate of ſuch a ſize as may reſt between the two doors.

For a more particular account of the method of preparing furnaces, ſee Furnace.

Baths.

64 Of two kind of baths, and the peculiar advantages of each.

Where a ſtrong degree of heat is requiſite, as in the fuſion of metals, &c. the veſſel containing the ſubject matter is placed among the burning fuel, or immediately over it: this is called *operating in a naked fire*. Where a ſmaller heat is ſufficient, and the veſſel employed is either of glaſs, or of the more tender kinds of earthen ware, the ſand-bath or water-bath is uſed to defend the veſſel from the immediate action of the fire, and to render the heat leſs fluctuating.

Both theſe baths have their peculiar advantages and inconveniences. In water, the heat is equal through every part of the fluid: whereas in ſand it varies in different parts of one perpendicular line, decreaſing from the bottom to the top. Water cannot be made to receive, or to tranſmit to veſſels immerſed in it, above a certain degree of heat, viz. that which is ſufficient to make it boil; and hence it ſecures effectually againſt any danger of an exceſs of heat in thoſe operations wherein the product would be injured by a heat greater than that of boiling water: but this advantage renders it uſeleſs for proceſſes which require a greater heat, and for which ſand or other ſolid intermedia are neceſſarily employed. There is this convenience alſo in the ſand-bath, that the heat may be readily diminiſhed or increaſed about any particular veſſel, by raiſing it higher out of the ſand or ſinking it deeper; that different ſubjects may be expoſed to different degrees of heat from one fire; and that it keeps the veſſels ſteady. The ſand made choice of ſhould be a large coarſe grained kind, ſeparated from the finer parts by waſhing, and from little ſtones by the ſieve.

Coating of Glasses, Lutes.

65 In ſome operations glaſs veſſels are uſed in a naked fire.

Some proceſſes require to be performed with glaſs veſſels in a naked fire. For theſe purpoſes, veſſels made of the thinneſt glaſs ſhould be choſen; for theſe bear the fire without cracking, much better than thoſe which are thicker, and in appearance ſtronger.

All glaſſes, or other veſſels that are apt to crack in the fire, muſt be cautiouſly nealed, that is, heated by ſlow degrees: and when the proceſs is finiſhed, they ſhould be as ſlowly cooled, unleſs where the veſſel is to be broken to get out the preparation, as in ſome ſublimations; in this caſe it is more adviſable to expoſe the hot glaſs ſuddenly to the cold air, which will ſoon occaſion it to crack, than to endanger throwing down the ſublimated matter among the feces by a blow.

66 Of the coating of glaſs veſſels.

As a defence from the violence of the fire, and to prevent the contact of cold air on ſupplying freſh fuel, &c. the glaſs is to be coated over, to the thickneſs of about half-a-crown, with Windſor loam, ſoftened with water into a proper conſiſtence, and beaten up with ſome horſe-dung, or with the other clayey compoſitions abovementioned.

Theſe compoſitions ſerve alſo as a lute, for ſecuring the junctures of the veſſels in the diſtillation of the volatile ſalts and ſpirits of animals: for the diſtillation of acid ſpirits, the matter may be moiſtened with a ſolution of fixed alkaline ſalt inſtead of water. For moſt other purpoſes, a piece of wet bladder, or paſte of flour and water, or of linſeed meal (that is, the cake left after the expreſſion of oil of linſeed), are ſufficient lutes.

Sometimes clay and chalk are mixed up into a paſte, and ſpread upon ſlips of paper; and ſometimes gum-arabic is uſed inſtead of the clay, and mixed up in the ſame manner.

Wet bladders contract ſo ſtrongly by drying, that they not unfrequently break the veſſels: and the fat lute of Mr Macquer, which is a compoſition of clay and chalk with oil, is too cloſe for moſt operations. Where very elaſtic ſteams are to be condenſed, we are often obliged, even where the common lutes are employed, to leave or make an opening which may be occaſionally ſtopped by a plug: by this means we give paſſage to a part of theſe vapours, which prevents the burſting of the veſſels and facilitates the condenſation of the reſt. If we wiſh to collect incondenſible vapours, we receive them into a jar inverted under a baſon of water, or quickſilver, as is uſually done in the analyſis of vegetables by fire.

Beſides theſe, there are alſo required ſome other kinds of lutes for joining veſſels together in operations requiring a ſtrong heat, and for lining furnaces; for which ſee Chemistry, n° 604, 605.

Vessels.

In this place, we ſhall only give the operator a few general cautions with regard to the *matter* of the veſſels deſigned for containing the ſubject; and refer their deſcription, to the account of the operations in which they are employed. See likewiſe Chemistry, n° 557, &c.

67 Cautions reſpecting the matter of other veſſels.

Metalline veſſels poſſeſs the advantage of being able to bear ſudden alterations of heat and cold, and of being very ſtrong, ſo as to be capable of confining elaſtic ſteams; but, except thoſe made of gold or ſilver, they are readily corroded by acids, even by the mild ones of the vegetable kingdom. Copper veſſels are corroded alſo by alkaline liquors, and by ſome neutral ones, as ſolutions of ſal ammoniac. It is obſervable, that vegetable acids do not act upon this metal by boiling, ſo much as by ſtanding in the cold; for even lemon juice may be boiled in a clean copper veſſel, without receiving from it any taſte or ill quality; whereas, in the cold, it ſoon diſſolves ſo much as to contract a pernicious taint. The tin, with which copper veſſels are uſually lined, gives likewiſe a ſenſible impregnation to acid juices; and this impregnation alſo is probably not innocent, more eſpecially as a quantity of lead is commonly mixed with the tin. From the want of tranſparency in theſe veſſels, we are alſo deprived of the advantage of ſeeing the different changes during the operation.

The earthen veſſels poſſeſs none of the deſirable qualities for chemical operations, except that of ſuſtaining very violent degrees of heat, without being melted or otherwiſe changed. Theſe veſſels are leſs liable to external cracks, from ſudden applications of heat and cold, when they are made with a certain proportion of ſand, than with pure clay. Black lead, too, mixed with the clay, makes the veſſels ſuſtain violent degrees and ſudden alterations of heat ſurpriſingly well: crude clay, reduced to a kind of ſand by violent heat, and then mixed with raw clay, is alſo found to furniſh veſſels excellently fitted for thoſe operations where ſand might be corroded; but of all kinds of earthen ware, the moſt perfect is porcelain, compoſed of the fineſt clay mixed with a ſtony matter capable of melting in a violent heat. This, however, is too coſtly an article for general uſe. Reaumur diſcovered a method of imitating porcelain, by melting the coarſer kinds of glaſs with a mixture of ſand and clay: this has been found to be nearly of the colour of porcelain, to be much ſtronger than glaſs, and to bear the moſt ſudden changes of heat and cold that we have occaſion to apply. There has not hitherto been any manufacture of this ware, and of courſe it has not come into general uſe.

The common earthen veſſels are of a looſe porous texture; and hence are apt to imbibe a conſiderable quantity of certain liquids, particularly of thoſe of the ſaline kind; which ſoon diſcover that they have penetrated the veſſel, by ſhooting into ſaline efflореſcences on the outſide. Thoſe which are *glazed* have their glazing corroded by acids: by vinegar, and the acid juices of fruits, as well as by the ſtronger acids of the mineral kingdom. And as this glazing conſiſts chiefly of vitrified lead, the impregnation which it communicates to theſe liquors is of a very dangerous kind. If vinegar be boiled for ſome time in a glazed earthen veſſel, it will yield, on being inſpiſſated, a pure ſal plumbi, that is, a ſalt compoſed of lead and the acetous acid.

The veſſels called, from their hardneſs and compactneſs, *ſtone ware*, are in a good meaſure free from the inconveniences of the coarſer earthen ones. Their glazing being a part of the clay itſelf, ſuperficially vitrified by means of the fumes of common ſalt, appears to be proof againſt acids.

Glaſs veſſels ſuffer no corroſion, and give no taint, in any of the pharmaceutic-operations. When, therefore, they are made of a proper thinneſs, when they are well annealed, and when blown into a ſpherical form ſo that the heat may be equally applied, they are preferable to all others, where great and ſudden changes of heat and cold are not to take place, and where ſtrength is not required: what is called the *flint-glaſs*, which contains a quantity of lead in its compoſition, is the beſt for chemical purpoſes.

WEIGHTS.

68
Two kinds of weights uſed in pharmacy.

Two different kinds of weights are made uſe of in this country; one in the merchandiſe of gold and ſilver; the other for almoſt all other goods. The firſt we call Troy, the latter Avoirdupois weight.

The goldſmiths divide the Troy pound into twelve ounces; the ounce into 20 pennyweights; and the pennyweight into 24 grains. The avoirdupois pound is divided into 16 ounces; and the ounce into 16 parts, called *drams*.

The pound of the London and Edinburgh diſpenſatories is that of the goldſmiths, divided in the following manner:

The pound	contains	twelve ounces.
The ounce		eight drams.
The dram		three ſcruples.
The ſcruple		twenty grains.

The grain is equal to the goldſmith's grain.

The medical or Troy pound is leſs than the Avoirdupois, but the ounce and the dram greater. The Troy pound contains 5760 grains: the Avoirdupois 7000 grains. The Troy ounce contains 480 grains; the Avoirdupois only $437\frac{1}{2}$. The Troy dram 60; the Avoirdupois dram ſomewhat more than 27. Eleven drams Avoirdupois are nearly equal to five drams Troy; 12 ounces Avoirdupois to nearly 11 ounces Troy; and 19 pounds Avoirdupois are equal to ſomewhat more than 23 pounds Troy.

Theſe differences in our weights have occaſioned great confuſion in the practice of pharmacy. As the druggiſts and grocers ſell by the Avoirdupois weight, the apothecaries have not in general kept any weights adjuſted to the Troy pound greater than two drams, uſing Avoirdupois ounces. By this means it is apparent, that in all compoſitions, where the ingredients are preſcribed, ſome by pounds and others by ounces, they are taken in a wrong proportion to each other; and the ſame happens where any are directed in leſſer denominations than the ounce, as theſe ſubdiviſions uſed by the apothecaries are made to a different ounce.

MEASURES.

69
The meaſures uſed in pharmacy the ſame with thoſe commonly uſed for wine.

The meaſures employed in pharmacy are the common wine meaſures.

A gallon	contains	eight pints (*libræ*.)
The pint		ſixteen ounces.
The ounce		eight drams.

Though the pint is called by Latin writers *libra* or pound, there is not any known liquor of which a pint meaſure anſwers to that weight. A pint of the higheſt rectified ſpirit of wine exceeds a pound by above half an ounce; a pint of water exceeds it by upwards of three ounces; and a point of oil of vitriol weighs more than two pounds and a quarter.

The Edinburgh College, ſenſible of the many errors from the promiſcuous uſe of weights and meaſures, and of their different kinds, have in the laſt edition of their Pharmacopœia entirely rejected meaſures, and employ the Troy weight in directing the quantity either of ſolid or fluid ſubſtances. They have, however, taken all poſſible care that the proportion of the ſimples and ſtrength of the compounds ſhould neither be increaſed nor diminiſhed by this alteration. This change in the Edinburgh Pharmacopœia muſt be very particularly adverted to. And it is, we think to be regretted, that the London College have not in the laſt edition of their Pharmacopœia followed the ſame plan.

70
A table of the weights of certain meaſures of various fluids may frequently be uſeful.

A table of the weights of certain meaſures of different fluids may on many occaſions be uſeful, both for aſſiſting the operator in regulating their proportions in certain caſes, and ſhowing the comparative gravities of the fluids themſelves. We here inſert ſuch a table for a pint, an ounce, and a dram meaſure, of thoſe liquids whoſe gravity has been determined by experiments that can be relied on. The wine gallon contains 231 cubic inches; whence the pint contains $28\frac{7}{8}$, the ounce $1\frac{103}{128}$, and the dram $\frac{231}{1024}$ of a cubic inch.

	Pint weighs			Ounce meaſure weighs	Dram meaſure weighs
	ounces	drams	grains	grains	grains
INFLAMMABLE SPIRITS.					
Æthereal ſpirit of wine	11	1	36	336	42
Highly-rectified ſpirit of wine	12	5	20	380	47½
Common-rectified ſpirit of wine	13	2	40	400	50
Proof ſpirit	14	1	36	426	53¼
Dulcified ſpirit of ſalt	14	4	48	438	55¾
Dulcified ſpirit of nitre	15	2	40	460	57½
WINES.					
Burgundy - -	14	1	36	426	53¼
Red port - -	15	1	36	456	57
Canary - -	15	6	40	475	59½
EXPRESSED OILS.					
Oil olive -	14	0	0	420	52½
Linſeed oil -	14	2	8	428	53½
ESSENTIAL OILS.					
Oil of turpentine -	12	1	4	364	45½
of orange-peel -				408	51
of juniper-berries				419	52⅛
of roſemary -				430	53¾
of origanum				432	54
of caraway ſeeds -				432	54
of nutmegs -				436	54½
of ſavin -				443	$55\frac{2}{8}$
of hyſſop -				443	55⅜
of cummin-ſeed				448	56
of mint				448	56
of pennyroyal -				450	56¼
of dill-ſeed -				457	57⅛
of fennel-ſeed -				458	57¼
of cloves -				476	59½
of cinnamon -				576	59½
of ſaſſafras -				503	62⅞
ALKALINE LIQUORS.					
Aqua kali pura, *Pharm. Lond.*	16	0	0	480	60
Spirit of ſal ammoniac	17	1	10	514¾	$64\frac{1}{3}\frac{1}{2}$
Strong ſoap-boilers ley	17	6	24	534	66¾
Lixivium Tartari -	24	0	0	720	90
ACID LIQUORS.					
Wine-vinegar -	15	3	44	464	58
Beer vinegar -	15	6	56	476	59½
Glauber's ſpirit of ſalt	17	4	0	525	65_{8}
Glauber's ſpirit of nitre	20	2	40	610	76¼
Strong oil of vitriol -	28	5	20	860	107½
ANIMAL FLUIDS.					
Urine - -	15	5	20	470	58⅞
Cows milk -	15	6	40	475	59⅜
Aſſes milk -	16	0	0	480	60
Blood - -	16	1	4	484	60½
WATERS.					
Diſtilled water -	15	1	50	456⅞	57
Rain-water -	15	2	40	460	57½
Spring water -	15	3	12	462	57¾
Sea-water -	15	5	20	470	58⅞
QUICKSILVER.	214	5	20	6440	805

CHAP. III. *Of the Pharmaceutical Operations.*

SECT. I. *SOLUTION.*

71 The nature of ſolution both in the humid and dry way.

SOLUTION is an intimate commixture of ſolid bodies with fluids into one ſeemingly homogeneous liquor. The diſſolving fluid is called a *menſtruum* or *ſolvent*; and the body diſſolved is called the *ſolvend*.

Objections have been made, and perhaps with propriety, to theſe terms; as it is ſuppoſed that the two bodies uniting in ſolution act reciprocally on each other: there is, however, no danger from the words themſelves, if we do not derive them from a miſtaken theory. Solution cannot take place, unleſs one of the bodies, at leaſt, be in a fluid ſtate; and this fluidity is effected either by water or fire: hence ſolution is ſaid to be performed in the *humid* or in the *dry way*. Thus, for inſtance, if any quantity of brimſtone be diſſolved in a ſolution of fixed alkali, the brimſtone is ſaid to be diſſolved in the *humid way*: but if the brimſtone be diſſolved by melting it in a pan with the dry alkali, the ſolution is ſaid to be done in the *dry way*. The hepar ſulphuris is the ſame in both. Another kind of ſolution reſembling that by the dry way, is, however, to be carefully diſtinguiſhed from it: if, for example, a piece of Glauber's ſalt is put into a pan over the fire, the ſalt very ſoon aſſumes a liquid ſtate; but on continuing the heat, it loſes its fluidity, and becomes a white powder: this powder is the ſalt freed from its water, and it is found to be very refractory. This liquidity depended on the water of cryſtallization being enabled by the heat to keep the ſalt in ſolution, and the ſalt ceaſed to be fluid as ſoon as its cryſtallizing water was evaporated. This kind of ſolution, then, differs not from the firſt, or humid way.

If one of the two bodies to be united is tranſparent, the ſolution, if complete, is a tranſparent compound: this is the caſe in ſolutions of alkalis and calcareous earths in acids. But if the ſolution be opaque and milky, as is the caſe with ſoap and water, it is then conſidered as incomplete.

72 The principal menſtrua uſed in pharmacy, as water.

The principal menſtrua uſed in pharmacy are, *water*, *vinous ſpirits*, *oils*, *acid* and *alkaline liquors*.

Water is the menſtruum of all ſalts, of vegetable gums, and of animal gellies. Of ſalts, it diſſolves only a determinate quantity, though of one kind of ſalt more than another; and being thus *ſaturated*, leaves any additional quantity of the ſame ſalt untouched.

Experiments have been made for determining the quantities of water which different ſalts require for the diſſolution. Mr Eller has given a large ſet in the Memoirs of the Royal Academy of Sciences of Berlin for the year 1750, from which the following table is extracted.

Eight ounces by weight of diſtilled water diſſolved.

	oz.	dr.	gr.
Of refined ſugar -	24	0	0
Green vitriol -	9	4	0
Blue vitriol -	9	0	0
White vitriol -	4	4	0
Epſom ſalt - -	4	0	0
Purified nitre -	4	0	0
Soluble tartar -	4	0	0
Common ſalt -	3	4	0
Sal gemmæ - -	3	4	0

Sal catharticus Glauberi	3	4	0
Seignette's ſalt	3	0	0
Alum	2	4	0
Sal ammoniac	2	4	0
Vitriolated tartar	1	4	0
Salt of hartſhorn	1	4	0
Sugar of lead	1	2	0
Cream of tartar	1	0	0
Borax	0	4	20

Though great care appears to have been taken in making theſe experiments, it is not to be expected that the proportions of the ſeveral ſalts, ſoluble in a certain quantity of water, will always be found exactly the ſame with thoſe above ſet down. Salts differ in their ſolubility according to the degree of their purity, perfection, and dryneſs: the vitriols, and the artificial compound ſalts in general, differ remarkably in this reſpect, according as they are more or leſs impregnated with the acid ingredient. Thus vitriolated tartar; perfectly neutralized, is extremely difficult of ſolution: the matter which remains in making Glauber's ſpirit of nitre is no other than a vitriolated tartar; and it diſſolves ſo difficultly, that the operator is obliged to break the retort in order to get it out; but on adding more of the vitriolic acid, it diſſolves with eaſe. Hence many have been tempted to uſe an over-proportion of acid in this preparation: and we frequently find in the ſhops, under the name of vitriolated tartar, this acid ſoluble ſalt. The degree of heat occaſions alſo a remarkable difference in the quantity of ſalt taken up: in very cold weather, 8 ounces of water will diſſolve only about one ounce of nitre; whereas in warm weather, the ſame quantity will take up three ounces or more. To theſe circumſtances are probably owing, in part, the remarkable differences in the proportionable ſolubilities of ſalts, as determined by different authors. It is obſervable that common ſalt is leſs affected in its ſolubility by a variation of heat than any other; water in a temperate ſtate diſſolving nearly as much of it as very hot water: and accordingly this is the ſalt in which the different experiments agree the beſt. In the experiments of Hoffmann, Neumann, and Petit, the proportion of this ſalt, on a reduction of the numbers comes on exactly the ſame, viz. three ounces of the ſalt to eight of water; Dr Brownrigg makes the quantity of ſalt a little more; Dr Grew, a dram and a ſcruple more; and Eller, as appears in the above table, four drams more: ſo that in the trials of ſix different perſons, made probably in different circumſtances, the greateſt difference is only one ſixth of the whole quantity of ſalt; whereas in ſome other ſalts there are differences of twice or thrice the quantity of the ſalt. In the experiments from which the table is drawn, the water was of the temperature of between 40 and 42 degrees of Fahrenheit's thermometer, or above freezing by about one-ſeventh of the interval between freezing and the human heat.

Some ſalts omitted by Eller are here ſubjoined; the firſt is taken from Dr Grew, and the other four from Neumann.

Eight ounces of water diſſolved,

	oz.	dr.	gr.
Of fixed alkaline ſalt	above 8	0	0
Sal diureticus	8	0	0
Sugar candy, both brown and white	9	0	0
Sugar of milk	0	2	40
Eſſential ſalt of ſorrel	0	1	20

Though water takes up only a certain quantity of one kind of ſalt, yet when ſaturated with one, it will ſtill diſſolve ſome portion of another; and when it can bear no more of either of theſe, it will ſtill take up a third, without letting go any of the former. The principal experiments of this kind which have been made relative to pharmaceutic ſubjects, are exhibited in the following table; of which the two firſt articles are from Grew, and the others from Eller.

Water, 32 parts by weight,

Fully ſatured with	diſſolved afterwards			
Nitre	Sal ammoniac	10		
Common ſalt	Nitre	10	Sal ammoniac	2
Nitre	Fixed alkali	7	Common ſalt	2
Common ſalt	Nitre, near	2	Fixed alkali	2½
Volatile alkali	Nitre	4	Sugar	2
Sal ammoniac	Common ſalt	2½		
Soluble tartar	Nitre	2		
Vitriolated tartar	Fixed alkali	2		
Glauber's ſalt	Nitre	1	Sugar	1
Epſom ſalt	Sugar	6		
Borax	Fixed alkali	2		

In regard to the other claſs of bodies for which water is a menſtruum, viz. thoſe of the gummy gelatinous kind, there is no determinate point of ſaturation: the water unites readily with any proportions of them, forming with different quantities liquors of different conſiſtence. This fluid takes up likewiſe, when aſſiſted by trituration, the vegetable gummy reſins, as amoniacum and myrrh; the ſolutions of which, though *imperfect*, that is, not tranſparent, but turbid and of a milky hue, are nevertheleſs applicable to valuable purpoſes in medicine. It mingles with vinous ſpirits, with acid and alkaline liquors, not with oils, but imbibes ſome of the more ſubtile parts of eſſential oils, ſo as to become impregnated with their ſmell and taſte.

73 Rectified ſpirit of wine, or alcohol, the menſtruum of the eſſential oils and reſins of vegetables.

Rectified *ſpirit of wine*, or rather *alcohol*, is the menſtruum of the eſſentail oils and reſins of vegetables; of the pure diſtilled oils, and ſeveral of the colouring and medicinal parts of animals; of ſome mineral bituminous ſubſtances, as of ambergris; and of ſoaps, though it does not act upon the expreſſed oil and fixed alkaline ſalt, of which ſoap is compoſed: whence, if ſoap contains any ſuperfluous quantity of either the oil or ſalt, it may by means of this menſtruum be excellently purified. It diſſolves, by the aſſiſtance of heat, volatile alkaline ſalts; and more readily the neutral ones, compoſed either of fixed alkali and the acetous acid, as the ſal diureticus, or of the volatile alkali and the nitrous acid, as alſo the ſalt of amber, &c. It mingles with water and with acids; not with alkaline lixivia.

74 Oils diſſolve various ſubſtances.

Oils diſſolve vegetable reſins and balſams, wax, animal-fats, mineral bitumens, ſulphur, and certain metallic ſubſtances, particularly lead. The expreſſed oils are, for moſt of thoſe bodies, more powerful menſtrua than thoſe obtained by diſtillation; as the former are more capable of ſuſtaining, without injury, a ſtrong heat, which is in moſt caſes neceſſary to enable them to act. It is ſaid, that one ounce of ſulphur will diſſolve in three ounces of expreſſed oil, particularly linſeed oil; but requires ſix ounces of eſſential oil, as turpentine.

75 All acids diſſolve alkaline ſalts, alkaline earths, and metallic ſubſtances.

All acids diſſolve alkaline ſalts, alkaline earths, and metallic ſubſtances. The different acids differ greatly in their action upon theſe laſt; one diſſolving only ſome particular metals; and another, others.

The *vegetable* acids diſſolve a conſiderable quantity of zinc, iron, copper, lead, and tin; and extract ſo much from the metallic part of antimony, as to become powerfully emetic; they diſſolve lead more readily, if the metal be previouſly calcined by fire, than in its metallic ſtate.

The *marine* acid diſſolves zinc, iron, and copper; and though it ſcarcely acts on any other metallic ſubſtance in the common way of making ſolutions, it may nevertheleſs be artfully combined with them all except gold. The corroſive ſublimate, and antimonial cauſtic of the ſhops, are combinations of it with mercury and the metallic part of antimony, effected by applying the acid, in the form of fume, to the ſubjects, at the ſame time alſo ſtrongly heated.

The *nitrous* acid is the common menſtruum of all metallic ſubſtances, except gold and the metallic part of antimony; of which two, the proper ſolvent is a mixture of the nitrous and marine acids, called *aqua regia*.

The *vitriolic* acid diluted with water, eaſily diſſolves zinc and iron. In its concentrated ſtate, and aſſiſted by a boiling heat, it may be made to corrode, or imperfectly diſſolve, moſt of the other metals.

The aerial acid diſſolves iron, zinc, and calcareous earth: and thoſe ſolutions muſt be conducted without heat.

76 Alkaline lixivia diſſolves oils, reſinous ſubſtances, and ſulphur.

Alkaline *lixivia* diſſolve oils, reſinous ſubſtances, and ſulphur. Their power is greatly promoted by the addition of quicklime; inſtances of which occur in the preparation of ſoap, and in the common cauſtic. Thus acuated, they reduce the fleſh, bones, and other ſolid parts of animals, into a gelatinous matter. This increaſed acrimony in alkaline ſalts is owing to the abſtraction of their fixed air; that acid having a greater attraction for quicklime than for alkalis.

Solutions made in water and in ſpirit of wine poſſeſs the virtues of the body diſſolved; while oils generally ſheath its activity, and acids and alkalis vary its quality. Hence watery and ſpirituous liquors are the proper menſtrua of the native virtues of vegetable and animal matters.

Moſt of the foregoing ſolutions are eaſily effected, by pouring the menſtruum on the body to be diſſolved, and ſuffering them to ſtand together for ſome time expoſed to a ſuitable warmth. A ſtrong heat is generally requiſite to enable oils and alkaline liquors to perform their office; nor will acids act on ſome metallic bodies without its aſſiſtance. The action of watery and ſpirituous menſtrua is likewiſe expedited by a moderate heat; though the quantity which they afterwards keep diſſolved is not, as ſome ſuppoſe, by this means increaſed; all that heat occaſions theſe to take up, more than they would do in a longer time in the cold, will, when the heat ceaſes, ſubſide again. This at leaſt is moſt commonly the caſe, though there may be ſome inſtances of the contrary.

The action of acids on the bodies which they diſſolve, is generally accompanied with heat, efferveſcence, and a copious diſcharge of fumes. The fumes which ariſe during the ſolution of ſome metals in the vitriolic acid, prove inflammable: hence in the preparation of the artificial vitriols of iron and zinc, the operator ought to be careful, eſpecially where the ſolution is made in a narrow mouthed veſſel, leſt by the imprudent approach of a candle the exhaling vapour be ſet on fire. This vapour is the inflammable air of Dr Prieſtley and other modern chemiſts.

There is another ſpecies of ſolution, in which the moiſture of the air is the menſtruum. Fixed alkaline ſalts, and thoſe of the neutral kind, compoſed of alkaline ſalts and the vegetable acids, or of ſoluble earths and any acid, except the vitriolic, and ſome metallic ſalts, on being expoſed for ſome time to a moiſt air, gradually attract its humidity, and at length become liquid. Some ſubſtances, not diſſoluble by the application of water in its groſſer form, as the butter of antimony, are eaſily liquefied by this ſlow action of the aerial moiſture. This proceſs is called *deliquation*.

SECT. II. *Extraction*.

77 Thoſe liquors which diſſolve ſubſtances are alſo uſeful for extracting them from admixtures of other matter.

The liquors which diſſolve certain ſubſtances in their pure ſtate, ſerve likewiſe to *extract* them from admixtures of other matter. Thus ardent ſpirit, the menſtruum of eſſential oils and reſins, takes up the virtues of the reſinous and oily vegetables, as water does thoſe of the mucilaginous and ſaline; the inactive earthy parts remaining untouched by both. Water extracts likewiſe from many plants, ſubſtances which by themſelves it has little effect upon; even eſſential oils being, as we have formerly obſerved, rendered ſoluble in that fluid by the admixture of gummy and ſaline matter, of which all vegetables participate, in a greater or leſs degree. Thus many of the aromatic plants, and moſt of the bitters and aſtringents, yield their virtues to this menſtruum.

78 Method of performing extraction.

Extraction is performed, by *macerating* or *ſteeping* the ſubject in its appropriated menſtruum in the cold; or *digeſting* or *circulating* them in a moderate warmth; or *infuſing* the plant in the boiling liquor, and ſuffering them to ſtand in a covered veſſel till grown cold; or actually *boiling* them together for ſome time. If the vegetable matter is itſelf ſucculent and watery, it is ſometimes only neceſſary to expreſs the juice, and evaporate it to the proper conſiſtence.

The term *digeſtion* is ſometimes uſed for maceration; and in this caſe the proceſs is directed to be performed *without heat*: where this circumſtance is not expreſſed, digeſtion always implies the uſe of heat. Circulation differs from digeſtion only in this, that the ſteam, into which a part of the liquor is reſolved by the heat, is, by means of a proper diſpoſition of the veſſels, condenſed and conveyed back again upon the ſubject. Digeſtion is uſually performed in a matraſs (or bolt head), Florence flaſk, or the like; either of which may be conveyed into a circulatory veſſel, by inverting another into the mouth, and ſecuring the juncture with a piece of wet bladder. A ſingle matraſs, if its neck be very long and narrow, will anſwer the purpoſe as effectually; the vapour cooling and condenſing before it can riſe to the top; in a veſſel of this kind, even ſpirit of wine, one of the moſt volatile liquors we know, may be boiled without any conſiderable loſs: the uſe of the inſtrument is likewiſe free from an inconvenience which may in ſome caſes attend the other, of the uppermoſt veſſel being burſt or thrown off. As the long necked matraſſes here recommended are difficultly filled or emptied, and likewiſe very dear, a long glaſs pipe may be occaſionally luted to the ſhorter ones.

Heat greatly expedites extraction; but by this means proves as injurious to ſome ſubſtances, by occaſioning the menſtruum to take up the groſſer and more ungrateful parts, as it is neceſſary for enabling it to extract the virtues of others. Thus guaiacum and logwood impart little to aqueous liquors without a boiling heat; whilſt even a ſmall degree of warmth proves greatly prejudicial to the fine bitter of carduus benedictus. This plant, which infuſed in boiling, or digeſted in ſenſibly hot water, gives out a nauſeous taſte, ſo offenſive to the ſtomach as to promote vomiting, yields to the cold element a grateful balſamic bitter.

As heat promotes the diſſolving power of liquids; ſo cold, on the other hand, diminiſhes it. Hence tinctures or extractions made by a conſiderable heat, depoſite in cold weather a part of their contents, and thus become proportionally weaker: a circumſtance which deſerves particular regard.

SECT. III. *Depuration.*

79 Various methods of depurating or purifying liquors.

THERE are different methods of depurating or purifying liquors from their feculencies, according as the liquor itſelf is more or leſs tenacious, or the feculent matter of greater or leſs gravity.

Thin fluids readily depoſite their more ponderous impurities upon ſtanding at reſt for ſome time in a cool place; and may then be decanted or poured off clear, by inclining the veſſel.

Glutinous, unctuous, or thick ſubſtances, are to be liquefied by a ſuitable heat; when the groſſer feculencies will fall to the bottom, the lighter ariſing to the ſurface to be *deſpumated* or ſcummed off.

Where the impurities are neither ſo ponderous as to ſubſide freely to the bottom, nor ſo light as to ariſe readily to the ſurface, they may be ſeparated in great meaſure by *colature* through ſtrainers of linen, woollen, or other cloth; and more perfectly by *filtration* through a ſoft bibulous kind of paper made for the purpoſe.

The grey paper, which covers pill-boxes as they come from abroad, is one of the beſt for this purpoſe; it does not eaſily break when wetted, or tinge the liquor which paſſes through it, which the rediſh ſort called *bloſſom paper* frequently does. The paper is ſupported by a funnel or piece of canvas fixed in a frame. When the funnel is uſed, it is convenient to put ſome ſtraws or ſmall ſticks between the paper and its ſides, to prevent the weight of the liquor from preſſing the paper ſo cloſe to it, as not to allow room for the fluid to tranſude. In ſome caſes a funnel made of wire is put between the paper and the glaſs funnel. There is alſo a kind of glaſs funnel with ridges down its ſides made on purpoſe for this uſe.

Glutinous and unctuous liquors, which do not eaſily paſs through the pores of a filter or ſtrainer, are clarified by beating them up with whites of eggs; which concreting and growing hard when heated, and entangling the impure matter, ariſe with it to the ſurface: the mixture is to be gently boiled till the ſcum begins to break, when the veſſel is to be removed from the fire, the cruſt taken off, and the liquor paſſed thro' a flannel bag.

Decantation, colature, and filtration, are applicable to moſt of the medicated liquors that ſtand in need of purification. Deſpumation and clarification very rarely have place; ſince theſe, along with the impurities of the liquor, frequently ſeparate its medicinal parts. Thus, if the decoction of poppy heads, for making diacodium, be ſolicitouſly ſcummed or clarified, the medicine will loſe almoſt all that the poppies communicated; and inſtead of a mild opiate, turns out little other than a plain ſyrup of ſugar.

It may be proper to obſerve, that the common ſorts of filtering paper are apt to communicate a diſagreeable flavour: and hence in filtering fine bitters or other liquors, whoſe gratefulneſs is of primary conſequence, the part which paſſes through firſt ought to be kept apart for inferior purpoſes.

SECT. IV. *Cryſtallization.*

80 Cauſes, nature, and methods of cryſtallization.

WATER, aſſiſted by heat, diſſolves a larger proportion of moſt ſaline ſubſtances than it can retain when grown cold; hence, on the abatement of the heat, a part of the ſalt ſeparates from the menſtruum, and concretes at the ſides and bottom of the veſſel. The concretions, unleſs too haſtily formed by the ſudden cooling of the liquor, or diſturbed in their coaleſcence by agitation, or other ſimilar cauſes, prove tranſparent and of regular figures, reſembling in appearance the natural ſpring-cryſtals.

Salts, diſſolved in a large quantity of water, may in like manner be recovered from it in their cryſtalline form, by boiling down the ſolution, till ſo much of the fluid has exhaled as that the remainder will be too little to keep the ſalt diſſolved when grown perfectly cold. It is cuſtomary to continue the evaporation till the ſalt ſhows a diſpoſition to concrete even from the hot water, by forming a pellicle on that part which is leaſt hot, *viz.* on the ſurface. If large, beautiful, and perfectly figured cryſtals are required, this point is ſomewhat too late: for if the ſalt thus begins to coaleſce whilſt conſiderably hot, on being removed into a cold place its particles will run too haſtily and irregularly together: the pellicle at the ſame time falling down through the liquor, proves a farther diſturbance to the regularity of the cryſtallization.

In order to perform this proceſs in perfection, the evaporation muſt be gentle, and continued no longer than till ſome drops of the liquor, let fall on a cold glaſs-plate, diſcover cryſtalline filaments. When this mark of ſufficient exhalation appears, the veſſel is to be immediately removed from the fire into a leſs warm but not cold place, and covered with a cloth to prevent the acceſs of cold air, and conſequently the formation of a pellicle.

The fixed alkalis, eſpecially the mineral, when fully ſaturated with fixed air or the aerial acid, aſſume a cryſtalline form; but theſe cryſtals, are not ſo perfect as when the ſame alkalis are united with the other acids; the volatile alkalis cannot cryſtallize, becauſe they eſcape before the menſtruum exhales.

Some even of the other neutral ſalts, particularly thoſe of which certain metallic bodies are the baſis are ſo ſtrongly retained by the aqueous fluid, as not to exhibit any appearance of cryſtallization, unleſs ſome other ſubſtance be added, with which the water has a greater affinity. The table of Affinity ſhows that ſpirit of wine is ſuch a ſubſtance; by the prudent addition of which, theſe kinds of ſalt ſeparate freely from the menſtruum, and form large and beautiful cryſtals ſcarcely obtainable by any other means.

The operator muſt be careful not to add too much of the ſpirit; leſt, inſtead of a gradual and regular cryſtallization, the baſis of the ſalt be haſtily precipitated in a powdery form. One-twentieth part of the weight of the liquor will in moſt caſes be a ſufficient, and in ſome too large a quantity.

Different ſalts require different quantities of water to keep them diſſolved: and hence, if a mixture of two or more be diſſolved in this fluid, they will begin to ſeparate and cryſtallize at different periods of the evaporation. Upon this foundation, ſalts are freed not only from ſuch impurities as water is not capable of diſſolving and carrying through the pores of a filter, but likewiſe from admixtures of each other; that which requires moſt water to diſſolve ſhooting firſt into cryſtals.

It is proper to remark, that a ſalt, when cryſtallizing, ſtill retains and combines with a certain portion of water: this water is not eſſential to the ſalt as a ſalt, but is eſſential to a ſalt as being cryſtallized; it is therefore called by the chemiſts the *water of cryſtallization*. The quantity of this water varies in different ſalts: In ſome of them, as in Glauber's ſalt, alum, and copperas, it makes up about one half of their weight; in others, as in nitre, common ſalt, and eſpecially ſelenites, it is in very ſmall quantity. As ſalts unite to the water of their cryſtallization by their attraction for water alone, we accordingly find that this water is perfectly pure, and contains, in complete cryſtals, no ſubſtance foreign to the ſalt. Salts not only differ in the quantity of water neceſſary to their ſolution, but ſome of them are alſo ſoluble with equal facility in cold as in hot water. Sometimes then we employ evaporation; ſometimes cooling; and at other times both theſe expedients are uſed alternately, to ſeparate different ſalts diſſolved in the ſame liquor. It is obvious, then, that thoſe which are nearly or equally ſoluble in cold as in boiling water, can only be cryſtallized by evaporation: thoſe again, which are much more ſoluble in boiling than in cold water, are to be ſeparated by cooling. Of the firſt of theſe is common or marine ſalt; of the latter is nitre or ſaltpetre. It remains, then, that we ſhould know how to ſeparate theſe two ſalts, when both of them happen to be diſſolved in the ſame water; this method conſiſts in alternate evaporation and cooling. If in ſuch a ſolution a pellicle appears in the boiling liquor before cryſtals can be formed in the cooling, we then conclude that the common ſalt predominates: In this caſe we evaporate the water, and ſeparate the common ſalt as faſt as it is formed, till the liquor on cooling ſhows cryſtals of nitre: we then allow the nitre to cryſtallize by cooling. After all the nitre which had been diſſolved by the heat alone has now ſeparated by cooling, we reſume the evaporation, and ſeparate the common ſalt till the cooling liquor again ſhows cryſtals of nitre. We thus repeat the ſame ſeries of operations, by which means theſe two ſalts may be alternately cryſtallized; the one by evaporation, the other by cooling, till they are perfectly ſeparated from each other. If in the beginning of the operation the liquor had, upon trial, given cryſtals of nitre by cooling, before any pellicle appeared on its ſurface when boiling, this would have indicated that the nitre was predominant in the ſolution; the nitre in this caſe would have been cryſtallized, firſt by cooling, till the quantity of nitre exceeding that of the common ſalt having been ſeparated, the common ſalt would next have cryſtallized in its turn by evaporation. The example we have now given may be applied to other ſalts, or to a number of ſalts which may happen to be diſſolved in the ſame liquor. For though there are few ſo completely ſoluble in cold water as common ſalt, and few ſo ſcantily as nitre; yet there are ſcarcely two ſalts which either preciſely ſhow the ſame ſolubility or the ſame appearance of their cryſtals. It is obvious, too, that by cryſtallization we diſcover the peculiar predominant ſalt in any ſolution of mixed ſaline matter; but as one ſalt always takes down a ſmall portion of another, it is neceſſary to rediſſolve the firſt products, and repeat the cryſtallization, in order to render the ſeparation complete.

We ſee, then, that though the cryſtal appearance and form does not alter the ſalt itſelf, yet that this proceſs affords an elegant method of diſcovering compound ſolutions of ſalts, of judging of their purity, and laſtly of ſeparating different ſalts very completely from each other. Cryſtallization, then, is one of the moſt important agents in pharmacy, and ought to be well underſtood. We ſhall attempt to explain the particular management in cryſtallizing particular ſalts, when we come to treat of each of them ſeparately.

Sect. V. *Precipitation.*

81 Nature of precipitation; and various methods of performing this operation.

By this operation bodies are recovered from their ſolutions by means of the addition of ſome other ſubſtance, with which either the menſtruum or the body diſſolved have a greater affinity than they have with each other.

Precipitation, therefore, is of two kinds; one, where the ſubſtance ſuperadded unites with the menſtruum, and occaſions that before diſſolved to be thrown down; the other, in which it unites with the diſſolved body, and falls along with it to the bottom. Of the firſt, we have an example in the precipitation of ſulphur from alkaline lixivia by the means of acids; of the ſecond, in the precipitation of mercury from aquafortis by ſea-ſalt, or its acid.

The ſubjects of this operation, as well thoſe which are capable of being precipitated as thoſe which precipitate them, will readily appear from inſpection of the Table of Affinity. See Chemistry, page 438. The manner of performing it is ſo ſimple, as not to ſtand in need of any particular directions; no more being required than to add the precipitant by degrees as long as it continues to occaſion any precipitation. When the whole of the powder has fallen, it is to be well *edulcorated*, that is, waſhed in ſeveral freſh parcels of water, and afterwards dried for uſe.

Where metals are employed as precipitants, as in the purification of martial vitriol from copper by the addition of freſh iron, they ought to be perfectly clean and free from any ruſty or greaſy matter; otherwiſe they will not readily, if at all, diſſolve, and conſequently ly the precipitation will not ſucceed; for the ſubſtance to be precipitated ſeparates only by the additional one diſſolving and taking its place. The ſeparated powder often, inſtead of falling to the bottom, lodges upon the precipitant; from which it muſt be occaſionally ſhaken off, for reaſons ſufficiently obvious.

Though in this operation the precipitated powder is generally the part required for uſe, yet ſome advantage may frequently be made of the liquor remaining after the precipitation. Thus when fixed alkaline ſalt is diſſolved in water, and ſulphur diſſolved in this lixivium, the addition of acids ſeparates and throws down the ſulphur only in virtue of the acid uniting with and neutralizing the alkali by which the ſulphur was held diſſolved; conſequently, if the precipitation be made with the vitriolic acid, and the acid gradually dropt in till the alkali be completely ſaturated, that is, as long as it continues to occaſion any precipitation or turbidneſs, the liquor will yield, by proper evaporation and cryſtallization, a neutral ſalt, compoſed of the vitriolic acid and fixed alkali, that is, vitriolated tartar. In like manner, if the precipitation be made with the nitrous acid, a true nitre may be recovered from the liquor; if with the marine, the ſalt called *ſpiritus ſalis marini coagulatus*; and if with the acid of vinegar, the *ſal diureticus*.

SECT. VI. *Evaporation*.

82 Nature, uſe, and manner of evaporation.

EVAPORATION, the third method of recovering ſolid bodies from their ſolutions, is effected by the means of heat; which evaporating the fluid part, that is forcing it off in ſteam, the matter which was diſſolved therein is left behind in its ſolid form.

The general rules for evaporation are, to place the matter in a flat, ſhallow, wide veſſel, ſo that a large ſurface of the liquor may be preſented to the air; for it is only from the ſurface that evaporation takes place. The degree of heat ought to be proportioned to the volatility of the ſubſtance to be evaporated, and to the degree of the fixity of the matter to be left: thus, the leſs fixed the matter to be left is, and the more ſtrongly it adheres to the volatile parts, the leſs the degree of heat ought to be; and in ſuch caſes, too, a forcible current of air is ſometimes ſcarcely admiſſible: on the contrary, when the matter to be evaporated is not very volatile, and when the matter to be left is very fixed, and does not adhere ſtrongly to the volatile part, the evaporation may be urged by a ſtrong heat, aided by a current of air directed upon the ſurface of the liquor.

This proceſs is applicable to the ſolutions of all theſe ſubſtances which are leſs volatile than the menſtruum, or which will not exhale by the heat requiſite for the evaporation of the fluid; as the ſolutions of fixed alkaline ſalts; of the gummy, gelatinous, and other inodorous parts of vegetables and animals in water; and of many reſinous and odorous ſubſtances in ſpirit of wine.

Water extracts the virtues of ſundry fragrant aromatic herbs, almoſt as perfectly as rectified ſpirit of wine; but the aqueous infuſions are far from being equally ſuited to this proceſs with thoſe made in ſpirit, water carrying off the whole odour and flavour of the ſubject which that lighter liquor leaves entire behind it. Thus a watery infuſion of mint loſes in evaporation the ſmell, taſte, and virtues, of the herb; whilſt a tincture drawn with pure ſpirit yields on the ſame treatment a thick balſamic liquor, or ſolid gummy reſin, extremely rich in the peculiar qualities of the mint.

In evaporating theſe kinds of liquors, particular care muſt be had, towards the end of the proceſs, that the heat be very gentle; otherwiſe the matter as it grows thick will burn to the veſſel, and contract a diſagreeable ſmell and taſte: this burnt flavour is called *empyreuma*. The liquor ought to be kept ſtirring during the evaporation; otherwiſe a part of the matter concretes on the ſurface expoſed to the air, and forms a pellicle which impedes the farther evaporation.

SECT. VII. *Diſtillation*.

83 The nature of diſtillation, with obſervations on the manner of performing it.

IN the foregoing operation fluids are rarefied by heat into ſteam, or vapour, which is ſuffered to exhale in the air, but which it is the buſineſs of diſtillation to collect and preſerve. For this purpoſe the ſteam is received in proper veſſels, luted to that in which the ſubject is contained; and being there cooled, condenſes into a fluid form again.

There are two kinds of diſtillation; by the one, the more ſubtile and volatile parts of liquors are elevated from the groſſer; by the other, liquids incorporated with ſolid bodies, are forced out from them with vehemence by fire.

To the firſt belong the diſtillation of the pure inflammable ſpirit from vinous liquors; and of ſuch of the active parts of vegetables as are capable of being extracted by boiling water or ſpirit, and at the ſame time of ariſing along with their ſteam.

As boiling water extracts or diſſolves the eſſential oils of vegetables, while blended with the other principles of the ſubject, without ſaturation, but imbibes only a determinate, and that a ſmall proportion of them, in their pure ſtate; as theſe oils are the only ſubſtances contained in common vegetables, which prove totally volatile in that degree of heat; and as it is in them that the virtues of aromatics, and the peculiar odour and flavour of all plants, reſide;—it is evident, that water may be impregnated by diſtillation, with the more valuable parts of many vegetables: that this impregnation is limited, the oil ariſing in this proceſs pure from thoſe parts of the plant which before rendered it ſoluble in water without limitation; hence the greateſt part of the oil ſeparates from the diſtilled aqueous liquor, and, according to its greater or leſs gravity, either ſinks to the bottom or ſwims on the ſurface; that conſequently infuſions and diſtilled waters are very different from each other: that the firſt may be rendered ſtronger by pouring the liquor on freſh parcels of the ſubjects; but that the latter cannot be in like manner improved by cohobating or rediſtilling them from freſh ingredients.

As the oils of many vegetables do not freely diſtil with a leſs heat than that in which water boils; as rectified ſpirit of wine is not ſuſceptible of this degree of heat; and as this menſtruum totally diſſolves theſe oils in their pure ſtate; it follows, that ſpirit elevates far leſs from moſt vegetables than water; but that nevertheleſs the diſtilled ſpirit, by keeping all that it does elevate perfectly diſſolved, may, in ſome caſes, prove as ſtrong of the ſubject as the diſtilled water. The more gentle the heat, and the ſlower the diſtillation goes on, the volatile parts are the more perfectly ſeparated in their native ſtate.

It may be obſerved, that as the parts which are preſerved in evaporation cannot ariſe in diſtillation, the liquor remaining after the diſtillation, properly depurated and inſpiſſated, will yield the ſame extracts as thoſe prepared from the tincture or decoction of the ſubject made on purpoſe for that uſe; the one of theſe operations collecting only the volatile parts, and the other the more fixed; ſo that where one ſubject contains medicinal parts of both kinds, they may thus be obtained diſtinct, without one being injured by the proceſs which collects the other.

The ſubjects of the ſecond kind of diſtillation are, the groſs oils of vegetables and animals, the mineral acid ſpirits, and the metallic fluid quickſilver; which as they require a much ſtronger degree of heat to elevate them than the foregoing liquors can ſuſtain, ſo they likewiſe condenſe without ariſing ſo far from the action of the fire. The diſtillation of theſe is performed in low glaſs veſſels, called, from their neck being bent to one ſide, *retorts:* to the further end of the neck a receiver is luted, which ſtanding without the furnace, the vapours ſoon condenſe in it, without the uſe of a refrigeratory: nevertheleſs, to promote this effect, ſome are accuſtomed, eſpecially in warm weather, to cool the receiver, by occaſionally applying wet clothes to it, or keeping it partly immerſed in a veſſel of cold water.

The vapours of ſome ſubſtances are ſo ſluggiſh, or ſtrongly retained by a fixed matter, as ſcarce to ariſe even over the low neck of the retort. Theſe are moſt commodiouſly diſtilled in ſtraight-necked earthen veſſels called *longnecks*, laid on their ſides, ſo that the vapour paſſes off laterally with little or no aſcent: a receiver is luted to the end of the neck without the furnace. In this manner, the acid ſpirit of vitriol is diſtilled. The matter which remains in the retort or longneck, after the diſtillation, is vulgarly called *caput mortuum.*

In theſe diſtillations, a quantity of elaſtic air is frequently generated: which, unleſs an exit be allowed, blows off or burſts the receiver. The danger of this may in good meaſure be prevented, by ſlowly raiſing the fire; but more effectually by leaving a ſmall hole in the luting, to be occaſionally opened or ſtopt with a wooden plug; or inſerting at the juncture an upright pipe of ſuch a height, that the ſteam of the diſtilling liquor may not be able to riſe to the top: but it is ſtill better done by fitting to the apparatus other veſſels, by which their vapours may be condenſed. For the purpoſe of diſtilling, and the apparatus made uſe of, ſee DISTILLATION; and CHEMISTRY, n° 574.

SECT. VIII. *SUBLIMATION.*

84 Of the ſublimation of ſolids.

As all fluids are volatile by heat, and conſequently capable of being ſeparated, in moſt caſes, from fixed matters, by the foregoing proceſs; ſo various ſolid bodies are ſubjected to a ſimilar treatment. Fluids are ſaid to *diſtil*, and ſolids to *ſublime;* though ſometimes both are obtained in one and the ſame operation. If the ſubliming matter concretes into a maſs, it is commonly called a *ſublimate;* if into a powdery form, *flowers.*

The principal ſubjects of this operation are, volatile alkaline ſalts; neutral ſalts, compoſed of volatile alkalis and acids, as ſal ammoniac; the ſalt of amber, and flowers of benzoin; mercurial preparations; and ſulphur. Bodies of themſelves not volatile, are frequently made to ſublime, by the mixture of volatile ones: this iron is carried up by ſal ammoniac in the preparation of the *flores martiales*, or *ferrum ammoniacale.*

The fumes of ſolid bodies in cloſe veſſels riſe but little way, and adhere to that part of the veſſel where they concrete. Hence a receiver or condenſer is leſs neceſſary here than in the preceding operation; a ſingle veſſel, as a matraſs, or tall phial, or the like, being frequently ſufficient.

SECT. IX. *EXPRESSION.*

84 On the expreſſion of juices, &c.

THE preſs is chiefly made uſe of for forcing out the juices of ſucculent herbs and fruits, and the inſipid oils of the unctuous ſeeds and kernels.

The harder fruits, as quinces, require to be previouſly well beat or ground; but herbs are to be only moderately bruiſed. The ſubject is then included in a hair bag, and preſſed between wooden plates, in the common ſcrew-preſs, as long as any juice runs from it.

The expreſſion of oils is performed nearly in the ſame manner as that of juices: only here, iron-plates are ſubſtituted for the wooden ones there made uſe of. The ſubject is well pounded, and included in a ſtrong canvas bag, between which and the plates of the preſs a haircloath is interpoſed.

The inſipid oils of all the unctuous ſeeds are obtained, uninjured, by this operation, if performed without the uſe of heat which though it greatly promotes the extraction of the oil, at the ſame time impreſſes an ungrateful flavour, and increaſes its diſpoſition to grow rancid.

The oils expreſſed from aromatic ſubſtances generally carry with them a portion, of their eſſential oil; hence the ſmell and flavour of the expreſſed oils of nutmegs and mace. They are very rarely found impregnated with any of the other qualities of the ſubject; oil of muſtard-ſeed, for inſtance, is as ſoft and void of acrimony as that of the almond, the pungency of the muſtard remaining entire in the cake left after the expreſſion.

SECT. X. *EXSICCATION*

86 Two methods of exſiccating or drying moiſt bodies.

THERE are two general methods of exſiccating or drying moiſt bodies; in the one, their humid parts are exhaled by heat; in the other, they are imbibed or abſorbed by ſubſtances whoſe ſoft and ſpongy texture adapts them to that uſe. Bodies intimately combined with, or diſſolved in a fluid, as recent vegetables and their juices, require the firſt; ſuch as are only ſuperficially mixed, as when earthy or indiſſoluble powders are ground with water, are commodiouſly ſeparated from it by the ſecond.

Vegetables and their parts are uſually exſiccated by the natural warmth of the air: the aſſiſtance of a gentle artificial heat may, nevertheleſs, in general, be not only ſafely, but advantageouſly, had recourſe to: By a moderate fire, even the more tender flowers may be dried, in a little time, without any conſiderable loſs either of their odour or lively colour; which would both be greatly injured or deſtroyed by a more ſlow exſiccation in the air. Some plants, indeed, particularly thoſe of the acrid kind, as horſe-radiſh, ſcurvy-graſs, and arum, loſe their virtues by this proceſs, however carefully performed; but far the greater number retain them unimpared, and often improved.

The thicker vegetable juices may be exſiccated by the heat of the ſun; or, where this is not ſufficient, by that of a water-bath, or an oven moderately warm. The thinner juices may be gently boiled till they begin to thicken, and then treated as the foregoing. The proceſs, termed *inſpiſſation* or *evaporation*, has been ſpoken of already. The juices of ſome plants, as arum root, bryony root, orris root, wild cucumbers, &c. ſeparate, upon ſtanding for ſome time, into a thick part, which falls to the bottom; and a thin aqueous one, which ſwims above it: this laſt is to be poured off, and the firſt exſiccated by a gentle warmth. Preparations of this kind have been uſually called *fæculæ;* that of the cucumber, to be ſpoken of in its place, is the only one which practice now retains.

Indiſſoluble bodies, mixed with water into a thick conſiſtence, may be eaſily freed from the greateſt part of it, by dropping them on a *chalkſtone*, or ſome powdered chalk preſſed into a ſmooth maſs, which readily imbibes their humidity. Where the quantity of fluid is large, as in the edulcoration of precipitates, it may be ſeparated by decantation or filtration.

We before obſerved, that one of the principal circumſtances favouring fermentation, was a certain degree of moiſture. Exſiccation is therefore employed to diſſipate humidity, and render vegetables thereby leſs liable to thoſe changes produced by a kind of inſenſible fermentation.

Sect. XI. *Comminution.*

87
Comminution, or the turning of ſolid bodies into ſmall particles or powder.

Comminution is the bare reduction of ſolid coherent bodies into ſmall particles or powder. The methods of effecting this are various, according to the texture of the ſubject.

Dry friable bodies, or ſuch as are brittle and not very hard, and mixtures of theſe with ſomewhat moiſt ones, are eaſily pulverized in a mortar.

For very light dry ſubſtances, reſins, and the roots of tenacious texture, the mortar may in ſome caſes be previouſly rubbed with a little ſweet oil, or a few drops of oil be occaſionally added: this prevents the finer powder of the firſt from flying off, and the others from cohering under the peſtle. Camphor is commodiouſly powdered by rubbing it with a little rectified ſpirit of wine.

Tough ſubſtances, as woods, the peels of oranges and lemons, &c. are moſt conveniently raſped; and ſoft oily bodies, as nutmegs, paſſed through a grater.

The comminution of the harder minerals, as calamine, cryſtal, flint, &c. is greatly facilitated by extinction; that is, by heating them red-hot, and quenching them in water: by repeating this proceſs a few times, moſt of the hard ſtones become eaſily pulveriſable. This proceſs, however, is not to be applied to any of the alkaline or calcareous ſtones; leſt, inſtead of an inſipid powder, we produce an acrimonious calx or lime.

Some metals, as tin, though ſtrongly cohering in their natural ſtate, prove extremely brittle when heated, inſomuch as to be eaſily divided into ſmall particles by dexterous agitation. Hence the officinal method of pulveriſing tin, by melting it, and at the inſtant of its beginning to return into a ſtate of ſolidity, briſkly ſhaking it in a wooden box. The comminution of metals, in this manner, is termed by the metallurgiſts *granulation*.

On a ſimilar principle, certain ſalts, as nitre, may be reduced into powder in large quantity, by diſſolving them in boiling water, ſetting the ſolution over a moderate fire, and keeping the ſalt conſtantly ſtirring during its exſiccation, ſo as to prevent its particles, diſjoined by the fluid, from reuniting together into larger maſſes.

Powders are reduced to a great degree of fineneſs by triturating, or rubbing them, for a length of time, in a mortar. Such as are not diſſoluble in water, or injured by the admixture of that fluid, are moiſtened with it into the conſiſtence of a paſte, and levigated or ground on a flat ſmooth marble or iron plate; or where a large quantity is to be prepared at a time, in mills made for that uſe.

Comminution, though one of the moſt ſimple operations of pharmacy, has, in many caſes, very conſiderable effect. The reſinous purgatives, when finely triturated, are more eaſily ſoluble in the animal fluids, and conſequently prove more cathartic, and leſs irritating, than in their groſſer ſtate. Crude antimony, which, when reduced to a tolerably fine powder, diſcovers little medicinal virtue, if levigated to a great degree of ſubtility proves, a powerful medicine in many chronical diſorders.

By comminution, the heavieſt bodies may be made to float in the lighteſt fluids (c), for a longer or ſhorter time, according to their greater or leſs degree of tenuity. Hence we are furniſhed with an excellent criterion of the fineneſs of certain powders, and a method of ſeparating the more ſubtile parts from the groſſer, diſtinguiſhed by the name of *elutrition* or *waſhing over*.

(c) Some attribute this effect to a diminution of the ſpecific gravity of the body; and at the ſame time, ſuppoſe the peculiar virtues of certain medicines, particularly mercury, to be in great meaſure owing to their gravity. If theſe hypotheſes were juſt, it ſhould follow, that the mercurial preparations, by being finely comminuted, would loſe proportionably of their efficacy; and ſo indeed mercurius dulcis, for inſtance, has been ſuppoſed to do. But experience ſhows, that this is far from being the caſe; and that comminution by no means leſſens but rather increaſes its power: when reduced to a great degree of ſubtility, it paſſes readily into the habit, and operates, according to its quantity, as an alterative or a ſialogogue; while in a groſſer form, it is apt to irritate the ſtomach and bowels, and run off by the inteſtines, without being conveyed into the blood.

Sect. XII. *Fusion.*

88 Fuſion the reduction of ſolid bodies into a fluid ſtate by fire.

Fusion is the reduction of ſolid bodies into a ſtate of fluidity by fire. Almoſt all natural ſubſtances, the pure earths and the ſolid parts of animals and vegetables excepted, melt in proper degrees of fire; ſome in a very gentle heat, while others require its utmoſt violence.

Turpentine, and other ſoft reſinous ſubſtances, liquefy in a gentle warmth: wax, pitch, ſulphur, and the mineral bitumens, require a heat too great for the hand to ſupport: fixed alkaline ſalt, common ſalt, nitre, require a red or almoſt white heat to melt them; and glaſs, a full white heat.

Among metallic ſubſtances, tin, biſmuth, and lead, flow long before ignition: antimony likewiſe melts before it is viſibly red-hot, but not before the veſſel is conſiderably ſo: the regulus of antimony demands a much ſtronger fire. Zinc begins to melt in a red heat; gold and ſilver require a low white heat; copper a bright white heat; and iron an extreme white heat.

One body, rendered fluid by heat, becomes ſometimes a menſtruum for another, not fuſible of itſelf in the ſame degree of fire. Thus red-hot ſilver melts on being thrown into melted lead leſs hot than itſelf: and thus if ſteel, heated to whiteneſs, be taken out of the furnace, and applied to a roll of ſulphur, the ſulphur inſtantly liquefying, occaſions the ſteel to melt with it; hence the *chalybs cum ſulphure* of the ſhops. This concrete, nevertheleſs, remarkably impedes the fuſion of ſome other metals, as lead; which when united with a certain quantity of ſulphur is ſcarce to be perfectly melted by a very ſtrong fire. Hence the method, deſcribed in its place, of purifying zinc; a metal upon which ſulphur has no effect from the lead ſo frequently mixed with it.

Sulphur is the only unmetallic ſubſtance which mingles in fuſion with metals. Earthy, ſaline, and other like matters, even the calces and glaſſes prepared from metals themſelves, float diſtinct upon the ſurface, and form what is called *ſcoria* or droſs. Where the quantity of this is large in proportion to the metal, it is moſt commodiouſly ſeparated by pouring the whole into a conical mould: the pure metal or *regulus*, though ſmall in quantity, occupies a conſiderable height in the lower narrow part of the cone; and when congealed, may be eaſily freed from the ſcoriæ by a hammer. The mould ſhould be previouſly greaſed, or rather ſmoked, to make the metal come freely out; and thoroughly dried and heated, to prevent the exploſion which ſometimes happens from the ſudden contact of melted metals with moiſt bodies.

Sect. XIII. *Calcination.*

89 Calcination reduces bodies by means of fire from a coherent to a powdery ſtate, and changes their quality.

By calcination is underſtood the reduction of ſolid bodies, by the means of fire, from a coherent to a powdery ſtate, accompanied with a change of their quality; in which laſt reſpect this proceſs differs from comminution.

To this head belong the burning of vegetable and animal matters, otherwiſe called *uſtion*, *incineration*, or *concremation*; and the change of metals into a powder, which in the fire either does not melt or vitrifies, that is, runs into glaſs.

The metals which melt before ignition, are calcined by keeping them in fuſion for ſome time. The free admiſſion of air is eſſentially neceſſary to the ſucceſs of this operation; and hence, when the ſurface of the metal appears covered with calx, this muſt be taken off or raked to one ſide, otherwiſe the remainder excluded from the air will not undergo the change intended. If any coal, or other inflammable matter which does not contain a mineral acid, be ſuffered to fall into the veſſel, the effect expected from this operation will not be produced, and part of what is already calcined will be revived or reduced; that is, it will return into its metallic form again.

Thoſe metals which require a ſtrong fire for fuſion, calcine with a much leſs heat than is ſufficient to make them flow. Hence the burning or ſcorification of ſuch iron or copper veſſels as are long expoſed to a conſiderable fire without defence from the air. Gold and ſilver are not calcinable by any degree of fire.

In calcination, the metals viſibly emit fumes: nevertheleſs the weight of the calx proves greater than that of the metal employed. The antimonial regulus gains about one-eleventh part of its weight; zinc ſometimes one-tenth; tin above one-ſixth; and lead in its converſion into minium often one fourth.

The calcination of metallic bodies, gold, ſilver, and mercury excepted, is greatly promoted by nitre. This ſalt expoſed to the fire in conjunction with any inflammable ſubſtances, extricates their inflammable matter, and burſts with it into flame, accompanied with a hiſſing noiſe. This proceſs is uſually termed *deflagration* or *detonation*.

All the metallic calces and ſcoriæ are revived into their metallic ſtate by fuſion with any vegetable or animal inflammable matter. They are all more difficult of fuſion than the reſpective metals themſelves; and ſcarcely any of them, thoſe of lead and biſmuth excepted, can be made to melt at all, without ſome addition, in the ſtrongeſt fire that can be produced in the common furnaces. The additions called *fluxes*, employed for promoting the fuſion, conſiſt chiefly of fixed alkaline ſalts. A mixture of alkaline ſalt with inflammable matter, as powdered charcoal, is called a *reducing flux*, as contributing at the ſame time to bring the calx into fuſion, and to revive it into metal. Such a mixture is commonly prepared from one part of nitre and two parts of tartar, by grinding them well together, ſetting the powders on fire with a bit of coal or a red-hot iron, then covering the veſſel, and ſuffering them to deflagrate or burn till they are changed into a black alkaline coaly maſs. This is the common reducing flux of the chemiſts, and is called from its colour the *black flux*. Metallic calces of ſcoriæ, mingled with twice their weight of this compound, and expoſed to a proper fire in a cloſe covered crucible, melt and reſume their metallic form; but though they receive an increaſe of weight in the calcination, the revived metal is always found to weigh conſiderably leſs then the quantity from which the calx was made.

For a more particular account of all theſe proceſſes, and an explanation of the principles on which they depend, ſee Chemistry *paſſim*, and the articles themſelves as they occur in the order of the alphabet.

Part II. PREPARATIONS and COMPOSITIONS.

Containing thoſe of the London and Edinburgh Pharmacopoeias.

Chap. I. *The more Simple Preparations.*

The preparation of ſome ſubſtances not ſoluble in water. L.

90 Pound theſe ſubſtances firſt in a mortar; then, pouring on a little water, levigate them on a hard and poliſhed, but not calcareous, ſtone, that they may be made as fine as poſible. Dry this powder on blotting-paper laid on chalk, and ſet it in a warm, or at leaſt a dry, place, for ſome days.

In this manner are to be prepared,
Amber,
Antimony,
Calamine,
Chalk,
Coral,
Oyſter-ſhells, firſt cleanſed from their impurities,
Tutty.

Crabs claws, firſt broken into ſmall pieces, muſt be waſhed with boiling water before they be levigated.

Verdegriſe muſt be prepared in the ſame manner.

Where large quantities of the foregoing powders are to be prepared, it is cuſtomary inſtead of the ſtone and mallet, to employ hand-mills made for this purpoſe, conſiſting of two ſtones; the uppermoſt of which turns horizontally on the lower, and has an aperture in the middle, for ſupplying freſh matter, or of returning that which has already paſſed, till it be reduced to a proper degree of fineneſs.

For the levigation of hard bodies, particular care ſhould be taken, whatever kind of inſtruments be uſed, that they may be of ſufficient hardneſs, otherwiſe they will be abraded by the powders. The hematites, a hard iron one, is moſt conveniently levigated between two iron planes; for if the common levigating ſtones be uſed, the preparation, when finiſhed will contain almoſt as much foreign matter from the inſtrument as the hematites.

It has been cuſtomary to moiſten ſeveral powders in levigation, with roſe, balm, and other diſtilled waters: theſe, nevertheleſs, have no advantage above common water, ſince in the ſubſequent exſiccation they muſt neceſſarily exhale, leaving the medicine poſſeſſed of no other virtue than what might be equally expected from it when prepared with the cheaper element.

Some few ſubſtances, indeed, are more advantageouſly levigated with ſpirit of wine than with water. Thus bezoar has the green colour uſually expected in this coſtly preparation conſiderably improved thereby. A little ſpirit may be added to the other animal ſubſtances, if the weather be very hot, and large quantities of them are prepared at once, to prevent their running into putrefaction; an accident which in thoſe circumſtances ſometimes happens when they are levigated with water only. Crabs-eyes, which abound with animal gelatinous matter, are particularly liable to this inconvenience.

The caution given above for reducing antimony, calamine, and tutty, to the greateſt ſubtility poſſible, demands particular attention. The tenderneſs of the parts to which the two laſt are uſually applied, requires them to be perfectly free from any admixture of groſs irritating particles. The firſt, when not thoroughly comminuted, might not only, by its ſharp needle-like ſpicula, wound the ſtomach, but likewiſe anſwers little valuable purpoſe as a medicine, proving either an uſeleſs load upon the viſcera, or at beſt paſſing off without any other ſenſible effect than an increaſe of the groſſer evacuations; while, if reduced to a great degree of fineneſs, it turns out a medicine of conſiderable efficacy.

The moſt ſucceſsful method of obtaining theſe powders of the requiſite tenuity, is, to waſh off the finer parts by means of water, and continue levigating the remainder till the whole become fine enough to remain for ſome time ſuſpended in the fluid; this proceſs is received in the Edinburgh pharmacopœia, and there directed in the preparation of the following article.

Prepared antimony. E.

91 Let the antimony be firſt pounded in an iron mortar, and then levigated on a porphyry with a little water. After this, put it into a large veſſel, and pour a quantity of water on it. Let the veſſel be repeatedly ſhaken, that the finer part of the powder may be diffuſed through the water; the liquor is then to be poured off, and ſet by till the powder ſettles. The groſs part, which the water would not take up, is to be further levigated, and treated in the ſame manner.

By this method, which is that commonly practiſed in the preparation of colours for the painter, powders may be obtained of any required degree of tenuity; and without the leaſt mixture of the groſs parts, which are always found to remain in them after long continued levigation; all the coarſer matter ſettles at firſt, and the finer powder continues ſuſpended in the water longer and longer, in proportion to the degree of its fineneſs. The ſame proceſs may likewiſe be advantageouſly applied to other hard pulveriſable bodies of the mineral kingdom, or artificial preparations of them; provided they be not ſoluble in, or ſpecifically lighter than, water. The animal and abſorbent powders, crabs-claws, crabs-eyes, oyſter-ſhells, egg-ſhells, chalk, pearl, coral, and bezoar, are not well adapted to this treatment; nor indeed do they require it. Theſe ſubſtances are readily ſoluble in acid juices without much comminution: if no acid be contained in the firſt paſſages, they are apt to concrete, with the mucous matter uſually lodged there, into hard indiſſoluble maſſes; the greater degree of fineneſs they are reduced to, the more they are diſpoſed to form ſuch concretions, and become liable to obſtruct the orifices of the ſmall veſſels.

Prepared calamine. E.

92 Calamine previouſly calcined for the uſe of thoſe who make braſs, is to be treated in the ſame manner as antimony.

Prepared chalk.

93 Chalk firſt triturated, and then frequently waſhed with water, till it imparts to it neither taſte nor colour, is to be treated in the ſame manner as antimony.

As calamine is intended for external application, and often to parts very eaſily irritated, too much pains cannot be beſtowed in reducing it to a fine powder; and the frequent waſhing of the chalk may have the effect of freeing it from ſome foreign matters: But with regard to this ſubſtance, the after part of the proceſs, if not improper, is, in our opinion at leaſt unneceſſary: and this obſervation may alſo be made with reſpect to the oculi, or more properly lapilli, cancrorum, which the Edinburgh college direct to be treated in the ſame manner.

The preparation of hog's lard and mutton ſuet. L.

94 Cut them into pieces, and melt them over a ſlow fire; then ſeparate them from the membranes by ſtraining.

Theſe articles had formerly a place alſo among the preparations of the Edinburgh college: But now they introduce them only into their liſt of the materia medica; as the apothecary will in general find it more for his intereſt to purchaſe them thus prepared, than to prepare them for himſelf: for the proceſs requires to be very cautiouſly conducted, to prevent the fat from burning or turning black.

The purification of gum ammoniacum. L.

95 If gum ammoniac do not ſeem to be pure, boil it in water till it become ſoft; then ſqueeze it through a canvas bag, by means of a preſs. Let it remain at reſt till the reſinous part ſubſide; then evaporate the water; and toward the end of the evaporation reſtore the reſinous part, mixing it with the gummy.

In the ſame manner are purified aſſafœtida and ſuch like gum reſins.

You may alſo purify any gum which melts eaſily, ſuch as Galbanum, by putting it in an ox-bladder, and holding it in boiling water till it be ſo ſoft that it can be ſeparated from its impurities by preſſing through a coarſe linen cloth.

In ſtraining all the gums, care ſhould be taken that the heat be neither great nor long continued; otherwiſe a conſiderable portion of the more active volatile matter will be loſt; an inconvenience which cannot by any care be wholly avoided. Hence the purer tears, unſtrained, are in general to be preferred, for internal uſe, to the ſtrained gums.

As an additional reaſon for this preference, we may add, that ſome of the gum-reſins, purified in the common way, by ſolution in water, expreſſion and evaporation, are not ſo eaſily ſoluble in aqueous menſtrua after as before ſuch depuration. On theſe accounts this proceſs is entirely omitted by the Edinburgh college; and in every caſe where a gummy reſinous ſubſtance, before it be taken, is to be diſſolved in water, it may be as effectually freed from impurities at the time of ſolution as by this proceſs. And when it is to be employed in a ſolid ſtate, care ſhould be taken that the pure parts alone be ſelected.

The burning of hartſhorn. L.

96 Burn pieces of hartſhorn till they become perfectly white; then reduce them to a very fine powder.

The pieces of horn generally employed in this operation are thoſe left after diſtillation.

In the burning of hartſhorn, a ſtrong fire and the free admiſſion of air are neceſſary. The potter's furnace was formerly directed for the ſake of convenience; but any common furnace or ſtove will do. If ſome lighted charcoal be ſpread on the bottom of the grate, and above this the pieces of the horn are laid, they will be burnt to whiteneſs, ſtill retaining their original form.

Burnt hartſhorn is not now conſidered as a pure earth, having been found to be a compound of calcareous earth and phoſphoric acid. It is the weakeſt of the animal abſorbents, and is difficultly ſoluble in acids; but whether it be of equal or ſuperior uſe in diarrhœas to more powerful abſorbents, muſt be left to obſervation.

The drying of herbs and flowers.

97 Let theſe, ſpread out lightly, be dried by a gentle heat. *L.*

Herbs and flowers muſt be dried by a gentle heat, from a ſtove or common fire. They muſt be taken in ſuch quantities at a time, that the proceſs will be ſpeedily finiſhed; for by this means their medical powers are beſt preſerved. The moſt certain teſt of this is the perfect preſervation of the natural colour: but the leaves of cicuta, and of other plants containing a volatile matter, muſt be immediately pounded, after being dried, and afterwards kept in a phial with a ground ſtopper. *E.*

The directions given by the London college are here leſs explicit, and perhaps leſs proper, than thoſe of the Edinburgh college: for there can be no doubt of the propriety of drying theſe ſubſtances haſtily, by the aid of artificial heat, rather than by the heat of the ſun. In the application of artificial heat, the only caution requiſite is to avoid burning; and of this a ſufficient teſt is afforded by the preſervation of colour. And the direction given with regard to cicuta may perhaps with advantage be followed with moſt of the other flowers and herbs, afterwards to be exhibited in powder.

The purifying of honey. L.

98 Melt the honey by the heat of a water bath, and remove the ſcum.

The intention of this proceſs is to purify the honey from wax, or other droſſy matters that have been united with it by the violence of the preſs in its ſeparation from the comb, and from meal and ſuch like ſubſtances, which are ſometimes fraudulently mixed with it. When the honey is rendered liquid and thin by the heat, theſe lighter matters riſe freely to the ſurface,

This preparation is not ſo neceſſary for honey that is to be uſed as an article of diet, as for that which is employed in the preparation of oxymels: hence the Edinburgh college, who have rejected all the oxymels, have omitted this proceſs.

The preparation of millipeds. L. E.

99 The millipeds are to be incloſed in a thin canvas cloth, and ſuſpended over hot proof-ſpirit in a cloſe veſſel, till they be killed by the ſteam, and rendered friable.

This is a convenient way of rendering millipeds pulveriſable, without endangering any loſs of ſuch virtues as they may poſſeſs.

The directions given by both colleges are preciſely the ſame, and delivered in almoſt the ſame words.

The extracting of pulps. L. E.

100 Unripe pulpy fruits, and ripe ones if they be dry are to be boiled in a ſmall quantity of water until they become ſoft: then preſs out the pulp through a ſtrong hair-ſieve, and afterwards boil it down to the conſiſtence of honey in an earthen veſſel, over a gentle fire; taking care to keep the matter continually ſtirring, to prevent its burning.

The pulp of caſſia fiſtularis is in like manner to be boiled out from the bruiſed pod, and reduced afterwards to a proper conſiſtence, by evaporating the water.

The pulps of fruits that are both ripe and freſh, are to be preſſed out through the ſieve, without any previous boiling.

In the extraction of pulps, the direction of both colleges ſo nearly agree, that it is unneceſſary to give a ſeparate tranſlation of each. We may only obſerve, that the London college, inſtead of ſoftening the fruits by boiling them in a ſmall quantity of water, direct them to be put in a moiſt place. This direction, though proper in ſome caſes, is not generally the moſt ſuitable.

The drying of ſquills. L. E.

101 Let the ſquill, cleared from its outer ſkin, be cut tranſverſely into thin ſlices, and dried with a very gentle heat. When properly managed, the ſquill is friable and retains its bitterneſs and acrimony.

By this method the ſquill dries much ſooner than when its ſeveral coats are only ſeparated, as has been uſually directed; the internal part is here laid bare, but, in each of the entire coats, it is covered with a thin ſkin, which impedes the exhalation of the moiſture. The root loſes in this proceſs four-fifths of its original weight; the parts which exhale appear to be merely watery: ſix grains of the dry root being equivalent to half a dram of the freſh; a circumſtance to be particularly regarded in the exhibition of this medicine. In the preceding editions of our pharmacopœias, a particular caution was given, not to uſe an iron knife for cutting ſquills, but one of wood, ivory, or bone: the reaſon of this caution is ſaid to be, not ſo much that the ſquill would receive any ill qualities from the iron; as, that its acrid juice, adhering to the knife, might render a wound received by it extremely painful, or even dangerous; but as no danger is to be apprehended from ſuch an accident, the direction appears unneceſſary. Dried ſquills furniſh us with a medicine, ſometimes advantageouſly employed as an emetic, often as an expectorant, but ſtill more frequently as a powerful diuretic.

The burning of ſponge.

102 Beat the ſponge, after cutting it in pieces; and, when ſeparated from its gritty matter, burn it in a cloſe iron veſſel, until it becomes black and friable; afterwards rub it to a very fine powder. *L.*

Put the ſponge, cut into ſmall pieces, and well freed from adhering earthy matters, into a cloſe earthen veſſel. Place it on the fire, and let it be ſtirred frequently till it become black and friable; then reduce it to a powder in a glaſs or marble mortar. *E.*

This medicine has been in uſe for a conſiderable time, and employed againſt ſcrofulous diſorders and cutaneous foulneſs, in doſes of a ſcruple and upwards. Its virtues ſeem to depend on a volatile ſalt juſt formed, and combined with its own oil. If the ſponge be diſtilled with a ſtrong heat, it yields a large proportion of that ſalt in its proper form. The ſalt is in this preparation ſo far extricated, that if the burnt ſponge be ground in a braſs mortar, it corrodes the metal ſo as to contract a diſagreeable taint, and ſometimes an emetic quality.

Bees, earthworms, and other animal ſubſtances, have by ſome been prepared in the ſame manner, and recommended in different diſeaſes: but as theſe ſubſtances fall much ſhort of ſponge in the quantity of volatile ſalt producible from them by fire, they are probably inferior alſo in medicinal efficacy. Of all the animal matters that have been tried, raw ſilk is the only one which exceeds or equals ſponge, in the produce of ſalt.

A good deal of addreſs is requiſite for managing this proceſs in perfection. The ſponge ſhould be cut ſmall, and beaten for ſome time in a mortar, that all the ſtony matters may be got out, which compared with the weight of the ſponge when prepared, will ſometimes amount to a conſiderable quantity. The burning ſhould be diſcontinued as ſoon as the matter is become thoroughly black. If the quantity put into the veſſel at once be large, the outſide will be ſufficiently burnt before the inſide be affected; and the volatile ſalt of the former will in part eſcape, before that in the latter is begun to be formed. The beſt method of avoiding this inconvenience ſeems to be, to keep the ſponge continually ſtirring, in ſuch a machine as is uſed for the roaſting of coffee.

And from this circumſtance the iron veſſel directed by the London college is preferable to the earthen one directed by that of Edinburgh. But the pounding in a glaſs or marble mortar, directed by the latter, is a neceſſary caution which the former college have omitted.

The purification of ſtorax. L.

103 Diſſolve the ſtorax in rectified ſpirit of wine, and ſtrain the ſolution; afterwards reduce it to a proper thickneſs with a gentle heat.

Storax was formerly directed to be purified by means of water; hence it was ſtyled *ſtoracis collatio*: but the method now adopted is much preferable, for the active parts of the ſtorax totally diſſolve in ſpirit of wine, the impurities alone being left. And as theſe active parts do not riſe in diſtillation, the ſpirit may be again recovered by diſtillation.

Purified filings of iron. E.

104 Apply a magnet to a ſieve placed on filings of iron, ſo that the filings may be attracted upwards through the ſieve.

Ruſt of iron, commonly called *ſhavings of iron, prepared.* E.

105 Set purified filings of iron in a moiſt place, that they may turn to ruſt, which is to be ground into an impalpable powder.

The cleanſing of iron filings by means of a magnet is very tedious, and does not anſwer ſo well as might be expected; for if they are ruſty, they will not be attracted by it, or not ſufficiently: nor will they by this means be entirely freed from braſs, copper, or other metallic ſubſtances which may adhere to them. It appears from the experiments of Henckel, that if iron be mixed by fuſion with even its own weight of any of the other metals, regulus of antimony alone excepted, the compound will be vigourouſly attracted by the loadſtone. The ruſt of iron is to be procured at a moderate rate from the dealers in iron, free from any impurities except ſuch as may be waſhed off by water.

The ruſt of iron is by ſome preferred as a medicine to the calces or croci made by a ſtrong fire. Hoffman relates, that he has frequently given it with remarkable ſucceſs in obſtinate chlorotic caſes accompanied with exceſſive headachs and other violent ſymptoms; and that he uſually joined with it pimpinella, arum root, and ſalt of tartar, with a little cinnamon and ſugar. The doſe is from four or five grains to twenty or thirty; ſome have gone as far as a dram: but all the preparations of this metal anſwer beſt in ſmall doſes, which ſhould rather be often repeated than enlarged.

Scales of iron purified. E.

106 Let the ſcales of iron, which may be had at the anvils of the workmen, be purified by the magnet; for the magnet only attracts the ſmaller and purer parts, leaving the more thick and impure behind.

This is perhaps of all the forms the moſt eligible for obtaining the pure matter in ſuch a divided ſtate as to render it eaſily acted on by different menſtrua; and the mode of purification here proſpered is not only very effectual, but alſo very eaſily put into practice.

The extraction of mucilage. Gen.

107 Boil the gums or mucilaginous ſeeds in a ſufficient quantity of water till it becomes viſcid, nearly reſembling the white of an egg; and then ſtrain it by preſſure through a linen cloath.

By this means vegetable mucilage may be eaſily obtained from many different ſubſtances in its pure ſtate. And although this proceſs is not directed in our pharmacopœias, yet we think that it might with advantage be adopted.

CHAP. II. *Of Conſerves.*

108 CONSERVES are compoſitions of recent vegetable matters and ſugar, beaten together into an uniform maſs.

This management is introduced for preſerving certain ſimples, undried, in an agreeable form, with as little alteration as poſſible in their native virtues; and to ſome ſubjects it is very advantageouſly applied. Vegetables, whoſe virtues are loſt or deſtroyed by drying, may in this form be kept uninjured for a length of time: for by carefully ſecuring the mouth of the containing veſſel, the alteration, as well as diſſipation, of their active principles, is generally prevented; and the ſugar preſerves them from the corruption which juicy vegetables would otherwiſe undergo. There are, however, ſundry vegetables whoſe virtues are impaired by this treatment. Mucilaginous ſubſtances by long lying with ſugar, become leſs glutinous; and aſtringents become ſenſibly ſofter on the palate. Many of the fragrant flowers are of ſo tender and delicate a texture, as almoſt entirely to loſs their peculiar qualities on being beaten or bruiſed.

In general, it is obvious, that in this form, on account of the large admixture of ſugar, ſubſtances of conſiderable activity can alone be taken to advantage as medicines. And, indeed, conſerves are at preſent conſidered chiefly as auxiliaries to medicines of greater efficacy, or as intermedia for joining them together. They are very convenient for reducing into boluſes or pills, the more ponderous powders as mercurius dulcis, the calces of iron and other mineral preparations; which with liquid or leſs conſiſtent matters, as ſyrups, will not cohere.

The ſhops were formerly encumbered with many conſerves altogether inſignificant; the few now retained have in general either an agreeable flavour to recommend them, or are capable of anſwering ſome uſeful purpoſes as medicines. Their common doſe is the bulk of a nutmeg, or as much as can be taken up at once or twice upon the point of a knife. There is in general no great danger of exceeding in this particular.

Conſerves of woodſorrel;
ſea wormwood;
the red roſe;
the outer rind of the Seville orange. L.

Pluck the leaves from the ſtalks, the unblown petals from the cups, taking off the heels. Take off the outer rind of the oranges by a grater; then beat each of them with a wooden peſtle in a marble mortar, firſt by themſelves, afterwards with three times their weight of double refined ſugar, until they be mixed.

Conſerves of the freſh leaves of mint;
red roſes not blown;
the outer rind of Seville oranges raſped off by a grater. E.

Theſe are directed to be prepared with triple their weight of ſugar in the ſame manner as the conſerves of the London college. The ſugar ſhould be pounded by itſelf, and paſſed through a ſieve before it be mixed with the vegetable maſs; for without this it cannot be properly incorporated. Roſe buds, and ſome other vegetables, are prepared for mixing with ſugar by a ſmall wooden mill contrived for that purpoſe.

In the ſame manner conſerves may be prepared from many other vegetables. But beſides the conſerves for which general directions are given, there are others, for which, either on account of the particular mode of preparation, or of the proportion, our pharmacopœias have thought it neceſſary to give particular directions. But before taking notice of theſe, it is neceſſary to mention the medical properties of the conſerves above enumerated.

Conſerve of the leaves of wood-ſorrel. L.

109 This is a very elegant and grateful conſerve; in taſte it is lightly acidulous, with a peculiar flavour, which ſome compare to that of green-tea. It is taken occaſionally for quenching thirſt, and cooling the mouth and fauces, in diſtempers where the heat of the body is much increaſed.

Conſerve of the tops of ſea wormwood. L.

110 The conſerve of wormwood has been celebrated in dropſies: Matthiolus relates, that ſeveral perſons were cured by it of that diſtemper without the aſſiſtance of any other medicine. Where the diſorder indeed proceeds from a ſimple laxity or flaccidity of the ſolids, the continued uſe of this medicine may be of ſome ſervice; as it appears to be an elegant mild corroborant. It is directed to be given in the doſe of half an ounce about three hours before meals.

Conſerve of the buds of red roſes. L. E.

111 This is a very agreeable and uſeful conſerve. A dram or two diſſolved in warm milk are frequently given as a light aſtringent, in weakneſs of the ſtomach, and likewiſe in coughs and phthiſical complaints. In the German ephemerides, examples are related of very dangerous phthiſes cured by the continued uſe of this medicine: In one of theſe caſes, twenty pounds of the conſerve were taken in the ſpace of a month; and in another, upwards of thirty. Riverius mentions ſeveral other inſtances of this kind. There is, however, much room for fallacy in ſuch obſervations; as phthiſis has not at all times been accurately diſtinguiſhed from obſtinate catarrhs, and ſome other affections; the antiſeptic property of the ſugar may perhaps have ſome ſhare in the effect.

Conſerve of the yellow rind of Seville orange-peel. L. E.

112 This conſerve is a very elegant one, containing all the virtues of the peel in a form ſufficiently agreeable, both with regard to the doſe and the conveniency of taking. It is a pleaſant warm ſtomachic; and with this intention is frequently uſed.

Conſerve of the leaves of ſpearmint. E.

113 The conſerve of mint retains the taſte and virtues of the herb. It is given in weakneſs of the ſtomach and retchings to vomit: and frequently does ſervice in ſome caſes of this kind, where the warmer and more active preparations of mint would be leſs proper.

Conſerve of arum.

114 Take of the freſh root of arum bruiſed, half a pound; double refined ſugar, a pound and a half. Beat them together in a mortar.

The root of arum, in its recent ſtate, is a ſubſtance of great activity; but this activity is almoſt entirely loſt on drying. Hence the compound powder which had formerly a place in our pharmacopœias is now rejected. And as neither water nor ſpirit extract its activity, this conſerve is perhaps the beſt form in which it can be preſerved in our ſhops. It may be given to adults in doſes of a dram.

Conſerve of hips. L.

115 Take of pulp of ripe hips one pound; double refined ſugar, powdered, twenty ounces. Mix them into a conſerve.

The conſerve of hips is of ſome eſteem as a ſoft cooling reſtringent; three or four drams or more are given at a time, in bilious fluxes, ſharpneſs of urine, and hot indiſpoſitions of the ſtomach: A good deal of care is requſite on the part of the apothecary in making this conſerve: the pulp is apt to carry with it ſome of the prickly fibres, with which the inſide of the fruit is lined; if theſe be retained in the conſerve, they will irritate the ſtomach, ſo as to occaſion vomiting.

Conſerve of ſloes. L. E.

116 Put the ſloes in water upon the fire that they may ſoften, taken care that they be not broken; then, the ſloes being taken out of the water, preſs out the pulp, and mix it with three times its weight of double-refined ſugar into a conſerve.

This preparation is a gentle aſtringent, and may be given as ſuch in the doſe of two or three drams. The degree of its aſtringency will vary according to the maturity of the ſloes, and the length of time for which the conſerve has been kept.

Conſerve of ſquills.

117 Take of freſh ſquils, one ounce; double-refined ſugar, five ounces. Beat them together in a mortar into a conſerve.

This conſerve is directed to be prepared in a ſmall quantity, to guard againſt its varying in ſtrength. It may be given to adults from half a dram to two ſcruples, eſpecially when freſh.

But the conſerve of ſquills is a more uncertain and leſs agreeable mode of exhibiting this article, than the powder of the dried root, particularly when made into pills, or given in the form of bolus with any other conſerve.

Conſerve of chervil. Suec.

118 Take of freſh leaves of chervil, double-refined ſugar, each equal parts. Beat them together into a conſerve.

Chervil has by ſome been extolled as an uſeful diuretic; and this is perhaps one of the moſt pleaſant forms under which it can be exhibited.

Conſerve of millepeds. Brun.

119 Take of live millepeds, one pound; double refined ſugar, two pounds and an half. Beat them together into a conſerve.

If the millepeds poſſeſs thoſe virtues which ſome have alleged, this is perhaps one of the beſt forms under which they can be exhibited. And by children, to whom they are frequently preſcribed, it may be eaſily taken, when other forms cannot be introduced.

Vitriolated conſerve of roſes. Brun.

120 To each pound of the conſerve of roſes add two drams of the diluted vitriolic acid.

This may be in ſome caſes an uſeful means of increaſing ſomewhat the aſtringency of the conſerve of roſes: But for the purpoſes for which the vitriolic acid is in general employed, the quantity that can thus be introduced is too inconſiderable to be of much ſervice.

Chap. III. *Of Juices.*

121 Juices are obtained from the ſucculent parts of plants, by including them, after being properly cut, bruiſed, &c. in a hair bag, and preſſing them, between wooden cheeks, in the common ſcrew-preſs, as long as any liquor exudes.

The harder fruits require to be previouſly well beaten or ground; but herbs are to be only moderately bruiſed, for if theſe are over bruiſed, a large quantity of the herbaceous matter will be forced out along with the juice. Hempen or woollen bags are apt to communicate a diſagreeable flavour; the threads of theſe likewiſe ſwell in proportion as they imbibe moiſture, ſo as in great meaſure to prevent the free percolation of the juice.

The fluids thus extracted from ſucculent fruits, both of the acid and ſweet kind, from moſt of the acrid herbs, as ſcurvy graſs and water-creſſes, from the acid herbs, as ſorrel and wood-ſorrel, from the aperient lacteſcent plants, as dandelion and hawkweed, and from ſundry other vegetables, contain great part of the peculiar taſte and virtues of the reſpective ſubjects. The juices, on the other hand, extracted from moſt of the aromatic herbs as thoſe of mint and the fragrant Turkey balm, commonly called *ba'm of Gilead*, have ſcarcely any thing of the flavour of the plants, and ſeem to differ little from decoctions of them made in water boiled till the volatile odorous parts has been diſſipated. Many of the odoriferous flowers, as the lily, violet, hyacinth, not only impart nothing of their fragrance to their juice, but have it totally deſtroyed by the previous bruiſing. From want of ſufficient attention to theſe particulars, practitioners have been frequently deceived in the effects of preparations of this claſs; juice of mint has been often preſcribed as a ſtomachic, tho' it wants thoſe qualities by which mint itſelf and its other preparations operate.

The juices, thus forcibly preſſed out from plants, differ from thoſe which flow ſpontaneouſly, or from inciſions; theſe laſt conſiſting chiefly of ſuch fluids as are not diffuſed through the whole ſubſtance of the vegetable ſubject, but elaborated in diſtinct veſſels, or ſecreted into particular receptacles. From poppy heads, ſlightly wounded, there iſſues a thick milky liquor, which dries by a moderate warmth into opium; whilſt the juice obtained from them by preſſure is of a dark-green colour, and far weaker virtue.

Juices newly expreſſed are generally thick, viſcid, and very impure: By colature, a quantity of groſs matter is ſeparated, the juice becomes thinner, limpid, and better fitted for medicinal purpoſes, though as yet not entirely pure: on ſtanding, it becomes again turbid, and apt to run into a fermentative or putrefactive ſtate. Clarification with whites of eggs renders the juices more perfectly fine; but there are few that will bear this treatment without a manifeſt injury to their flavour, taſte, and virtue.

The moſt effectual method of purifying and preſerving theſe liquors, is to let the ſtrained juices ſtand in a cool place till they have depoſited their groſſer feces, and then gently paſs them ſeveral times through a fine ſtrainer till perfectly clear; when about a fortieth part of their weight of good ſpirit of wine may be added, and the whole ſuffered to ſtand as before; a freſh ſediment will now be depoſited, from which the liquor is to be poured off, ſtrained again, and put into ſmall bottles which have been waſhed with ſpirit and dried. A little oil is to be poured on the ſurface, ſo as very nearly to fill the bottles, and the mouths cloſed with leather, paper, or ſtopped with ſtraw, as the flaſks in which Florence wine is brought to us: this ſerves to keep out duſt, and ſuffers the air, which in proceſs of time ariſes from all vegetable liquors, to eſcape; which air would otherwiſe endanger the burſting of the bottles; or, being imbibed afreſh, render their contents vapid and foul. The bottles are to be kept on the bottom of a good cellar or vault, placed up to the necks in ſand. By this method ſome juices may be preſerved for a year or two; and others for a much longer time.

It has already been obſerved, that there are great difference in juices, in regard to their being accompanied in the expreſſion with the virtues of the ſubjects. There are equal differences in regard to their preſerving thoſe virtues, and this independently of the volatility of the active matter, or its diſpoſition to exhale. Even the volatile virtue of ſcurvy-graſs may by the above method be preſerved almoſt entire in its juice for a conſiderable time: while the active parts of the juice of the wild cucumber quickly ſeparate and ſettle to the bottom, leaving the fluid part inert. Juices of arum root, iris root, bryony root, and ſundry other vegetables, throw off in like manner their medicinal parts to the bottom.

Compound juice of ſcurvy-graſs.

Take of the juice of garden ſcurvy-graſs two pints; brook lime and water-creſſes, of each one pint; Seville oranges, twenty ounces by meaſure. Mix them, and, after the feces have ſubſided, pour off the liquor, or ſtrain it. *L.* 122

Take of juice of garden ſcurvy-graſs, water-creſſes, both expreſſed from the freſh herbs, Seville oranges, of each two pounds; ſpirituous nutmeg-water, half a pound. Mix them and let them ſtand till the feces have ſubſided, then pour off the clear liquor. *E.*

By this formula the Edinburgh college have rejected the brook-lime and the ſugar of their former editions, The ſugar was certainly a very improper addition; for though it may preſerve dry vegetable matters, yet when added to juices largely inpregnated with watery and mucilaginous matter, it would no doubt furniſh that very principle moſt favourable to the production of the vinous fermentation. For the compound horſe-radiſh water they have ſubſtituted the ſpirituous water of nutmegs: Beſides, that, this water has the ſame property

of

of preſerving the juices from fermentation; it is alſo much more agreeable to the palate, and will make the juices ſit eaſier on the ſtomach.

The London college have retained nearly their former formula, giving it only a more proper name.

Both theſe compoſitions are of conſiderable uſe for the purpoſes expreſſed in the title: the orange juice is an excellent aſſiſtant to the ſcurvy-graſs and other acrid antiſcorbutics; which, when thus mixed, have been found from experience to produce much better effects than when employed by themſelves. Theſe juices may be taken from an ounce or two to a quarter of a pint, two or three times a-day: they generally increaſe the urinary ſecretion, and ſometimes induce a laxative habit. Preſerved with the cautions abovementioned, they will keep good for a conſiderable time; though, whatever care be taken, they are found to anſwer better when freſh: and from the difficulty of preſerving them ſo, they have of late been very much laid aſide, eſpecially ſince we have been provided with more convenient and uſeful remedies.

INSPISSATED JUICES.

123 When vegetable juices, or watery or ſpiritous decoctions or infuſions, are expoſed to a continued heat, the fluid gradually evaporating, carries off with it ſuch volatile matters as it was impregnated with, and leaves the more fixed united together into one maſs. The maſs which remains from the evaporation of the expreſſed juice of a plant is called *inſpiſſated juice*; from watery decoctions or infuſions, an *extract*; from ſpirituous tinctures, a *reſin*, or *eſſential extract*. The term *extract* is frequently uſed alſo as a general appellation of all the three kinds. Inſpiſſated juices and watery decoctions, particularly the former, when evaporated no further than to the conſiſtence of oil or honey, are called *robs*; and ſpirituous tinctures, reduced to a like conſiſtence, are called *balſams*.

What relates to the expreſſion of juices has already been delivered, with the moſt effectual means of preſerving them in their liquid ſtate, and a general account of what ſubſtances do or do not give out their virtues with their juices. In the inſpiſſation of juices, there is farther to be conſidered the volatility or fixity of their medicinal parts: if a plant loſes its virtue, or part of its virtue, in being dried, it is obvious that the juice muſt loſe as much in being inſpiſſated to dryneſs, how gentle ſoever the heat be with which the inſpiſſation is performed. It is likewiſe to be obſerved that the medicinal parts of ſome juices are kept in a ſtate of perfect ſolution by the watery fluid, ſo as to be completely retained by it after the liquor has been made fine by ſettling, ſtraining or other means; while the medicinal parts of others, not diſſoluble by watery menſtrua, are only diffuſed through the liquor in the ſame manner as the feculencies are, and ſeparate along with theſe on ſtanding.

Inſpiſſated juice of the elder-berry. L.

124 Take of expreſſed and depurated juice of elder-berries two pints; inſpiſſate it in a water bath, ſaturated with ſea-ſalt.

Inſpiſſated juice, commonly called *rob of elder-berries*. E.

Take of juice of ripe elder-berries, five pounds: pureſt ſugar, one pound. Evaporate with a gentle heat to the conſiſtence of pretty thick honey.

This preparation, made with or without ſugar, keeps well, and proves a medicine of conſiderable importance as an aperient, generally promoting the natural excretions by ſtool, urine, or ſweat. The doſe is from a dram or two to an ounce or more. A ſpoonful, diluted with water, is uſually taken in common colds at bed-time.

Inſpiſſated juice of wolfſbane. E.

125 Bruiſe the freſh leaves of aconitum; and including them in a hempen bag, ſtrongly compreſs them in a preſs, ſo that they may give out their juice: let the juice be evaporated in open veſſels in a water bath, to the conſiſtence of pretty thick honey: An empyreuma is to be avoided by conſtantly ſtirring the mixture towards the end of the proceſs.

After the matter has become cold, let it be put up in glazed earthen veſſels, and moiſtened with rectified ſpirit of wine.

In the ſame manner are prepared inſpiſſated juices of belladonna or deadly nightſhade, and hyoſcyamus or henbane.

In theſe inſpiſſated juices, the active parts of the plant are obtained in a concentrated ſtate, and in a condition which admits of preſervation for a conſiderable length of time. They furniſh, therefore, a convenient form for exhibiting theſe articles which, in the practice of medicine, are perhaps more frequently uſed in the ſtate of inſpiſſated juice than any other. This is particularly the caſe with the hyoſcyamus, which may often be advantageouſly employed when opium is indicated, but diſagrees with the patient. But aconite and belladonna may in general, with greater advantage, be exhibited under the form of powder made from the dried leaves.

It is very remarkable that the London college have given no place to theſe articles. We cannot however help thinking, that their pharmacopæia would be enriched by introducing not only the articles themſelves, but likewiſe theſe preparations, eſpecially as they are not unfrequently preſcribed by Britiſh practitioners.

Inſpiſſated juice of hemlock. E.

126 Having expreſſed the juice of the leaves and ſtalks of hemlock when flowering, in the ſame manner as directed for that of the aconitum, evaporate it to the conſiſtence of pretty thin honey; when it is cooled, add of the powder of the dried leaves of the plant as much as to make it into a maſs fit for forming pills. Care, however, is to be taken, that the evaporation proceed only to ſuch length, that as much of the powder can be mixed with the inſpiſſated juice as ſhall make up about a fifth part of the whole maſs.

A preparation ſimilar to this was publiſhed it Vienna by Dr Stoerk, who recommends it as an efficacious reſolvent in many obſtinate diſorders, where the common remedies avail nothing. He obſerves, that ſmall doſes ſhould always be begun with, as two grains, made into a pill twice a-day; and that by gradually increaſing the doſe, it may be given to two, three, or even four drams a-day, and continued in ſuch quantities for ſeveral weeks: that it may be uſed in ſafety in infancy, old age, and pregnancy: that it neither accelerates nor diſturbs the circulation; neither heats, nor cools, nor affects the animal functions: that it increaſes the ſecretions, and renders the mouth moiſt; ſeldom purges; very rarely vomits; ſometimes augments perſpiration; often produces a copious diſcharge of viſcid urine; but in many patients does not increaſe any of the ſenſible evacuations: that it removes obſtructions and their conſequences; relieves rheumatic pains, though of long continuance; diſcuſſes ſcirrhous tumours, both internal and external; and cures dropſies and conſumptions proceeding from ſchirrhoſities: that it often diſſolves cataracts, or ſtops their progreſs, and has ſometimes removed the gutta ſerena: that inveterate cutaneous eruptions, ſcald heads, malignant ulcers, cancers, the malignant fluor albus and gonorrhœa of long ſtanding, obſtinate remains of the venereal diſeaſe, and carries of the bones, generally yield to it: that for the moſt part it is neceſſary to continue this medicine for a conſiderable time before the cure be effected, or much benefit perceived from it: that in ſome caſes it failed of giving any relief; that he met with ſome perſons who could not bear its effects: and that conſequently there muſt be ſome latent difference in the habit, the diagnoſtic ſigns of which are at preſent unknown: that though it is by no means infallible any more than other medicines, yet the great number of deplorable caſes that have been happily cured by it, is ſufficient to recommend it to further trials. The efficacy of this medicine is confirmed by many eminent practitioners abroad; though the trials hitherto made of it in this country have not been attended with much ſucceſs. Somewhat, perhaps, may depend on the time of the plant's being gathered, and the manner of the preparation of the extract. Dr Stoerk himſelf takes notice of ſome miſtakes committed in this reſpect: ſome have left the herb in a heap for ſeveral days, whence part of it withered, part rotted, and the juice became thick and mucilaginous; others have taken a very large quantity of the juice, and boiled it down in copper veſſels with a great heat; by which means a ſtrong fetor was diffuſed to a conſiderable diſtance, and the moſt efficacious parts diſſipated: others, with officious care, have clarified the juice, and thus obtained a black tenacious extract, retaining but a ſmall degree of the ſpecific ſmell of the plant. The extract duly prepared, according to the above preſcription, is of a greeniſh brown colour, and a very diſagreeable ſmell, like that of mice. But though there be reaſon to belive that much of the extract uſed here had been ill prepared, we can by no means admit that its general inefficacy was owing to this cauſe; for though there are not many inſtances of its diſcovering any valuable medicinal powers, there are ſeveral of its having activity enough, even in ſmall doſes, to produce alarming ſymptoms.

Modern practice, however, ſeems to hold a middle place; being neither influenced by the extravagant encomiums of Dr Stoerk, nor frightened by the wary ſuſpicions of Dr Lewis. The inſpiſſated juice of the hemlock is accordingly given with freedom in a great variety of complaints, without our experiencing the wonderful effects aſcribed to it by the former, or the baneful conſequences dreaded by the latter. Like other preparations of this valuable herb, it is no doubt a very uſeful addition to our pharmacopœia; nor does its uſe ſeem to be more hazardous than that of opium and ſome other narcotics.

The London college direct the inſpiſſated juice of cicuta to be prepared in the ſame manner as that of the elder-berry, and without the addition of any of the powder. This is the moſt pure extract; and the powder may eaſily be occaſionally added. They direct the cicuta to be collected as ſoon as the flowers appear: And at that time the leaves are moſt fully impregnated with their active powers.

Inſpiſſated juice of black currants. L.

Inſpiſſated juice of lemons. L.

127 Theſe two the London college alſo direct to be prepared in the ſame manner with the elder-berry juice. And under this form the agreeable and uſeful acid of theſe vegetables, in a concentrated ſtate, may be preſerved for a conſiderable length of time.

CHAP. IV. *Extracts and Reſins.*

Obſervations on Extracts with Water.

128 Theſe extracts are prepared by boiling the ſubject in water, and evaporating the ſtrained decoction to a thick conſiſtence.

This proceſs affords us ſome of the more active parts of the plants, free from the uſeleſs indiſſoluble earthy matter, which makes the largeſt ſhare of their bulk. There is a great difference in vegetable ſubſtances, with regard to their fitneſs for this operation; ſome yielding to it all its virtues, and others ſcarce any. Thoſe parts in which the ſweet glutinous, emollient, cooling, bitter, auſtere, aſtringent virtues reſide, are for the moſt part totally extracted by the boiling water, and remain almoſt entire on evaporating it: whilſt thoſe which contain the peculiar odour, flavour, and aromatic quality, are either not extracted at all, or exhale along with the menſtruum. Thus gentian root, which is almoſt ſimply bitter, yields an extract poſſeſſing in a ſmall volume the whole taſte and virtues of the root.—Wormwood, which has a degree of warmth and ſtrong flavour joined to the bitter, loſes the two firſt in the evaporation, and gives an extract not greatly different from the foregoing: the aromatic quality of cinnamon is diſſipated by this treatment, its aſtringency remaining; while an extract made from the flowers of lavender and roſemary diſcovers nothing either of the taſte, ſmell, or virtues of the flowers.

General Rules for making Extracts with Water.

129 1. It is indifferent, with regard to the medicine, whether the ſubject be uſed freſh or dry; ſince nothing that can be preſerved in this proceſs will be loſt by drying. With regard to the facility of extraction, there is a very conſiderable difference; vegetables in general giving out their virtues more readily when moderately dried than when freſh.

2. Very compact dry ſubſtances ſhould be reduced into exceeding ſmall parts, previous to the affuſion of the menſtruum.

3. The quantity of water ought to be no greater than is neceſſary for extracting the virtues of the ſubject. A difference herein will ſometimes occaſion a variation in the quality of the product; the larger the quantity of the liquor, the longer time will be requiſite for evaporating it, and conſequently the more volatile parts of the ſubject will be diſſipated. A long-continued heat likewiſe makes a conſiderable alteration in the matter which is not volatile. Sweet ſubſtances, by long boiling with water, become nauſeous; and the draſtic purgatives loſe their virulence, though without any remarkable ſeparation of their parts.

4. The decoctions are to be depurated by colature; and afterwards ſuffered to ſtand for a day or two, when a conſiderable quantity of ſediment is uſually found at the bottom. If the liquor poured off clear be boiled down a little, and afterwards ſuffered to cool again, it will depoſite a freſh ſediment, from which it may be decanted before you proceed to finiſh the evaporation. The decoctions of very reſinous ſubſtances do not require this treatment, and are rather injured by it; the reſin ſubſiding along with the inactive dregs.

5. The evaporation is moſt conveniently performed in broad ſhallow veſſels; the larger the ſurface of the liquor, the ſooner will the aqueous parts exhale: This effect may likewiſe be promoted by agitation.

6. When the matter begins to grow thick, great care is neceſſary to prevent its burning. This accident almoſt unavoidable if the quantity be large, and the fire applied as uſual under the evaporating pan, may be effectually provided againſt, by carrying on the inſpiſſation after the common manner, no farther than to the conſiſtence of a ſyrup, when the matter is to be poured into ſhallow tin or earthen pans, and placed in an oven with its door open, moderately heated; which acting uniformly on every part of the liquid, will ſoon reduce it to any degree of conſiſtence required. This may likewiſe be more ſecurely done, by ſetting the evaporating veſſel in boiling water, but the evaporation is in this way very tedious.

Obſervations on Extracts with Rectified Spirit.

130 Rectified ſpirit of wine diſſolves the eſſential oils and reſins of vegetables, and does not readily carry off the oil in its exhalation; the heat ſufficient to exhale pure ſpirit being much leſs than that in which water evaporates to any conſiderable degree, or moſt eſſential oils diſtil. Hence a reſinous or ſpirituous extract of wormwood, contrary to that made with water contains the warmth and flavour, as well as bitterneſs, of the herb; one made from cinnamon poſſeſſes its aromatic virtue, as well as its aſtringency; and one from lavender and roſemary flowers, retains great part of their flavour and virtues; the volatile parts, which are carried off by water in its evaporation, being left behind by the ſpirit.

The ſpirit employed for this purpoſe ſhould be perfectly free from any ill flavour, which would be communicated in part to the preparation; and from any admixture of phlegm or water, which would not only vary its diſſolving power, but likewiſe, evaporating towards the end of the inſpiſſation would promote the diſſipation of the volatile parts of the ſubject. Hence alſo, the ſubject itſelf ought always to be dry: thoſe ſubſtances which loſe their virtue by drying, loſe it equally on being ſubmitted to this treatment with the pureſt ſpirit.

The inſpiſſation ſhould be performed from the beginning, in the gentle heat of a water bath. It is not needful to ſuffer the ſpirit to evaporate in the air; greateſt part of it may be recovered by collecting the vapour in common diſtilling veſſels. If the diſtilled ſpirit be found to have brought over any flavour from the ſubject, it may be advantageouſly reſerved for the ſame purpoſes again.

It is obſervable, that though rectified ſpirit be the proper menſtruum of the pure volatile oils, and of the groſſer reſinous matter of vegetables, and water of the mucilaginous and ſaline; yet theſe principles are, in almoſt all plants, ſo intimately combined together, that whichever of theſe liquors is applied at firſt, it will take up a portion of what is directly ſoluble only in the other. Hence ſundry vegetables, extremely reſinous, and whoſe virtues conſiſt chiefly in their reſin, afford nevertheleſs very uſeful extracts with water, though not equal to thoſe which may be obtained by a prudent application of ſpirit. Hence alſo the extracts made from moſt vegetables by pure ſpirit, are not mere reſins; a part of the gummy matter, if the ſubject contained any ſuch, is taken up along with the reſin; an admixture of great advantage to it in a medicinal view. The ſpirituous extracts of ſeveral vegetable ſubſtances, as mint leaves, rhubarb, ſaffron, diſſolve in water as well as in ſpirit.

Pure reſins are prepared by mixing, with ſpirituous tincture of very reſinous vegetables, a quantity of water. The reſin, incapable of remaining diſſolved in the watery liquor, ſeparates and falls to the bottom; leaving in the menſtruum ſuch other principles of the plant as the ſpirit might have extracted at firſt along with it.

Obſervations on Extracts with Spirit and Water.

131 There are ſundry vegetables, particularly thoſe of a reſinous nature, which are treated to better advantage with a mixture of water and ſpirit, than with either of them ſingly. The virtues of reſinous woods, barks, and roots, may indeed be in great part extracted by long boiling in freſh portions of water; but at the ſame time they ſuffer a conſiderable injury from the continued heat neceſſary for the extraction, and for the ſubſequent evaporation of ſo large a quantity of the fluid. Rectified ſpirit of wine is not liable to this inconvenience; but the extracts obtained by it from the ſubſtances here intended, being almoſt purely reſinous, are leſs adapted to general uſe than thoſe in which the reſin is divided by an admixture of the gummy matter, of which water is the direct menſtruum.

There are two ways of obtaining theſe compound or gummy-reſinous extracts: one, by uſing proof ſpirit, that is, a mixture of about equal parts of ſpirit and water, for the menſtruum; the other, by digeſting the ſubject firſt in pure ſpirit and then in water, and afterwards uniting into one maſs the parts which the two menſtrua have ſeparately extracted. In ſome caſes, where a ſufficiency of gummy matter is wanting in the ſubject, it may be artificially ſupplied, by inſpiſſating the ſpirituous tincture to the conſiſtence of a balſam, then thoroughly mixing with it a thick ſolution of any ſimple gum, as mucilage of gum-arabic, and drying the compound with a gentle heat. By this method are obtained elegant gummy reſins, extemporaneouſly miſcible with water into milky liquors.

Obſervations on extracts by long digeſtion.

132 It has been obſerved, that the virtues of vegetable decoctions are altered by long boiling. Decoctions or infuſions of draſtic vegetables, by long continued boiling or digeſtion, loſe more and more of their virulence; and at the ſame time depoſite more and more of a groſs ſediment, reſulting probably from the decompoſition of their active parts. On this foundation it has been attempted to obtain ſafe and mild preparations from ſundry virulent drugs; and ſome of the chemiſts have ſtrongly recommended the proceſs, though without ſpecifying, or giving any intimation of, the continuance of boiling requiſite for producing the mildneſs in different ſubjects. M. Beaumé in his *Elemens de pharmacie*, lately publiſhed, has given a particular account of an extract of opium prepared on this principle; of which extract, as it is alleged to be very uſeful in practice, it may not be improper to give a ſhort deſcription: And this we ſhall accordingly ſubjoin to our account of the opium purificatum of the London college.

Obſervations on particular extracts.

133 *Extract of chamomile,*
broom tops,
gentian,
liquorice,
black hellebore,
rue,
ſavin. L.

Boil the article in diſtilled water, preſs out the decoction, ſtrain it, and ſet it apart that the feces may ſubſide; then boil it again in a water-bath ſaturated with ſea-ſalt to a conſiſtence proper for making pills.

The ſame kind of bath is to be uſed in the preparation of all the extracts, that the evaporation may be properly performed.

Extract of gentian. E.

134 Take of gentian root as much as you pleaſe. Having cut and bruiſed it, pour upon it four times its quantity of water. Boil to the conſumption of one half of the liquor; and ſtrongly expreſſing it, ſtrain. Evaporate the decoction to the conſiſtence of thick honey in veſſels expoſed to the vapour of hot water.

In preparing this and every other extract, it is neceſſary to keep up a conſtant ſtirring towards the end of the proceſs, in order to prevent an empyreuma, and that the extract may be of an uniform conſiſtence, and free of clots.

In the ſame manner are prepared,

Extract of the roots of black hellebore;
leaves of the pulſatilla nigricans;
leaves of rue;
leaves of white poppies;
imperfectly ripe ſeeds of hemlock.

All the above extracts contain the virtues of the vegetable in a ſtate of tolerable perfection.

The extract of chamomile loſes in its formation the ſpecific flavour of the plant; but it is ſaid to furniſh a bitter remarkably antiſeptic, and to be given with advantage in different ſtomach ailments to the extent of a ſcruple or two, either by itſelf, or in conjunction with other remedies. The extract of broom tops is chiefly employed in hydropic caſes; and when taken to the quantity of about a dram, is ſaid to operate as a powerful diuretic.

The mode of preparing theſe extracts directed by the London and Edinburgh colleges is not eſſentially different: but ſome advantage will ariſe from employing the diſtilled water directed by the former; and the directions given by the latter with regard to the quantity of water to be uſed, and the degree of boiling to be employed before expreſſion, are not without ſome uſe.

The extract is the only preparation of the pulſatilla nigricans, and it ſeems ſufficiently well ſuited to be brought into this form. The extract of the white poppy-heads is not perhaps ſuperior in any reſpect to opium; but to thoſe who may think otherwiſe, it is convenient to preſerve them in this form for preparing the ſyrup occaſionally. The ſeeds of hemlock have by ſome been thought ſtronger, or at leaſt that they produce giddineſs ſooner, than the leaves; but this extract has not hitherto come into general uſe.

Compound extract of coloquintida. L.

135 Take of pith of coloquintida, cut ſmall, ſix drams; ſocotorine aloes, powdered, an ounce and a half; ſcammony, powdered, half an ounce; ſmaller cardamom ſeeds, huſked and powdered, one dram; proof-ſpirit, one pint. Digeſt the coloquintida in the ſpirit, with a gentle heat, during four days. To the expreſſed tincture add the aloes and ſcammony; when theſe are diſſolved, diſtil off the ſpirit, ſo that what remains may be of a conſiſtence proper for making pills, adding the ſeeds towards the end of the proceſs.

This compoſition anſwers very effectually as a cathartic, ſo as to be relied on in caſes where the patient's life depends on that effect taking place; the doſe is from fifteen grains to half a dram. The proof ſpirit is a very proper menſtruum for the purgative materials; diſſolving nearly the whole ſubſtance of the aloes and ſcammony, except the impurities; and extracting from the colocynth, not only the irritating reſin, but great part of the gummy matter. In the former pharmacopœias three ſpices were employed in this compoſition, cinnamon, mace, and cloves; the cardamom ſeeds, now introduced, are preferable on account of their aromatic matter being of a leſs volatile nature; though a conſiderable part of the flavour, even of theſe, is diſſipated during the evaporation of the phlegmatic part of the proof-ſpirit.

Elaterium. L.

136 Slit ripe wild cucumbers, and paſs the juice, very

lightly preſſed, through a fine hair ſieve, into a glaſs veſſel; then ſet it by for ſome hours until the thicker part has ſubſided. Pour off the thinner part ſwimming at the top, and ſeparate the reſt by filtering: cover the thicker part, which remains after filtration, with a linen cloth, and dry it with a gentle heat.

What happens in part in preparing the extract of hemlock, happens in this preparation completely, viz. the ſpontaneous ſeparation of the medicinal matter of the juice on ſtanding for a little time: and the caſe is the ſame with the juices of ſeveral other vegetables, as thoſe of arum root, iris root, and bryony root. Preparations of this kind have been commonly called *fæculæ*. The filtration above directed, for draining off ſuch part of the watery fluid as cannot be ſeparated by decantation, is not the common filtration through paper, for this does not ſucced here: the groſſer parts of the juice, falling to the bottom, form a viſcid cake upon the paper, which the liquid cannot paſs through. The ſeparation is to be attempted in another manner, ſo as to drain the fluid from the top: this is effected by placing one end of ſome moiſtened ſtrips of woollen cloth, ſkains of cotton, or the like, in the juice, and laying the other end over the edge of the veſſel, ſo as to hang down lower than the ſurface of the liquor: by this management the ſeparation ſucceeds in perfection.

Elaterium is a very violent hydragogue cathartic. In general, previous to its operation, it excites conſiderable ſickneſs at the ſtomach, and not unfrequently it produces ſevere vomiting. Hence it is ſeldom employed till other remedies have been tried in vain. But in ſome inſtances of aſcites it will produce a complete evacuation of water where other cathartics have had no effect. Two or three grains are in general a ſufficient doſe. And perhaps the beſt mode of exhibiting it is by giving it only to the extent of half a dram at a time, and repeating that doſe every hour till it begins to operate.

Extract of logwood. L.

137 Take of ſhavings of logwood, one pound. Boil it four times, or oftener, in a gallon of diſtilled water, to one half; then, all the liquors being mixed and ſtrained, boil them down to a proper conſiſtence.

The extract of logwood has been uſed for a conſiderable time in ſome of our hoſpitals. It has an agreeable ſweet taſte, with ſome degree of aſtringency; and hence becomes ſerviceable in diarrhœas, for moderately conſtringing the inteſtines and orifices of the ſmaller veſſels: it may be given from a ſcruple to half a dram, and repeated five or ſix times a-day with advantage. During the uſe of this medicine, the ſtools are frequently tinged red by it, which has occaſioned ſome to be alarmed as if the colour proceeded from blood: the practitioner therefore ought to caution the patient againſt any ſurpriſe of this kind.

The active parts of the logwood are difficultly extracted by means of water alone: hence the Edinburgh college call in the aid of ſpirit of wine, directing this extract to be prepared in the ſame manner as that of jalap, afterwards to be mentioned. And of the two modes, we are inclined to conſider the latter as intitled to the preference.

Extract of Peruvian bark. L.

138 Take of Peruvian bark, coarſely powdered, one pound; diſtilled water, 12 pints. Boil it for one or two hours, and pour off the liquor, which, while hot, will be red and pellucid; but, as it grows cold, will become yellow and turbid. The ſame quantity of water being again poured on, boil the bark as before, and repeat this boiling until the liquor, being cold, remains clear. Then reduce all theſe liquors, mixed together and ſtrained, to a proper thickneſs, by evaporation.

This extract muſt be prepared under two forms; one *ſoft*, and fit for making pills; the other *hard*, that it may be reducible to a powder.

Extract of Peruvian bark with the reſin. L.

139 Take of Peruvian bark, reduced to coarſe powder, one pound; rectified ſpirit of wine, four pints. Digeſt it for four days, and pour off the tincture; boil the reſiduum in 10 pints of diſtilled water to two; then ſtrain the tincture and decoction ſeparately, evaporating the water from the decoction, and diſtilling off the ſpirit from the tincture, until each begins to be thickened. Laſtly, mix the reſinous with the aqueous extract, and make the maſs fit for forming into pills.

Extract of Peruvian bark. E.

140 The Edinburgh college, who have not given a place to any pure watery extract of the bark, direct their extract of this medicine to be prepared in the ſame manner as their extract of jalap, that is, almoſt preciſely in the ſame manner as the extract with reſin of the London college. It is, however, we think with propriety, that the London college have given a place to both extracts; for neither is without its uſe.

Peruvian bark is a reſinous drug; the reſin melts out by the heat, but is not perfectly diſſolved by the water; hence, in cooling, it ſeparates, renders the liquor turbid, and in part falls to the bottom, as appears manifeſtly upon examining the ſediment by ſpirit of wine. This extract might be made to better advantage by the aſſiſtance of ſpirit of wine, after the ſame manner as that of jalap; and this method the Edinburgh college have directed. But all the ſpirits which can be expected to be employed for this proceſs among us, are accompanied with ſome degree of bad flavour; this adheres moſt ſtrongly to the phlegmatic part of the ſpirit, which evaporating laſt, muſt communicate this ill flavour to the extract; a circumſtance of very great conſequence, as this medicine is deſigned for thoſe whoſe ſtomachs are too weak to bear a due quantity of bark in ſubſtance. Ten or twelve grains of the hard extract are reckoned equivalent to about half a dram of the bark itſelf.

In the Peruvian bark, however, we may readily diſtinguiſh two different kinds of taſtes, an aſtringent and a bitter one; the former ſeems to reſide principally in the reſinous matter, and the latter chiefly in the gummy. The watery extract is moderately ſtrong in point of bitterneſs, but of the aſtringency it has only a ſmall degree. The pure reſin, on the other hand, is ſtrong in aſtringency, and weak in bitterneſs. Both qualities are united in the extract with the reſin; which appears to be the beſt preparation of this kind that can be obtained from this valuable drug.

Extract of caſcarilla. L.

141 This extract, which is now for the firſt time introduced into the pharmacopœia of the London college, and which has not yet obtained a place in that of Edinburgh, is directed to be prepared by ſpirit and water in the ſame manner as the extract of bark with the reſin. It poſſeſſes, in a concentrated ſtate, the active conſtituent parts of the caſcarilla, and has accordingly been already received into ſeveral of the beſt foreign pharmacopœias. In ſome of theſe, as the pharmacopœia Suecica, it is a mere watery extract: but in others, as the Pharmacopœia Roſſica, the aid both of ſpirits and water are conjoined; and this we conſider as the beſt preparation.

Extract of jalap. E.

142 Take of jalap root one pound; rectified ſpirit of wine, four pounds. Digeſt four days, and pour out the tincture. Boil the remaining magma in ten pounds of water to two pounds; then ſtrain the decoction, and evaporate it to the conſiſtence of pretty thin honey. Draw off the ſpirit from the tincture by diſtillation till what remains becomes thick. Then mix the liquors thus inſpiſſated; and keeping them conſtantly ſtirring, evaporate to a proper conſiſtence.

The extract of jalap is directed to be prepared by the London college in the ſame manner as their extract of Peruvian bark with the reſin, which differs in nothing from the mode of preparation above directed.

This extract is an uſeful purgative; by ſome thought preferable to the crude root, as being of more uniform ſtrength, and as the doſe, by the rejection of the woody parts, is rendered ſmaller: the mean doſe is 12 grains. If the ſpirituous tincture were inſpiſſated by itſelf, it would afford a reſinous maſs, which, unleſs thoroughly divided by proper admixtures, occaſions violent griping, and yet does not prove ſufficiently cathartic: the watery decoctions yield an extract which operates very weakly: both joined together, as in this preparation, compoſe an effectual and ſafe purge. This method of making extracts might be advantageouſly applied to ſeveral other reſinous ſubſtances, as the dry woods, roots, bark, &c. A ſmall quantity of ſpirit takes up the reſin; and much leſs water than would otherwiſe be neceſſary, extracts all the other ſoluble parts.

In a former edition of the Edinburgh Pharmacopœia, a little fixed alkaline ſalt was ordered to be added to the water in which the jalap is boiled after the action of ſpirit; on a ſuppoſition that this would enable the water to extract more from the root than it could by itſelf. But, ſo far as the quantity of the alkaline ſalt could go, it had the oppoſite effect, impeding the action of the water. The reſinous parts of the jalap are diſſolved by the ſpirit; and little other than the gummy matter remains for water to extract. Now, if pure gum arabic be put into water along with any alkaline ſalt, the ſalt will render the water incapable of diſſolving the gum: if the gum be diſſolved firſt, the addition of any alkaline ſalt will precipitate it.

Extract of ſenna. L.

143 Take of ſenna, one pound; diſtilled water, one gallon. Boil the ſenna in the diſtilled water, adding after its decoction a little rectified ſpirit of wine. Evaporate the ſtrained liquor to a proper thickneſs.

This extract had no place in our former pharmacopœias, but may be conſidered as an uſeful addition.

The reſinous parts of ſenna are in ſo ſmall a proportion to the gummy, that they are readily boiled out together. The ſpirit may be added when the decoction is reduced to one half or to three pints.

This extract is given as a gentle purgative from 10 grains to a ſcruple; or, in leſs quantity, as an aſſiſtant to the milder laxatives.

Purified opium. L.

144 Take of opium, cut into ſmall pieces, one pound; proof ſpirit of wine, 12 pints. Digeſt the opium with a gentle heat, ſtirring now and then till it be diſſolved, and filter through paper. Diſtil the tincture ſo prepared, to a proper thickneſs.

Purified opium muſt be kept in two forms; one *ſoft*, proper for forming into pills; the other *hard*, which may be reduced into powder.

Opium was formerly purified by means of water; and in this ſtate it had the name in our pharmacopœia of *extractum thebaicum*. But proof-ſpirit has been found, by experiments, to be the beſt menſtruum for opium, having diſſolved three-fourths of dried opium, which was much more than was taken up either by rectified ſpirit or water. Hence we thus obtained moſt entirely the conſtituents of opium free from any adhering impurities: but it has been imagined that ſome particular advantages ariſe from the parts which are extracted by water, eſpecially after long digeſtion; and accordingly the following extract of opium has been recommended by Mr Beaumé.

Extract of opium prepared by long digeſtion.

145 Let five pounds of good opium, cut in pieces, be boiled about half an hour, in 12 or 15 quarts of water: ſtrain the decoction, and boil the remainder once or twice in freſh water, that ſo much of the opium as is diſſoluble in water may be got out. Evaporate the ſtrained decoction to about ſix quarts; which being put into a tin cucurbit, placed in a ſand-bath, keep up ſuch a fire as may make the liquor nearly boil, for three months together if the fire is continued day and night, and for ſix months if it is intermitted in the night; filling up the veſſel with water in proportion to the evaporation, and ſcraping the bottom with a wooden ſpatula from time to time, to get off the ſediment which begins to precipitate after ſome days digeſtion. The ſediment needs not to be taken out till the boiling is finiſhed; at which time the liquor is to be ſtrained when cold, and evaporated to an extract of a due conſiſtence for being formed into pills.

The author obſerves, that by keeping the liquor ſtrongly boiling, the tedious proceſs may be conſiderably expedited, and the ſix months digeſtion reduced to four months: that in the beginning of the digeſtion, a thick, viſcous, oily matter riſes to the top, and forms a tenacious ſkin as the liquor cools; this is ſuppoſed to be analogous to eſſential oils, though wanting their volatility: that the oils begins to diſappear about the end of the firſt month, but ſtill continues ſenſible till the end of the third, forming oily clouds as often as the liquid cools: that the reſin at the ſame time ſettles to the bottom in cooling, preſerving for a long while its reſinous form, but by degrees becoming powdery, and incapable of being any longer ſoftened, or made to cohere by the heat; that when the proceſs is finiſhed, part of it ſtill continues a perfect reſin, diſſoluble in ſpirit of wine, and part an indiſſoluble powder: that when the digeſted liquor is evaporated to about a a quart, and ſet in the cold till next day, it yields a browniſh earthy ſaline matter, called the *eſſential ſalt of opium*, in figure nearly like the ſedative ſalt obtained from borax, intermingled with ſmall needled cryſtals. He gives an account of his having made this preparation ſix or ſeven times. The veſſel he made uſe of was about two inches and a half diameter in the mouth; the quantity of water evaporated was about 24 ounces a day, and from 130 to 140 quarts during the whole digeſtion. Out of 64 ounces of opium, 17 ounces remained undiſſolved in the water; the quantity of reſinous matter precipitated during the digeſtion, was 12 ounces: from the liquor, evaporated to a quart, he obtained a dram of eſſential ſalt, and might, he ſays, have ſeparated more; the liquor being then further evaporated to a pilular conſiſtence, the weight of the extract was 31 ounces.

It is ſuppoſed that the narcotic virtue of opium reſides in the oily and reſinous parts; and that the gummy extract, prepared by the above proceſs, is endowed with the calming, ſedative or anodyne powers of the opium, diveſted of the narcotic quality as it is of the ſmell, and no longer productive of the diſorders which opium itſelf, and the other preparations of it, frequently occaſion. A caſe is mentioned, from which the innocence and mildneſs of the medicine are apparent; 50 grains having been taken in a day, and found to agree well, where the common opiate preparations could not be borne. But what ſhare it poſſeſſes of the proper virtues of opium is not ſo clear; for the cure of convulſive motions of the ſtomach and vomitings, which at length happened after the extract had been continued daily in the above doſes for ſeveral years *(pluſieurs annees)*, cannot perhaps be aſcribed fairly to the medicine.

If the theory of the proceſs, and of the alteration produced by it in the opium, be juſt, a preparation equivalent to the above may be obtained in a much ſhorter time. If the intention is to ſeparate the reſinous and oily parts of opium, they may be ſeparated by means of pure ſpirit of wine, in as many hours as the digeſtion requires months. The ſeparation will alſo be as complete in regard to the remaining gum, tho' ſome part of the gum will in this method be loſt, a little of it being taken up by the ſpirit along with the other principles.

In what particular part of opium its peculiar virtues reſide, has not perhaps been inconteſtably aſcertained; but this much ſeems clear from experiment, that the pure gum, freed from all that ſpirit can diſſolve, does not differ eſſentially in its ſoporific power from the reſinous part.

There are grounds alſo to preſume, that by whatever means we deſtroy or diminiſh what is called the *narcotic, ſoporific, virulent quality of opium*, we ſhall deſtroy or diminiſh likewiſe its ſalutary operation. For the ill effects which it produces in certain caſes, ſeem to be no other than the neceſſary conſequences of the ſame power, by which it proves ſo beneficial in others.

Extract of wormwood. Suec.

Take any quantity of the tops of wormwood, and pour upon it double its weight of water. Boil it for a ſhort time over a gentle fire, then preſs out the liquor. Boil the reſiduum again in a freſh quantity of water, and after expreſſion, ſtrain it. Let the ſtrained liquor be evaporated in a water-bath to a proper conſiſtence. 146

In this extract we have one of the ſtrongeſt vegetable bitters in its moſt concentrated ſtate: and though it is not perhaps to be conſidered as ſuperior to the extract of gentian, yet it furniſhes a good variety, and is a more agreeable form for exhibiting the wormwood than that of ſtrong tincture.

Extract of dandelion. Suec.

This is directed to be prepared from the roots of the dandelion, collected early in the ſpring, or late in the autumn, in the ſame manner as the extractum abſinthii. And as far as the dandelion really poſſeſſes a reſolvent, aperient, or diuretic power, it furniſhes a convenient form for obtaining theſe effects from it. But as the dandelion is well known to abound with a milky juice, it is probable that the activity of the medicine would be increaſed from employing ſpirit alſo in the extraction of its medical virtues. 147

Watery extract of aloes. Suec.

Take of hepatic aloes one pound; cold ſpring-water, four pounds; juice of citrons, one pound. Macerate them in a glaſs veſſel for one or two days, ſhaking the veſſel from time to time. When the reſinous and feculent parts have ſubſided, pour off the liquor: and to the reſiduum add freſh water, till by this treatment it obtains a little impregnation. Let the ſtrained liquors be then evaporated in a warm bath to the conſiſtence of honey. 148

Although aloes are perhaps upon the whole a better medicine, in their crude ſtate, where the gummy and reſinous matters are united, than in thoſe preparations where either is retained ſeparately, yet the gummy extract which is thus obtained is at leaſt leſs diſagreeable having little ſmell or taſte, while at the ſame time it is a very powerful purgative: hence it may be uſefully employed at leaſt on ſome occaſions.

Gummy extract of myrrh. Brun.

Take of myrrh, half a pound; ſpring water, four pounds. Let the myrrh be diſſolved by gentle digeſtion and repeated agitation of the veſſel for four or five days: let the water ſwimming above the myrrh be then pured off, ſtrained, and evaporated to the conſiſtence of an extract. 149

This watery extract of myrrh may be uſeful in ſome caſes, as being much deprived of the heating qualities which it has in its crude ſtate: and if it furniſhes us in phthiſis pulmonalis with that uſeful remedy which ſome imagine, it may probably be moſt advantageouſly exhibited under this form.

Refined liquorice. Dan.

150 Take any quantity of Spaniſh liquorice, cut it into ſmall fragments, diſſolve it in tepid water, and ſtrain the ſolution. Let the liquor be poured off from the feculent part after it has ſubſided, and inſpiſſated by a gentle heat.

The extract of liquorice already mentioned, when it is prepared with due ſkill and attention, is unqueſtionably an article ſuperior to this; but it is very rarely met with in the ſhops of our druggiſts or apothecaries as prepared by themſelves. In its place they very commonly employ either the extract brought from Spain, or that prepared by the makers of liquorice at home; both of which very commonly abound with impurities. It has even been ſaid, that a portion of ſand is not unfrequently mixed with it to increaſe the weight: but whether the impurities aroſe from this cauſe, or from the ſlovenly mode of preparing it, conſiderable advantage muſt ariſe from freeing it from all theſe before it be employed for any purpoſe in medicine. And in modern practice it is frequently uſed, not only in troches and pills, but alſo for ſuſpending powders in waters; ſuch as the powder of Peruvian bark: and the powder of bark, when thus ſuſpended, is in general taken more readily by children than in any other form. Hence conſiderable advantage muſt ariſe from a proper and eaſy mode of purifying it, which the above proceſs affords. We are of opinion, therefore, that although a place be with propriety given to the extract of liquorice prepared by the apothecaries themſelves, refined liquorice ought alſo to be introduced into our pharmacopœias; and it would be very convenient to keep it in the ſhops in a ſoft conſiſtence fit for making pills, as it would not only anſwer that purpoſe but admit of a ready ſolution in water when requiſite. To this conſiſtence, indeed an objection occurs, from its being apt to grow mouldy; but this may be effectually prevented by the addition of a ſmall proportion of ſpirit.

Beſides the extracts which we have here ſelected from the foreign pharmacopœias, many others alſo ſtill retain a place in ſeveral of theſe; ſuch, for example, as the *extractum arnicæ, artemiſiæ, bryoniæ, cardui, centaurei, cochleariæ, croci*, &c. Several of theſe had formerly a place in our pharmacopœias, but are now with propriety rejected; becauſe, where theſe ſubſtances are to be employed, they may with much more advantage be exhibited under other forms. And, indeed, although under the form of extract we have a condenſation of ſome active principles, yet by the action of fire others are very apt to be loſt. Hence, where any article can be conveniently exhibited in ſubſtance, that form is in general preferable; and recourſe ſhould be had to extracts only with a view to ſome particular intention. Our colleges therefore have with propriety diminiſhed the number of them; and even thoſe which they have adopted are but ſeldom to be had recourſe to in preference to other forms. In the formation of many of thoſe extracts, retained by the foreign colleges, the moſt valuable principles are either entirely diſſipated or deſtroyed by the fire. We think, however, that advantage may ſometimes be obtained from adopting theſe which are here ſelected.

The chapter on extracts and reſins in the London pharmacopœia is concluded with the two following general directions:

1. All the extracts, during, the time of inſpiſſation muſt be gently agitated.

2. On all the ſofter watery extracts, a ſmall quantity of ſpirit of wine muſt be ſprinkled

Chap. V. *Expreſſed Oils.*

Expressed oils are obtained chiefly from certain ſeeds and kernels of fruits, by thoroughly pounding them in a ſtone mortar, or, where the quantities are large, grinding them in mills, and then including them in a canvas bag, which is wrapt in a hair-cloth, and ſtrongly preſſed between iron plates. The canvas, if employed alone, would be ſqueezed ſo cloſe to the plates of the preſs as to prevent the oil from running down: by the interpoſition of the hair-cloth a free paſſage is allowed it. 151

Sundry machines have been contrived both for grinding the ſubject and preſſing out the oil, in the way of buſineſs. To facilitate the expreſſion, it is uſual to warm either the plates of the preſs, or the ſubject itſelf after the grinding, by keeping it ſtirring in a proper veſſel over the fire; the oil, liquefied by the heat ſeparates more freely and more plentifully. When the oil is deſigned for medicinal purpoſes, this practice is not to be allowed; for heat, eſpecially if its degree be ſufficient to be of any conſiderable advantage for promoting the ſeparation, renders the oil leſs ſoft and palatable, impreſſes a diſagreeable flavour, and increaſes its diſpoſition to grow rancid: hence the colleges both of London and Edinburgh expreſsly require the operation to be performed without heat.

Nor are the oils to be kept in a warm place after their expreſſion. Expoſed for a few days to heat no greater than that of the human body, they loſe their emollient quality, and become highly rancid and acrimonious. Too much care cannot be taken for preventing any tendency to this acrid irritating ſtate in medicines, ſo often uſed for abating immoderate irritation.

So much are theſe oils diſpoſed to this injurious alteration, that they frequently contract an acrimony and rancidity while contained in the original ſubjects. Hence great care is requiſite in the choice of the unctuous ſeeds and kernels, which are often met with very rancid; almonds are particularly liable to inconveniences of this kind.

Expreſſed oils are prepared for mechanic uſes from ſundry different ſubjects, as nuts, poppy-ſeed, hempſeed, rape-ſeed, and others. Thoſe directed for medicinal purpoſes in the London and Edinburgh pharmacopœias are the following:

Oil of almonds. L. E.

Pound freſh almonds, either ſweet or bitter, in a mortar, then preſs out the oil in a cold preſs. 152

In the ſame manner is to be expreſſed oil of lintſeed and oil of muſtard-ſeed.

The oil of almonds is prepared from the ſweet and bitter almonds indifferently, the oils obtained from both ſorts being exactly the ſame. Nor are the differences of the other oils very conſiderable, the diſcriminating qualities of the ſubjects not reſiding in the oils that are thus obtained by expreſſion. The oil of lintſeed acquires indeed ſome peculiarities from containing a portion of vegetable mucilage; but the oil of muſtard-ſeed is as ſoft, inſipid, and void of pungency, as that of ſweet almonds, the pungency of the muſtard remaining entire in the cake left after the expreſſion. The ſeveral oils differ in ſome of their properties from each other; but in medicinal qualities they appear to be all nearly alike, and agree in one common emollient virtue. They ſoften and relax the ſolids, and obtund acrimonious humours; and thus become ſerviceable internally in pains, inflammations, heat of urine, hoarſeneſs, tickling coughs, &c. in glyſters, for lubricating the inteſtines, and promoting the ejection of indurated feces; and in external applications, for tenſion and rigidity of particular parts. Their common doſe is half an ounce; in ſome caſes they are given to the quantity of three or four ounces. The moſt commodious forms for their exhibition we ſhall ſee hereafter in the chapter of Emulſions.

Caſtor oil. L.

153 This oil is directed by the London college to be prepared in the ſame manner as that of almonds, the ſeeds or nuts being taken from the huſks before putting them into the mortar. Palma Chriſti, or caſtor oil, (See *Oleum Palmæ Chriſti*, and Ricinus), is a gentle and uſeful purgative: it generally produces its effects without griping, and may be given with ſafety where acrid purgatives are improper. With adults, from half an ounce to an ounce is generally requiſite for a doſe. This article, however, is very ſeldom prepared by our apothecaries, being in general imported under the form of oil from the Weſt Indies: hence the Edinburgh college have not mentioned it among their preparations, but merely given it a place in their liſt of the materia medica. But when our apothecaries prepare it for themſelves, they are more certain of obtaing a pure oil, and one too obtained without the aid of heat, which is often employed, and gives a much inferior oil. It is therefore with propriety that the London college have given directions for the preparation of it by the apothecary himſelf. But even the London college have not thought it neceſſary to give directions for the preparation of the expreſſed oils, which, as well as the *oleum ricini*, are alſo introduced into the liſt of the materia medica by the Edinburgh college.

Expreſſed oil of bay berries.
mace,
olives,
palm.

154 Theſe alſo are principally conſidered as poſſeſſing only an emollient virtue; but as far as they have been ſuppoſed to exert any peculiar qualities, theſe we have had occaſion to mention in other parts of the work, when treating of the articles from which they are obtained. See Olea, Mace, &c.

Oil of chocolate nuts. Suec.

155 Expreſs the oil from the nuts ſlightly toaſted, and freed from their coverings.

In this oil we have the nutritious part of chocolate, free from thoſe aromatics with which it is united in the ſtate in which it is kept in our ſhops. And although under the form of chocolate it ſits perhaps more eaſily on the ſtomach than in moſt other forms; yet where, from any particular circumſtance, aromatics are contraindicated, the oil in its pure ſtate gives us an opportunity of employing in different ways this mild nutritious article.

Oil of hyoſcyamus. Suec.

156 This oil is directed to be obtained by expreſſion from the ſeeds of the hyoſcyamus, in the ſame manner as that of almonds.

Of the narcotic powers of the hyoſcyamus ſome obſervations have already been offered. This oil, although an expreſſed one, is ſaid to retain theſe virtues; and accordingly it has entered the compoſition of ſome anodyne ointments and plaſters. We are, however, inclined to think, that when the ſedative power of hyoſcyamus is wanted under the form of oil, it may be beſt obtained from impregnating olive oil by the leaves of the plant.

Egg oil. Suec.

157 Take any quantity of freſh eggs, boil them till they be quite hard; then take out the yolks, break them in pieces, and roaſt them gently in a frying-pan till they feel greaſy when preſſed between the fingers; put them while warm into a hair bag, and expreſs the oil.

The yolk of the egg is well known to be a mild nutritious ſubſtance: but notwithſtanding the many virtues at one time attributed to it, of being paregoric and ſtyptic, as externally applied; and of being uſeful in ſtomach complaints, dyſentery, and different affections of the alimentary canal, when taken internally;—it is much to be doubted whether it be in any other way uſeful in medicine than as an article of diet; and we are very uncertain whether any particular purpoſe in medicine will be anſwered by this expreſſed oil: but as it holds a place in moſt of the foreign pharmacopœias of modern date, it may juſtly be conſidered as deſerving ſome attention.

Notwithſtanding the juſtice of the obſervation reſpecting the great ſimilarity of expreſſed oils in general, yet there can be no doubt that in ſome inſtances they obtain a peculiar impregnation. This manifeſtly appears in the *oleum ricini*, *oleum nucis moſchatæ*, and ſome of the others mentioned above. Indeed oils expreſſed from aromatic ſubſtances in general retain ſome admixture of the eſſential oil of the ſubject from which they are expreſſed. Nor is this ſurpriſing, when we conſider that in ſome caſes the eſſential oil exiſts in a ſeparate ſtate even in the growing plant.

The rinds of the ſeveral varieties of oranges, lemons, and citrons, yield by a kind of expreſſion their eſſential oils almoſt pure, and nearly ſimilar to thoſe which are obtained from them by diſtillation. The eſſential oils, in which the fragrance and aromatic warmth of theſe fruits reſide, are contained in numerous little veſicles, which may be diſtinguiſhed by the naked eye, ſpread, all over the ſurface of the peel. If the rind be cut in ſlices, and the ſlices ſeparately doubled or bent in different parts, and ſqueezed between the fingers, the veſicles burſt at the bending, and diſcharge the oil in a number of fine ſlender jets. A glaſs plate being ſet upright in a glaſs or porcelain veſſel, and the ſlices ſqueezed againſt the plates, the little jets unite into drops upon the plate, and trickle down into the veſſel beneath. But though this proceſs affords the true native oil in the ſame ſtate wherein it exiſted in the ſubject, unaltered by fire or other agents, it is not practicable to advantage unleſs where the fruit is very plentiful, as only a ſmall part of the oil it contains can thus be extracted or collected.

The oil is more perfectly ſeparated by rubbing the rind upon a lump of ſugar. The ſugar, by the inequality of its ſurface, produces the effect of a raſp in tearing open the oily veſicles, and in proportion as the veſicles are opened the ſugar imbibes the oil. When the outward part of the lump is ſufficiently moiſtened, it is ſcraped off, and the operation continued on the freſh ſurface. The oil thus combined with the ſugar is fit for moſt of the uſes to which it is applied in a fluid ſtate. Indeed the pure eſſential oils obtained by diſtillation are often purpoſely mixed with ſugar to render their uſe the more commodious.

Chap. VI. *Eſſential oils.*

158 Essential oils are obtained only from odoriferous ſubſtances; but not equally from all of this claſs, nor in quantity proportional to their degree of odour. Some which, if we were to reaſon from analogy, ſhould ſeem very well fitted for this proceſs, yield extremely little oil, and others none at all. Roſes and camomile flowers, whoſe ſtrong and laſting ſmell promiſes abundance, are found upon experiment to contain but a ſmall quantity; the violet and jeſſamine flower, which perfume the air with their odour, loſe their ſmell upon the gentleſt coction, and do not afford the leaſt perceptible mark of oil on being diſtilled unleſs immenſe quantities are ſubmitted to the operation at once; while ſavin, whoſe diſagreeable ſcent extends to no great diſtance, gives out the largeſt proportion of oil of almoſt any vegetable known.

Nor are the ſame plants equally fit for this operation when produced in different ſoils or ſeaſons, or at different times of their growth. Some yield more oil if gathered when the flowers begin to fall off than at any other time. Of this we have examples in lavender and rue; others, as ſage, afford the largeſt quantity when young, before they have ſent forth any flowers; and others, as thyme, when the flowers have juſt appeared. All fragrant herbs yield a larger proportion of oil when produced in dry ſoils and warm ſummers than in oppoſite circumſtances. On the other hand, ſome of the diſagreeable ſtrong-ſcented ones, as wormwood, are ſaid to contain moſt in rainy ſeaſons and when growing in moiſt rich grounds.

Several of the chemiſts have been of opinion, that herbs and flowers, moderately dried, yield a greater quantity of eſſential oil than if they were diſtilled when freſh. It is ſuppoſed, that the oil being already blended in freſh plants, with a watery fluid, great part of it remains diffuſed through the water after the diſtillation, divided into particles too minute to unite and be collected; whereas in drying, the oily parts, on the exhalation of the moiſture which kept them divided and diſperſed, run together into globules, which have little diſpoſition to mingle with watery fluids, and eaſily ſeparate from the water employed in the diſtillation.

This theory, however, does not appear to be quite ſatisfactory; for though the oil be collected in the ſubject into diſtinct globules, it does not riſe in that form, but is reſolved into vapour, and blended and coagitated by the heat with the vapour of the water; and if the oil in a dry plant was leſs diſpoſed to unite with aqueous fluids than in a freſh one, the dry ought to yield a weaker infuſion than the freſh; the contrary of which is generally found to obtain. As the oil of the dry plant is moſt perfectly extracted and kept diſſolved by the water before the diſtillation, it is difficult to conceive any reaſon why it ſhould have a greater tendency to ſeparate from the water afterwards.

The opinion of dry plants yielding moſt oil ſeems to have ariſen from an obſervation of Hoffman, who has probably been miſunderſtood: "A pound (he ſays) of dry ſpike flowers yields an ounce of oil, but if they were diſtilled freſh they would ſcarcely yield above half an ounce; and the caſe is the ſame in balm, ſage, &c. The reaſon is, that in drying the watery humidity exhales; and as from two pounds of a freſh plant we do not obtain above one pound of dry, and little of the ſubtile oil evaporates in the drying, it follows, that more oil ought to be afforded by the dry than by the freſh." The meaning of which ſeems to be no more than this, that if two pounds of a freſh plant are by drying reduced to one without any loſs of the oil, then the one pound dry ought to be equivalent to the two freſh. A late writer quotes an experiment of Neumann, which appears to be miſunderſtood in the ſame manner; for Neumann, in the place referred to, ſays only that dry wormwood is found to yield much more oil than an *equal weight* of the freſh plant. Trials are yet wanting in which freſh and dry plants have been brought to a fair compariſon, by dividing a quantity of the ſubject into two equal weights, and diſtilling one while freſh, and the other after it has been carefully and moderately dried.

But whatever may be the effect of moderate exſiccation, it is certain, that if the drying be long continued, the produce of oil will be diminiſhed, its colour altered, and its ſmell impaired.

With regard to the proportion of water to be employed, if whole plants moderately dried are uſed, or the ſhavings of wood, as much of either may be put into the veſſel as, lightly preſſed, will occupy half its cavity: and as much water may be added as will fill two-thirds of it. The water and ingredients altogether ſhould never take up more than three-fourths of the ſtill; there ſhould be liquor enough to prevent any danger of an empyreuma, but not ſo much as to be too apt to boil over into the receiver.

The maceration ſhould be continued ſo long that the water may fully penetrate the parts of the ſubject. To promote this effect, woods ſhould be thinly ſhaved acroſs the grain or ſawn, roots cut tranverſely into thin ſlices, barks reduced into coarſe powder, and ſeeds ſlightly bruiſed. Very compact and tenacious ſubſtances require the maceration to be continued a week or two, or longer; for thoſe of a ſofter and looſer texture, two or three days are ſufficient; while ſome tender herbs and flowers not only ſtand in no need of maceration, but are even injured by it.

Whether the addition of ſea-ſalt, which ſome have recommended, be of any real ſervice, is much to be doubted. The uſes generally aſſigned to it are, to penetrate and unlock the texture of the ſubject more effectually than ſimple water could do, and to prevent the fermentation or putrefaction which the matter is apt to run into during the length of time for which the maceration is often continued. But ſea-ſalt ſeems rather to harden and condenſe, than to ſoften and reſolve, both vegetable and animal ſubjects; and if it prevents putrefaction, it muſt, on that very account, be injurious rather than of ſervice. The reſolution here aimed at approaches near to a beginning putrefaction; and ſaline ſubſtances, by retarding this, prolong the maceration far beyond the time that would otherwiſe be neceſſary. It is in the power of the operator, when he perceives the proceſs coming near this pitch, to put a ſtop to it at pleaſure, by proceeding immediately to diſtillation. By this means the whole affair will be finiſhed in a very little time, with at leaſt equal advantage in every other reſpect; provided the manual operations of pounding, raſping, and the like, which are equally neceſſary in either caſe, be minutely complied with.

Bodies of a very viſcous and compact texture were directed, in the Edinburgh pharmacopœia, to be fermented for ſome days with a little yeſt. Half their quantity of water is ſufficient for performing the fermentation; as much more as is neceſſary is to be added afterwards before the diſtillation. This proceſs undoubtedly promotes the reſolution of the ſubject, and the extrication of the oil. It rarely happens, however, that aſſiſtances of this kind are needful. Particular care muſt be had not to continue the fermentation too long; or to give a bad flavour to the oil by an ill-choſen ferment, or uſing too large a quantity of any.

Some chemiſts pretend, that by the addition of ſalts and acid ſpirits they have been enabled to gain more oil from certain vegetable matters than could poſſibly be got from them without ſuch aſſiſtance. Experiments made on purpoſe to ſettle this point ſeem to prove the contrary; this at leaſt is conſtantly found to be true, that where there is any reaſon to think the produce greater than uſual, the quality of the oil is proportionally injured. The quantity of true eſſential oil in vegetables can by no means be increaſed; and what is really contained in them may be eaſily ſeparated without any addition of this kind. All that ſaline matters can do in this reſpect is to make the water ſuſceptible of a greater degree of heat than it can ſuſtain by itſelf, and thus enable it to carry up a groſs unctuous matter not volatile enough to riſe with pure water: this groſs matter, mingling with the pure oil, increaſes the quantity, but at the ſame time muſt neceſſarily debaſe its quality. And indeed, when water alone is uſed, the oil which comes over about the end of the operation is remarkably leſs fragrant, and of a thicker conſiſtence, than that which riſes at the beginning: diſtilled a ſecond time, with a gentle heat, it leaves a large quantity of groſs almoſt inſipid reſinous matter behind.

The choice of proper inſtruments is of great conſequence for the performance of this proceſs to advantage. There are ſome oils which paſs freely over the ſwan-neck of the head of the common ſtill; others, leſs volatile, cannot eaſily be made to riſe ſo high. For obtaining theſe laſt, we would recommend a large low head, having a rim or hollow canal round it. In this canal the oil is detained on its firſt aſcent, and thence conveyed at once into the receiver, the advantages of which are ſufficiently obvious.

With regard to the fire, the operator ought to be expeditious in raiſing it at firſt, and to keep it up, during the whole proceſs, of ſuch a degree that the oil may freely diſtil; otherwiſe the oil will be expoſed to an unneceſſary heat; a circumſtance which ought as much as poſſible to be avoided. Fire communicates to all theſe oils a diſagreeable impregnation, as is evident from their being much leſs grateful when newly diſtilled, than after they have ſtood for ſome time in a cool place; the longer the heat is continued, the more alteration it muſt produce in them.

The greater number of oils require for their diſtillation the heat of water ſtrongly boiling; but there are many alſo which riſe with a heat conſiderably leſs; ſuch as thoſe of lemon and citron-peel, of the flowers of lavender and roſemary, and of almoſt all the more odoriferous kinds of flowers. We have already obſerved, that theſe flowers have their fragrance much injured, or even deſtroyed, by beating or bruiſing them; is impaired alſo by the immerſion in water in the preſent proceſs, and the more ſo in proportion to the continuance of the immerſion and the heat: hence oils, diſtilled in the common manner, prove much leſs agreeable in ſmell than the ſubjects themſelves. For the diſtillation of ſubſtances of this claſs another method has been contrived; inſtead of being immerſed in water, they are expoſed only to its vapour. A proper quantity of water being put into the bottom of the ſtill, the odoriferous herbs or flowers are laid lightly in a baſket, of ſuch a ſize that it may enter into the ſtill, and reſt againſt its ſides, juſt above the water. The head being then fitted on, and the water made to boil, the ſteam, percolating through the ſubject, imbibes the oil, without impairing its fragrance, and carries it over to the receiver. Oils thus obtained poſſeſs the odour of the ſubject in an exquiſite degree, and have nothing of the diſagreeable ſcent perceivable in thoſe diſtilled by boiling them in water in the common manner.

It may be proper to obſerve, that thoſe oils which riſe with a leſs heat than that of boiling water, are generally called, by the chemical and pharmaceutical writers, *light* oils; and thoſe which require the heat of water ſtrongly boiling, are called *ponderous*. We have avoided theſe expreſſions, as they might be thought to relate to the comparative *gravities* of the oils; with which the volatility or fixedneſs have no connection. Olive oil is lighter than moſt of the eſſential

ſential oils; but the heat requiſite to make it diſtil, exceeds that in which the heavieſt eſſential oil diſtils, conſiderably more than the heat of boiling water exceeds that of ice.

The water employed in the diſtillation of eſſential oils always imbibes ſome portion of the oil; as is evident from the ſmell, taſte, and colour, which it acquires. It cannot, however, retain above a certain quantity; and therefore, ſuch as has been already uſed and conſequently ſaturated with oil, may be advantageouſly employed, inſtead of common water, in a ſecond, third, or any future diſtillation of the ſame ſubject.

Some late chemical writers recommend, not the water which comes over, but that which remains in the ſtill, to be uſed a ſecond time. This can be of no ſervice; as conſiſting only of ſuch parts of the vegetable as are incapable of ariſing in diſtillation, and which ſerve only to impede the action of the water as a menſtruum, and to endanger an empyreuma.

After the diſtillation of one oil particular care ſhould be taken to cleanſe the worm before it be employed in the diſtillation of a different plant. Some oils, thoſe of wormwood and aniſeeds for inſtance, adhere to it ſo tenaciouſly, as not to be melted out by heat, or waſhed off by water; the beſt way of cleanſing the worm from theſe, is to run a little ſpirit of wine through it.

Eſſential oils, after they are diſtilled, ſhould be ſuffered to ſtand for ſome days, in veſſels looſely covered with paper, till they have loſt their diſagreeable fiery odour, and become limpid: then put them up in ſmall bottles, which are to be kept quite full, cloſely ſtopped, in a cool place: with theſe cautions, they will retain their virtues in perfection for many years.

When careleſsly kept, they in time gradually loſe their flavour, and become groſs and thick. Some endeavour to recover them after they have undergone this change, by grinding them with about thrice their weight of common ſalt, then adding a large proportion of water, and diſtilling them afreſh; the purer part riſes thin and limpid, poſſeſſing a great degree of the priſtine ſmell and taſte of the oil, though inferior in both reſpects to the original oil. This rectification, as it is called, ſucceeds equally without the ſalt: the oils, when thus altered, are nearly in the ſame ſtate with the turpentines, and other thickended oily juices, which readily yield their purer oil in diſtillation with water alone.

When eſſential oils have entirely loſt their ſmell, ſome recommend adding them in the diſtillation of a freſh quantity of the oil of the ſame plant; by which means they are ſaid to ſatiate themſelves anew with the odorous matter, and become entirely renovated. This practice, however, ought doubtleſs to be diſapproved, as being no other than a ſpecious ſophiſtication; for it can do no more than divide, between the old and the new, the active matter which belongs to the new alone.

Eſſential oils medicinally conſidered, agree in the general qualities of pungency and heat; in particular virtues, they differ as much as the ſubject from which they are obtained, the oil being the direct principle in which the virtues, or at leaſt a conſiderable part of the virtues, of the ſeveral ſubjects reſide. Thus the carminative virtue of the warm ſeeds, the diuretic of juniper-berries, the emmenagogue of ſavin, the nervine of roſemary, the ſtomachic of mint, the antiſcorbutic of ſcurvy graſs, the cordial of aromatics, &c. are ſuppoſed to be concentrated in their oil.

There is another remarkable difference in eſſential oils, the foundation of which is leſs obvious, viz. the degree of their pungency and heat. Theſe are by no means in proportion, as might be expected, to thoſe of the ſubject they were drawn from. The oil of cinnamon, for inſtance, is very pungent and fiery; in its undiluted ſtate it is almoſt cauſtic; whereas cloves, a ſpice which in ſubſtance is far more pungent than the other, yields an oil which is far leſs ſo. This difference ſeems to depend partly on the quantity of oil afforded, cinnamon yielding much leſs than cloves, and conſequently having its active matter concentrated into a ſmaller volume; partly on a difference in the nature of the active parts themſelves; for though eſſential oils contain always the ſpecific odour and flavour of their ſubjects, whether grateful or ungrateful, they do not always contain the whole pungency; this reſides frequently in a more fixed reſinous matter, and does not riſe with the oil. After the diſtillation of cloves, pepper, and ſome other ſpices, a part of their pungency is found to remain behind; a ſimple tincture of them in rectified ſpirit of wine is even more pungent than their pure eſſential oils.

The more grateful oils are frequently uſed for reconciling to the ſtomach medicines of themſelves diſguſtful. It has been cuſtomary to employ them as correctors for the reſinous purgatives; an uſe which they do not ſeem to be well adapted to. All the ſervice they can here be of, is, to make the reſin ſit more eaſily at firſt on the ſtomach; far from abating the irritating quality on which the virulence of its operation depends, theſe pungent oils ſuperadd a freſh ſtimulus.

Eſſential oils are never given alone, on account of their extreme heat and pungency; which in ſome is ſo great, that a ſingle drop let fall upon the tongue produces a gangrenous eſchar. They are readily imbibed by pure dry ſugar, and in this form may be conveniently exhibited. Ground with eight or ten times their weight of ſugar, they become ſoluble in aqueous liquors, and thus may be diluted to any aſſigned degree. Mucilages alſo render them miſcible with water into an uniform milky liquor. They diſſolve likewiſe in ſpirit of wine; the more fragrant in an equal weight, and almoſt all of them in leſs than four times their own quantity; theſe ſolutions may be either taken on ſugar, or mixed with ſyrups, or the like: on mixing them with water, the liquor grows milky, and the oil ſeparates.

The more pungent oils are employed externally againſt paralytic complaints, numbneſs, pains, and aches, cold tumors, and in other caſes where particular parts require to be heated or ſtimulated. The tooth-ach is ſometimes relieved by a drop of theſe almoſt cauſtic oils, received on cotton, and cautiouſly introduced into the hollow-tooth.

Eſſential oil of aniſe, L.
caraway,
lavender.
peppermint,
ſpearmint,
origanum,
pennyroyal,
roſemary,
juniper-berry,
ſaſſafraſs root.

159 Let theſe oils be drawn off by diſtillation, from an alembic with a large refrigeratory; but, to prevent an empyreuma, water muſt be added to the ingredient; in which they muſt be macerated before diſtillation.

The water which comes over with the oil in diſtillation is to be kept for uſe.

Eſſential oils. E.

Of the herbs of garden mint,
Of peppermint,
Of ſavin,
Of the tops of roſemary,
Of the flowering ſpikes of lavender,
Of aniſeeds,
Of juniper-berries,
Of ſaſſafras root,
Of Jamaica pepper.

160 Theſe are prepared almoſt in the ſame manner as the ſimple diſtilled waters, excepting that for procuring the oil a ſomewhat leſs quantity of water is to be uſed. Seeds and woody matters are firſt to be bruiſed or raſped. The oil riſes with the water; and as it is lighter or heavier, ſwims on the ſurface, or ſinks to the bottom, from which it is afterwards to be ſeparated.

It is, however, to be remarked, that in preparing theſe diſtilled waters and oils, ſo many varieties muſt neceſſarily take place from the goodneſs of the ſubject itſelf, its texture, the time of the year, and ſuch like circumſtances, that a certain and general rule, which ſhould ſtrictly apply to each example, can ſcarcely be laid down: wherefore we have only explained the general method, leaving many things to be varied by the judgment of the operator.

To the directions for preparing theſe eſſential oils given by the London and Edinburgh colleges, we ſhall here next ſubjoin a few remarks on their medical properties.

Eſſential oil of aniſeeds. L. E.

161 This oil poſſeſſes the taſte and ſmell of the aniſeeds in perfection. It is one of the mildeſt of the diſtilled oils; 15 or 20 drops may be taken at a time without danger, though common practice rarely goes ſo far as half this number. Its ſmell is extremely durable and diffuſive; milk drawn from the breaſt after taking it, is found impregnated with its odour; and poſſibly this may be, in part, the foundation of the pectoral virtues uſually aſcribed to it; in flatulencies and colics, it is ſaid by ſome to be leſs effectual than the ſeeds themſelves.

It is remarkable of this oil, that it congeals, even when the air is not ſenſibly cold, into a butyraceous conſiſtence: and hence, in the diſtillation of it, the operator ought not to be over-ſolicitous in keeping the water in the refrigeratory too cool: it behoves him rather to let it grow ſomewhat hot, particularly towards the end of the proceſs; otherwiſe, the oil congealing may ſo ſtop up the worm, as to endanger blowing off the head of the ſtill, or at leaſt a conſiderable quantity of oil will remain in it.

Eſſential oil of caraway ſeeds. L.

The flavour of this exactly reſembles that of the caraway itſelf. It is a very hot and pungent oil: a ſingle drop is a moderate doſe, and five or ſix is a very large one. It is not unfrequently uſed as a carminative; and ſuppoſed by ſome to be peculiarly ſerviceable for promoting urine, to which it communicates ſome degree of its ſmell. 162

Eſſential oil of lavender flowers. L E.

This oil, when in perfection, is very limpid, of a pleaſant yellowiſh colour, extremely fragrant, poſſeſſing in an eminent degree the peculiar ſmell generally admired in the flowers. It is a medicine of great uſe, both externally and internally, in paralytic and lethargic complaints, rheumatic pains, and debilities of the nervous ſyſtem. The doſe is from one drop to five or ſix. 163

Lavender flowers yield the moſt fragrant oil, and conſiderably the largeſt quantity of it, when they are ready to fall off ſpontaneouſly, and the leaves begin to ſhow themſelves: the ſeeds give out extremely little the flowers may be ſeparated from the reſt of the plant, by drying it a little, and then gently beating it: they ſhould be immediately committed to diſtillation, and the proceſs conducted with a well-regulated gentle heat; too great heat would not only change the colour of the oil, but likewiſe make a diſagreeable alteration in its ſmell.

Eſſential oil of the leaves of peppermint. L. E.

This poſſeſſes the ſmell, taſte, and virtues of the peppermint in perfection; the colour is a pale greeniſh yellow. It is a medicine of great pungency and ſubtilty; and diffuſes, almoſt as ſoon as taken, a glowing warmth through the whole ſyſtem. In colics, accompanied with great coldneſs, and in ſome hyſteric complaints, it is of excellent ſervice. A drop or two are in general a ſufficient doſe. 164

Eſſential oil of the leaves of common mint. L. E.

This oil ſmells and taſtes ſtrongly of the mint, but is in both reſpects ſomewhat leſs agreeable than the herb itſelf. It is an uſeful ſtomachic medicine; and not unfrequently exhibited in want of appetite, weakneſs of ſtomach, retching to vomit, and other like diſorders, when not accompanied with heat or inflammation: two or three drops, or more are given for a doſe. It is likewiſe employed externally for the ſame purpoſes; and is an uſeful ingredient in the ſtomachic plaſter of the ſhops. 165

Eſſential oil of the leaves of origanum. L.

This oil has a very pungent acrimonious taſte, and a penetrating ſmell. It has been chiefly employed externally as an errhine and for eaſing pains of the teeth. 166

Eſſential oil of the leaves of pennyroyal. L.

167 This oil, in ſmell and taſte, reſembles the original plant; the virtues of which it likewiſe poſſeſſes. It is given in hyſteric caſes, from one to four or five drops.

Eſſential oil of roſemary. L. E.

168 The oil of roſemary is drawn from the plant in flower. When in perfection, it is very light and thin, pale, and almoſt colourleſs; of great fragrancy, though not quite ſo agreeable as the roſemary itſelf. It is recommended, in the doſe of a few drops, in nervous and hyſteric complaints. Boerhaave holds it in great eſteem againſt epilepſies and ſuppreſſions of the uterine purgations occaſioned by weakneſs and inactivity.

Eſſential oil of juniper-berries. L. E.

169 This oil is a very warm and pungent one; of a ſtrong flavour, not unlike that of the berries. In the doſe of a drop or two, it proves a ſerviceable carminative and ſtomachic; in one of ſix, eight, or more, a ſtimulating, detergent, diuretic, and emmenagogue; it ſeems to have ſomewhat of the nature of the turpentines, or their diſtilled oil; like which it communicates a violent ſmell to the urine.

The oil of theſe berries reſides partly in veſicles ſpread through the ſubſtance of the fruit, and partly in little cells contained in the ſeeds: when the berry is dry, and the oil hardened into a reſinous ſubſtance, it becomes viſible, on breaking the ſeeds, in form of little tranſparent drops. In order therefore to obtain this oil to advantage, we ought previous to the diſtillation, to bruiſe the berry thoroughly, ſo as to break the ſeeds, and entirely lay open the oily receptacles.

Eſſential oil of ſaſſafras. L. E.

170 This is the moſt ponderous of all the known eſſential oils, but riſes in diſtillation with ſufficient eaſe: it appears limpid as water, has a moderately pungent taſte, a very fragrant ſmell, exactly reſembling that of the ſaſſafras. It ſtands greatly commended as a ſudorific, and for purifying the blood and juices; it is likewiſe ſuppoſed to be of ſervice in humoral aſthmas and coughs. The doſe is from one drop to eight or ten; though Geoffroy goes as far as twenty.

The decoction remaining after the diſtillation of the oil, affords by inſpiſſation an uſeful extract, of a mild, bitteriſh, ſubaſtringent taſte. Hoffman ſays, he has given it with great benefit, in doſes of a ſcruple, as a corroborant in cachectic caſes, in the decline of intermitting fevers, and for abating hypochondriacal ſpaſms.

Eſſential oil of ſavin leaves. L. E.

171 Savin is one of the plants which, in former editions of the Edinburgh pharmacopœia, were directed to be lightly fermented before the diſtillation: this, however, is not very neceſſary; for ſavin yields, without fermentation, and even without any ſuch maceration, a very large quantity of oil. The oil of ſavin is a celebrated uterine and emmenagogue: in cold phlegmatic habits, it is undoubtedly a medicine of great ſervice, though not capable of performing what it has been often repreſented to do. The doſe is, two or three drops, or more.

Eſſential oil of Jamaica pepper. E.

172 This is a very elegant oil, and may be uſed as a ſuccedaneum to thoſe of ſome of the dearer ſpices. It is of a fine pale colour; in flavour more agreeable than the oil of cloves, and not far ſhort of that of nutmegs. It ſinks in water, like the oils of ſome of the eaſtern ſpices.

Oil of foſſil tar. L.

173 Diſtil foſſil tar, the *bitumen petroleum*, in a ſand heat.

The oil obtained from this tar will be more or leſs thin according to the continuance of the diſtillation; and by its continuance the tar will at laſt be reduced to a black coal and then the oil will be pretty deep in colour though perfectly fluid. This oil has a property ſimilar to that of the tincture of nephritic wood in water, appearing blue when looked upon, but of an orange colour when held between the eye and the light. By long keeping it loſes this property. It is leſs diſagreeable than ſome of the other empyreumatic oils which had formerly a place in our pharmacopœia, ſuch as the oleum lateritium, though very acrid and ſtimulating.

Oil of turpentine. L.

174 Take of common turpentine five pounds; water four pints. Diſtil the turpentine with the water from an alembic of copper. After the diſtillation of the oil, what remains is yellow reſin.

Rectified oil of turpentine. L.

175 Take of oil of turpentine one pound; water four pints. Diſtil.

The proceſs here propoſed for rectifying this oil, is not only tedious but accompanied with danger. For unleſs the luting be very cloſe, ſome of the vapour will be apt to get through; and if this catch fire, it will infallibly burſt the veſſels. This rectified oil, which in many pharmacopœias is ſtyled æthereal, does not conſiderably differ in ſpecific gravity, ſmell, taſte, or medical qualities, from the former.

The ſpirit of turpentine, as this eſſential oil, has been ſtyled, is not unfrequently taken internally as a diuretic and ſudorific. And in theſe ways it has ſometimes a conſiderable effect when taken even to the extent of a few drops only. It has, however been given in much larger doſes, eſpecially when mixed with honey. Recourſe has principally been had to ſuch doſes in caſes of chronic rheumatiſm, particularly in thoſe modifications of it which are ſtyled *ſciatica* and *lumbago*. But they have not been often ſucceſsful, and ſometimes they have had the effect of inducing bloody urine.

Animal oil. L.

176 Take of oil of hartſhorn one pound. Diſtil three times.

Rectified oil of horns, or *animal oil*. E.

177 Take of empyreumatic oil, newly diſtilled from the horns of animals, as much as you will. Diſtil with a gentle heat, in a matraſs furniſhed with a head, as long as a thin colourleſs oil comes over, which is to be freed of alkaline ſalt and ſpirit by means of

water. That this oil may remain limpid and good, it ought to be put up in ſmall phials, completely filled and inverted, having previouſly put into each phial a few drops of water, that on inverting it the water may interpoſe itſelf between the oil and the mouth of the phial.

The quantity of oil employed in this proceſs ſhould be conſiderable: for it leaves ſo much black matter behind in the ſeveral diſtillations, that it is reduced at laſt to a ſmall portion of its original quantity. It is ſaid, that the product is rendered more limpid by mixing the oil with quicklime into a ſoft paſte; the lime keeping down more of the groſs matter than would remain without ſuch an addition. The quicklime may here alſo perhaps act by extracting fixed air; to the abſorption of which we are diſpoſed to refer in ſome meaſure the ſpoiling of the oil on expoſure to the atmoſphere.

The oil was firſt introduced by Dippelius, whoſe name it has ſince generally borne.

Animal oils thus rectified, are thin and limpid, of a ſubtle, penetrating, not diſagreeable ſmell and taſte. They are ſtrongly recommended as anodynes and antiſpaſmodics, in doſes from 15 to 30 drops. Hoffman reports, that they procure a calm and ſweet ſleep which continue often for 20 hours, without being followed by any langour or debility, but rather leaving the patient more alert and cheerful than before; that they procure likewiſe a gentle ſweat, without increaſing the heat of the blood: that given to 20 drops or more on an empty ſtomach, ſix hours before the acceſſion of an intermittent fever, they frequently remove the diſorder; and that they are likewiſe a very generous remedy in inveterate and chronical epilepſies and in convulſive motions, eſpecially if given before the uſual time of the attack, and preceded by proper evacuations.

The empyreumatic oils of vegetables, rectified in the ſame manner by repeated diſtillations, ſuffer a like change with the animal loſing their dark colour and offenſive ſmell, and becoming limpid, penetrating, and agreeable: in this ſtate they are ſuppoſed, like the animal oil, to be anodyne, antiſpaſmodic, and diaphoretic or ſudorific. It is obſervable, that all the empyreumatic oils diſſolve in ſpirit of wine, and that the oftener they are rectified or rediſtilled, they diſſolve the more readily; a circumſtance in which they differ remarkably from eſſential oils, which, by repeated diſtillations, become more and more difficult of ſolution.

How far theſe preparations really poſſeſs the virtues that have been aſcribed to them, has not yet been ſufficiently determined by experience; the tediouſneſs and trouble of the rectification having prevented their coming into general uſe, or being often made. They are liable alſo to a more material inconvenience, in regard to their medicinal uſe, precariouſneſs in their quality; for how perfectly ſoever they be rectified, they gradually loſe in keeping the qualities they had received from that proceſs, and return more and more towards their original fetid ſtate.

Oil of ſalt of amber. E.

178 Take equal parts of amber reduced to a powder and of pure ſand. Mix them and put them into a glaſs retort, of which the mixture may fill one half: then adapt a large receiver, and diſtil in a ſand furnace, with a fire gradually increaſed. At firſt a ſpirit will come over, with ſome yellow oil; then more yellow oil, along with a little ſalt; and on raiſing the heat, more of the ſalt, with a reddiſh and black coloured oil. When the diſtillation is finiſhed, empty the liquor out of the receiver; and having collected together the ſalt which adheres to the ſides, dry it by gentle preſſure between the folds of blotting paper; then purify it by ſolution in warm water and by cryſtallization.

Rectified oil of amber.

179 Diſtil the oil in a glaſs retort with ſix times its quantity of water till two thirds of the water have paſſed into the receiver; then ſeparate the rectified oil from the water, and keep it for uſe in cloſe ſhut veſſels. *E.*

Take of oil of amber one pound. Diſtil three times *L.*

The London college introduce their directions for the preparation of the ſal and oleum ſuccini at an after part of their work, under the head of *ſales*. Here we may only obſerve, that they direct it to be prepared from the amber alone, without the intervention of ſand. But this makes no eſſential difference in the article when prepared.

The Edinburgh college have rejected what was formerly called the ſpirit, as being nothing elſe than the watery parts, fraught with the inert impurities of the bitumen and a very ſmall portion of the ſalt. In the diſtillation of amber, the fire muſt for ſome time be continued gentle, ſcarce exceeding the degree at which water boils, till the aqueous phlegm and thin oil have ariſen; after which it is to be ſlowly increaſed. If the fire were urged haſtily, the amber would ſwell up, and riſe in its whole ſubſtance into the receiver, without undergoing the required decompoſition or ſeparation of its parts. When ſand or ſimilar intermedia are mixed with it, it is leſs ſubject to this rarefaction, and the fire may be raiſed ſomewhat more expeditiouſly; though this little advantage is perhaps more than counterbalanced by the room which the ſand takes up in the retort.

Our chemiſts generally leave the receiver unluted, that it may be occaſionally removed as the ſalt riſes and concretes in the neck of the retort; from whence it is every now and then ſcraped out to prevent the oil from carrying it down into the receiver. When a groſs thick oil begins to ariſe, and no more ſalt appears, the diſtillation is ſtopt, though it might perhaps be continued longer to advantage.

Mr Pott informs us (in a curious diſſertation on the ſalt of amber, publiſhed in the ninth volume of the Memoirs of the Academy of Sciences of Berlin), that the Pruſſian workmen, who prepare large quantities of this ſalt for exportation, from cuttings and ſmall pieces of amber, perform the diſtillation without any intermedium, and in an open fire: that ſweeping out the ſalt from the neck of the retort being found too troubleſome, they ſuffer the oil to carry it down into the receiver, and afterwards ſeparate it by means of bibulous paper, which imbibes the oil, and leaves the ſalt dry; which paper is afterwards ſqueezed and diſtilled: that they continue the diſtillation till all that can be forced over has ariſen, taking care only to catch the laſt thick oil in a ſeparate receiver; and that from this they extract a conſiderable quantity of ſalt, by ſhaking it in a ſtrong veſſel with three or four freſh portions of hot water, and evaporating and cryſtallizing the filtered waters.

The ſpirit of amber, ſo called, is no more than a ſolution of a ſmall proportion of the ſalt in phlegm or water; and therefore is very properly employed for diſſolving the ſalt in order to its cryſtallization.

The ſalt, freed from as much of the oil as ſpongy paper will imbibe, retains ſo much as to appear of a dark brown colour. Mr Pott ſays, the method he has found to ſucceed beſt, and with leaſt loſs, is to diſſolve the ſalt in hot water, and put into the paper, through which the ſolution is to be filtered, a little cotton ſlightly moiſtened with oil of amber: this, he ſays, detains a good deal of the oil of the ſalt, and the ſolution paſſes through the more pure. The liquor being evaporated with a very gentle fire, as that of a water-bath, and ſet to ſhoot, the firſt cryſtals prove tranſparent, with a ſlight yellowiſh tinge; but thoſe which follow, are brown, oily, and bitter, and are therefore to be further depurated in the ſame manner. The whole quantity of cryſtals amounts to about one thirtieth of the weight of the crude amber employed. By ſublimation from ſea ſalt, as directed in former editions of the Edinburgh pharmacopœia, the ſalt is thought to be more perfectly and more expeditiouſly purified: Mr Pott objects to ſublimation, that a part of the ſalt is decompoſed by it, a coaly matter being left behind, even though the ſalt was previouſly purified by cryſtallization: it may be preſumed, however, that this coal proceeds rather from the burning of ſome remains of the oily matter, than from the decompoſition of any part of the true ſalt.

Pure ſalt of amber has a penetrating, ſubaſtringent, acid, taſte. It diſſolves both in water and in rectified ſpirit; though not readily in either, and ſcarcely at all in the latter without the aſſiſtance of heat: of cold water in ſummer, it requires for its ſolution about twenty times its own weight; of boiling water only about twice its weight. Expoſed in a glaſs veſſel, to a heat little greater than that of boiling water, it firſt melts, then riſes in a white fume, and concretes again in the upper part of the glaſs into fine white flakes, leaving, unleſs it was perfectly pure, a little coaly matter behind. It efferveſces with alkalis both fixed and volatile, and forms with them neutral compounds much reſembling thoſe compoſed of the ſame alkalis and vegetable acids. Mixed with acid liquors, it makes no ſenſible commotion. Ground with fixed alkaline ſalts it does not exhale any urinous odour. By theſe characters, it is conceived this ſalt may be readily diſtinguiſhed from all the other matters that have been mixed with or vended for it. With regard to its virtue, it is accounted aperient, diuretic, and, on account of its retaining ſome portion of the oil, antihyſteric: Boerhaave gives it the character of *diureticorum et antihyſtericorum princeps*. Its great price, however, has prevented its coming much into uſe; and perhaps its real virtues are not equal to the opinion generally entertained of them.

The rectified oil has a ſtrong bituminous ſmell, and a pungent acrid taſte. Given in a doſe of ten or twelve drops, it heats, ſtimulates, and promotes the fluid ſecretions: It is chiefly celebrated in hyſterical diſorders, and in deficiencies of the uterine purgations. Sometimes it is uſed externally, in liniments for weak or paralytic limbs and rheumatic pains. This oil differs from all thoſe of the vegetable kingdom, and agrees with the mineral petrolea, in not being ſoluble either in its rectified or unrectified ſtate, by ſpirit of wine, fixed alkaline lixivia, or volatile alkaline ſpirits; the oil, after long digeſtion or agitation, ſeparating as freely as common oil does from water.

Oil of wine. L.

Take alcohol, vitriolic acid, of each one pint. Mix them by degrees, and diſtil; taking care that no black foam paſſes into the receiver. Separate the oily part of the diſtilled liquor from the volatile vitriolic acid. To the oily part add as much water of pure kali as is ſufficient to take away the ſulphureous ſmell: then diſtil the ether with a gentle heat. The oil of wine remains in the retort, ſwimming on the watery liquor, from which it is to be ſeparated. 180

Some caution is requiſite in mixing the two liquors, that the conſequent heat and ebullition, which would not only diſſipate a part of the mixture, but hazard the breaking of the veſſel and the hurt of the operator, may be avoided. The ſecureſt way is to add the vitriolic acid to the ſpirit of wine by a little at a time, waiting till the firſt addition be incorporated before another quantity be put in. By this, the enſuing heat is inconſiderable, and the mixture is effected without inconvenience.

Eſſential oil of wormwood. Roſſ.

Let the freſh leaves of wormwood ſlightly dried be macerated with a ſufficient quantity of water, and then ſubject to diſtillation; and let the oil which comes over be ſeparated from the water which accompanies it. 181

This is one of the more ungrateful oils: it ſmells ſtrongly of the wormwood, and contains its particular nauſeous taſte, but has little or nothing of its bitterneſs, this remaining entire in the decoction left after the diſtillation: its colour, when drawn from the freſh herb is dark green; from the dry, a browniſh yellow. This oil is recommended by Hoffman as a mild anodyne in ſpaſmodic contractions; for this purpoſe, he directs a dram of it to be diſſolved in an ounce of rectified ſpirit of wine, and ſeven or eight drops of the mixture taken for a doſe in any convenient vehicle. Boerhaave greatly commends, in tertian fevers, a medicated liquor compoſed of about ſeven grains of this oil ground firſt with a dram of ſugar, then with two drams of the ſalt of wormwood, and afterwards diſſolved in ſix ounces of the diſtilled water of the ſame plant: two hours before the fit is expected, the patient is to bathe his feet and legs in warm water, and then to drink two ounces of the liquor every quarter of an hour till the two hours are expired: by this means, he ſays, all caſes of this kind are generally cured with eaſe and ſafety, provided there be no ſchirroſity or ſuppuration. The oil of wormwood is employed chiefly as a vermifuge; and for this purpoſe is ſometimes applied both externally to the belly, and taken internally; it is moſt conveniently exhibited in the form of pills, into which it may be reduced by mixing it with crumb of bread.

In the ſame manner with the oil of wormwood, the following oils, mentioned on the authority of the pharmacopœia Roſſica, are alſo directed to be prepared.

Eſſential oil of orange ſkins. Roſſ.

Eſſence of lemons.

182 Of theſe eſſential oils, as exiſting in a ſeparate ſtate in the growing vegetable, we have already offered ſome obſervations. They are obtained in a very pure ſtate by diſtillation. They are now rejected from our pharmacopœias, being employed rather as perfumes than as medicines. This is particularly the caſe with the eſſence of lemons, which is a pleaſant oil, of a fine ſmell, very nearly as agreeable as that of the freſh peel; it is one of the lighteſt and moſt volatile eſſential oils we have, perfectly limpid, and almoſt colourleſs. It is taken in doſes of two or three drops, as a cordial, in weakneſs of the ſtomach, &c. though more frequently uſeful as a perfume. It gives a fine flavour to the officinal volatile aromatic ſpirit of the Edinburgh college, or the compound ſpirit of ammonia, as it is now ſtyled by that of the London: and it may be remarked, that it enters the formula of both colleges, altho' neither of them has given it a place among their preparations, probably as it is one of thoſe articles which the apothecary rarely prepares for himſelf. When ſoap is given in the form of pills, by the addition of a few drops of this oil they are thought to ſit more eaſily on the ſtomach.

Eſſential oil of cloves. Roſſ.

183 This oil is ſo ponderous as to ſink in water, and is not eaſily elevated in diſtillation; if the water which comes over be returned on the remaining cloves, and the diſtillation repeated, ſome more oil will generally be obtained, though much inferior in quality to the firſt. The oil of cloves is uſually deſcribed as being "in taſte exceſſively hot and fiery, and of a gold yellow colour," (*Boerh. proceſſ.*). Such indeed is the compoſition which we receive under this name from Holland; but the genuine oil of cloves is one of the milder oils; it may be taken with great ſafety (duly diluted) to the quantity of 10 or 12 drops or more. Nor is its colour at all yellow, unleſs it has been long and careleſsly kept or diſtilled by too violent a fire: when in perfection, it is limpid and colourleſs, of a pleaſant, moderately warm, and pungent taſte and a very agreeable ſmell, much reſembling that of the ſpice itſelf. The Dutch oil of cloves contains a large quantity of expreſſed oil, as evidently appears upon examining it by diſtillation. This, however, cannot be the addition to which it owes its acrimony. A mean proportion of a reſinous extract of cloves communicates to a large one of oil a deep colour, and a great degree of acrimony.

Eſſential oil of cammomile. Roſſ.

184 An oil of camomile had formerly a place in our pharmacopœias made by infuſion of the recent plant, and its flowers in olive oil; and again ſeparating it by preſſure after impregnating it with the active parts of the plant by heat. This, however, was intended only for external application; but the eſſential oil is meant to be uſed internally.

It is a very pungent oil, of a ſtrong not ungrateful ſmell, reſembling that of the flowers: its colour is yellow, with a caſt of greeniſh or brown. It is ſometimes given in the doſe of a few drops, as a carminative, in hyſteric diſorders, and likewiſe as a vermifuge; it may be conveniently made into pills with crumb of bread.

Oil of cinnamon. Roſſ.

185 This valuable oil is extremely hot and pungent, of a moſt agreeable flavour, like that of the cinnamon itſelf. In cold languid caſes, and debilities of the nervous ſyſtem, it is one of the moſt immediate cordials and reſtoratives. The doſe is one, two, or three drops; which muſt always be carefully diluted by the mediation of ſugar, &c.: for ſo great is the pungency of this oil, that a ſingle drop let fall upon the tongue, undiluted, produces as Boerhaave obſerves, a gangrenous eſchar. In the diſtillation of this oil, a ſmart fire is required; and the low head, with a channel round it, recommended for the diſtillation of the leſs volatile oils, is particularly neceſſary for this, which is one of the leaſt volatile, and which is afforded by the ſpice in exceeding ſmall quantity. The diſtilled water retains no ſmall portion of the oil; but this oil being very ponderous, great part of it ſubſides from the water, on ſtanding for two or three weeks in a cool place.

Eſſential oil of fennel ſeeds. Roſſ.

186 The oil obtained from ſweet fennel-ſeeds is much more elegant and agreeable than that of the common fennel. It is one of the mildeſt of theſe preparations; it is nearly of the ſame degree of warmth with that of aniſeeds; to which it is likewiſe ſimilar in flavour, though far more grateful. It is given from two or three drops to ten or twelve, as a carminative, in cold indiſpoſitions of the ſtomach; and in ſome kinds of coughs for promoting expectoration.

Eſſential oil of rhodium. Roſſ.

187 This oil is extremely odoriferous, and principally employed as a perfume in ſcenting pomatums, and the like. Cuſtom has not as yet received any preparation of this elegant aromatic wood into internal uſe among us.

Eſſential oil of mace. Roſſ.

188 The eſſential oil of mace is moderately pungent, very volatile, and of a ſtrong aromatic ſmell, like that of the ſpice itſelf. It is thin and limpid, of a pale yellowiſh colour, with a portion of thicker and darker coloured oil at the bottom. This oil, taken internally to the extent of a few drops, is celebrated in vomiting, ſingultus, and colic pains; and in the ſame complaints it has alſo been adviſed to be applied externally to the umbilical region. It is however, but rarely to be met with in the ſhops.

Eſſential oil of marjoram. Roſſ.

189 This oil is very hot and penetrating, in flavour not near ſo agreeable as the marjoram itſelf; when in perfection, it is of a pale yellow colour; by long keeping,

it turns reddiſh; if diſtilled with too great a heat, it riſes of this colour at firſt. It is ſuppoſed by ſome to be peculiarly ſerviceable in relaxations, obſtructions, and mucous diſcharges of the uterus; the doſe is one or two drops.

Eſſential oil of nutmegs. Roſſ.

190 The eſſential oil of nutmegs poſſeſſes the flavour and aromatic virtues of the ſpice in an eminent degree. It is ſimilar in quality to the oil of mace, but ſomewhat leſs grateful.

Eſſential oil of rue. Roſſ.

191 The oil of rue has a very acrid taſte, and a penetrating ſmell, reſembling that of the herb, but rather more unpleaſant. It is ſometimes made uſe of in hyſteric diſorders and as an anthelmintic; and alſo in epilepſies proceeding from a relaxed ſtate of the nerves.

Rue yields its oil very ſparingly. The largeſt quantity is obtained from it when the flowers are ready to fall off, and the ſeeds begin to ſhow themſelves: ſuitable maceration, previous to the diſtillation, is here extremely neceſſary.

Eſſential oil of ſavory. Roſſ.

192 Savory yields on diſtillation a ſmall quantity of eſſential oil, of great ſubtility and volatility; and it is unqueſtionably an active article, but among us it is not employed in medicine.

Eſſential oil of tanſy. Roſſ.

193 Tanſy yields on diſtillation an oil of a greeniſh colour inclining to yellow. It ſmells ſtrongly of the herb, and poſſeſſes at leaſt its aromatic property in a concentrated ſtate.

Oil of wax. Dan.

194 Melt yellow bees wax with twice its quantity of ſand, and diſtil in a retort placed in a ſand-furnace. At firſt an acid liquor riſes, and afterwards a thick oil, which ſticks in the neck of the retort, unleſs it be heated by applying live coal. This may be rectified into a thin oil, by diſtilling it ſeveral times, without addition, in a ſand-heat.

Boerhaave directs the wax, cut in pieces, to be put into the retort firſt, ſo as to fill one half of it; when as much ſand may be poured thereon as will fill the remaining half. This is a neater, and much leſs troubleſome way, than melting the wax, and mixing it with the ſand before they are put into the retort. The author above-mentioned highly commends this oil againſt roughneſs and chaps of the ſkin, and other like purpoſes: the college of Straſburgh ſpeak alſo of it being given internally, and ſay it is a powerful diuretic *(ingens diureticum)* in doſes from two to four or more drops: but its diſagreeable ſmell has prevented its coming into uſe among us.

The number of eſſential oils which have now a place in the London and Edinburgh pharmacopœias, and likewiſe in the foreign ones of modern date, is much leſs conſiderable than formerly; and perhaps thoſe ſtill retained afford a ſufficient variety of the more active and uſeful oils. Moſt of the oils mentioned above particularly thoſe which have a place in the London and Edinburgh pharmacopœias, are prepared by our chemiſts in Britain, and are eaſily procurable in a tolerable degree of perfection; but the oils from the more expenſive ſpices, though ſtill introduced among the preparations in the foreign pharmacopœias, are, when employed among us, uſually imported from abroad.

Theſe are frequently ſo much adulterated, that it is not an eaſy matter to meet with ſuch as are fit for uſe. Nor are theſe adulterations eaſily diſcoverable. The groſſer abuſes, indeed, may be readily detected: thus, if the oil be mixed with ſpirit of wine, it will turn milky on the addition of water; if with expreſſed oils, rectified ſpirit will diſſolve the eſſential, and leave the other behind; if with oil of turpentine, on dipping a piece of paper in the mixture, and drying it with a gentle heat, the turpentine will be betrayed by its ſmell. But the more ſubtile artiſts have contrived other methods of ſophiſtication, which elude all trials of this kind.

Some have looked upon the ſpecific gravity of oils as a certain criterion of their genuineneſs: and accordingly we have given a table of the gravity of ſeveral. This, however, is not to be abſolutely depended on: for the genuine oils, obtained from the ſame ſubjects, often differ in gravity as much as thoſe drawn from different ones. Cinnamon and cloves, whoſe oils uſually ſink in water, yield, if ſlowly and warily diſtilled, an oil of great fragrancy, which is nevertheleſs ſpecifically lighter than the aqueous fluid employed in the diſtillation of it, while, on the other hand, the laſt runnings of ſome of the lighter oils prove ſometimes ſo ponderous as to ſink in water.

As all eſſential oils agree in the general properties of ſolubility in ſpirit of wine, indiſſolubility in water, miſcibility with water by the intervention of certain intermedia, volatility in the heat of boiling water, &c. it is plain that they may be variouſly mixed with each other, or the dearer ſophiſticated with the cheaper, without any poſſibility of diſcovering the abuſe by any trials of this kind. And indeed it would not be of much advantage to the purchaſer, if he had infallible criteria of the genuineneſs of every individual oil. It is of as much importance that they be *good* as that they be *genuine*; for genuine oils, from inattentive diſtillation and long and careleſs keeping, are often weaker both in ſmell and taſte than the common ſophiſticated ones.

The ſmell and taſte ſeem to be the only certain teſt of which the nature of the thing will admit. If a bark ſhould have in every reſpect the appearance of good cinnamon, and ſhould be proved indiſputably to be the genuine bark of the cinnamon-tree; yet if it want the cinnamon flavour, or has it but in a low degree, we reject it: and the caſe is the ſame with the oil. It is only from uſe and habit, or compariſons with ſpecimens of known quality, that we can judge of the goodneſs either of the drugs themſelves or of their oils.

Moſt of the eſſential oils, indeed, are too hot and pungent to be taſted with ſafety: and the ſmell of the ſubject is ſo much concentrated in them, that a ſmall variation in this reſpect is not eaſily diſtinguiſhed; but we can readily dilute them to any aſſignable degree. A drop of the oil may be diſſolved in ſpirit of wine, or received on a bit of ſugar, and diſſolved by that intermedium in water. The quantity of liquor which it thus impregnates with its flavour, or the degree of flavour which it communicates to a certain determinate quantity, will be the meaſure of the degree of goodneſs of the oil.

We ſhall here ſubjoin the reſult of ſome experiments, ſhowing *the quantity of eſſential oil obtained from different vegetables*, reduced into the form of a table. The firſt column contains the names of the reſpective vegetable ſubſtances: the ſecond, the quantity of each which was ſubmitted to the diſtillation; and the third, the quantity of oil obtained. In every other part of this article, where *pound* weights are mentioned, the Troy pound of 12 ounces is meant: but theſe experiments having been all made by a pound of 16 ounces, it was thought expedient to ſet down the matter of fact in the original weights: eſpecially as the ſeveral materials, in the large quantity commonly required for the diſtillation of oils, are purchaſed by weights of the ſame kind. But to remove any ambiguity which might ariſe from hence, and to enable the reader to judge more readily of the product, a reduction of the weights is given in the next column; which ſhows the number of parts of each of the ſubjects from which one part of oil was obtained. To each article is affixed the author's name from whom the experiment was taken. The different diſtillations of one ſubject, ſeveral of which are inſerted in the table, ſhow how variable the product of oil is, and that the exotic ſpices, as well as our indigenous plants, do not always contain the ſame proportion of this active principle; though it muſt be obſerved, alſo, that part of the differences may probably ariſe from the operation itſelf having been more or leſs carefully performed.

195

TABLE *of the Quantity of* ESSENTIAL OIL *obtained from different* VEGETABLES.

		yielded of eſſential oil	ſo that one part of oil was obtained from	
Agallochum wood	10 lb.	4 dra.	320	*Hoff.*
Angelica root	1 lb.	1 dra.	128	*Carth.*
Aniſeed	1 lb.	4 dra.	32	*Neum.*
Aniſeed	3 lb.	1 oz.	48	*Lewis.*
Aniſeed	4 lb.	1 oz.	64	*Lewis.*
Aſafœtida	4 oz.	1 dra.	32	*Neum.*
Calamus aromaticus	50 lb.	2 oz.	185	*Hoff.*
Calamus aromaticus	1 lb.	2 ſcr.	192	*Neum.*
Caraway ſeeds	4 lb.	2 oz.	32	*Lewis.*
Caraway ſeeds	2 lb.	9 dra.	28½	*Lewis.*
Caraway ſeeds	1 cwt.	83 oz.	21½	*Lewis.*
Caroline thiſtle roots	1 lb.	2½ ſcr.	153	*Neum.*
Cardamom ſeeds	1 oz.	1 ſcr.	24	*Neum.*
Carrot ſeeds	2 lb.	1½ dra.	171	*Lewis.*
Caſcarilla	1 lb.	1 dra.	128	*Carth.*
Camomile flowers	1 lb.	30 gra.	256	*Carth.*
Common camomile flowers	6 lb.	5 dra.	153	*Lewis.*
Wild camomile flowers	1 lb.	20 gra.	384	*Carth.*
Wild camomile flowers	6 lb.	2½ dra.	307	*Lewis.*
Chervil leaves, freſh	9 lb.	30 gra.	2304	*Neum.*
Cedar wood	1 lb.	2 dra.	64	*Marg.*
Cinnamon	1 lb.	1 dra.	128	*Sala.*
Cinnamon	1 lb.	2½ ſcr.	153	*Neum.*
Cinnamon	4 lb.	6 dra.	85⅓	*Lemery.*
Cinnamon	1 lb.	2 dra.	64	*Carth.*
Cinnamon	1 lb.	8 ſcr.	45½	*Carth.*
Clary ſeeds	4 lb.	2 dra.	256	*Lewis.*
Clary in flower, freſh	130 lb.	3½ oz.	594	*Lewis.*
Cloves	1 lb.	1½ oz.	10½	*Teichm.*
Cloves	1 lb.	2½ oz.	7⅑	*Carth.*
Cloves	2 lb.	5 oz.	6⅖	*Hoff.*
Copaiba balſam	1 lb.	6 oz.	2⅓	*Hoff.*
Copaiba balſam	1 lb.	8 oz.	2	*Lewis.*
Cummin-ſeed	1 buſh.	21 oz.		*Lewis.*
Dictamnus Creticus	1 lb.	30 gra.	256	*Lewis.*
Dill-ſeed	4 lb.	2 oz.	32	*Lewis.*
Elecampane root	2 lb.	3½ ſcr.	245	*Neum.*
Elemi	1 lb.	1 oz.	16	*Neum.*
Fennel-ſeed, common	2 oz.	1 ſcr.	48	*Neum.*
Fennel-ſeed, ſweet	1 buſh.	18 oz.		*Lewis.*
Galangal root	1 lb.	1 dra.	128	*Carth.*
Garlic root, freſh	2 lb.	30 gra.	256	*Neum.*
Ginger	1 lb.	1 dra.	128	*Neum.*
Horſe-radiſh root, freſh	8 oz.	15 gra.	256	*Neum.*
Hyſſop leaves	2 lb.	1½ dra.	237	*Neum.*

		yielded of eſſential oil		ſo that one part of oil was obtained from	
Hyſſop leaves - -	1 lb.		1½dra.		85 *Carth.*
Hyſſop leaves - -	1 lb.		2 dra.		64 *Carth.*
Hyſſop leaves, freſh -	2 cwt.		6 oz.		597 *Lewis.*
Hyſſop leaves, freſh -	10 lb.		3 dra.		427 *Lewis.*
Hyſſop leaves, freſh -	30 lb.		9 dra.		427 *Lewis.*
Juniper-berries - -	8 lb.		3 oz.		42⅔ *Hoff.*
Juniper-berries - -	1 lb.		3 dra.		42⅔ *Carth.*
Lavender in flower, freſh -	48 lb.		12 oz.		64 *Lewis.*
Lavender in flower, freſh -	30 lb.		6¾oz.		72 *Lewis.*
Lavender in flower, freſh -	13½lb.		60 oz.		403 *Lewis.*
Lavender flowers, freſh -	2 lb.		4 dra.		64 *Hoff.*
Lavender flowers, dried - -	4 lb.		2 oz.		32 *Lewis.*
Lavender flowers, dried -	2 lb.		1 oz.		32 *Hoff.*
Lavender flowers, dried - -	4 lb.		3 oz.		21⅓ *Hoff.*
Broad-leaved lavender flowers, dry	4 lb.		1 oz.		64 *Hoff.*
Broad-leaved lavender flowers, dry	1 lb.		2 dra.		64 *Carth.*
Lovage root - -	1 lb.		1 dra.		128 *Carth.*
Mace - -	1 lb.		5 dra.		25⅗ *Neum.*
Mace - -	1 lb.		6 dra.		21⅓ *Carth.*
Marjoram in flower, freſh	81 lb.		3¾oz.		347 *Lewis.*
Marjoram in flower, freſh	13½lb.		3½dra.		493 *Lewis.*
Marjoram in flower, freſh -	34 lb.		1½oz.		362 *Lewis.*
Marjoram leaves, freſh -	18½lb.		4 dra.		592 *Lewis.*
Marjoram leaves, dried -	4 lb.		1 oz.		64 *Hoff.*
Maſterwort root - -	1 lb.		30 gra.		256 *Neum.*
Milfoil flowers, dried -	14 lb.		4 dra.		448 *Neum.*
Mint in flower, freſh -	6 lb.		4⅓dra.		177 *Neum.*
Mint leaves, dried - -	4 lb.		1½oz.		42⅔ *Hoff.*
Peppermint, freſh - -	4 lb.		3 dra.		170⅔ *Hoff.*
Myrrh - -	1 lb.		2 dra.		64 *Hoff.*
Myrrh - -	1 lb.		3 dra.		42⅔ *Neum.*
Nutmegs - -	1 lb.		1 oz.		16 *Hoff.*
Nutmegs - -	1 lb.		1 oz.		16 *Geoff.*
Nutmegs - -	1 lb.		4 dra.		32 *Neum.*
Nutmegs - -	1 lb.		6 dra.		21⅓ *Sala.*
Nutmegs - -	1 lb.		5 dra.		25⅗ *Carth.*
Parſley ſeeds - -	2 lb.		1 dra.		256 *Carth.*
Parſley leaves, freſh -	238 lb.		2 oz.		1904 *Carth.*
Parſnip ſeeds - -	8 lb.		2 dra.		512 *Carth.*
Pennyroyal in flower, freſh -	13 lb.		6 dar.		277 *Carth.*
Black pepper - -	2 lb.		6 dra.		42⅔ *Carth.*
Black pepper - - -	1 lb.		2½dra.		82 *Neum.*
Black pepper - - -	1 lb.		4 ſcr.		96 *Carth.*
Black pepper - - -	1 lb.		1 dra.		128 *Heiſter*
Black pepper - - -	6 lb.		3 dra.		256 *Geoff.*
Pimento - - -	1 oz.		30 gra.		16 *Neum.*
Rhodium wood - - -	1 lb.		3 dra.		42⅔ *Neum.*
Rhodium wood - -	1 lb.		2 dra.		64 *Sala.*
Rhodium wood - -	1 lb.		3 dra.		42⅔ *Sala.*
Rhodium wood - -	1 lb.		3 dra.		42⅔ *Carth.*
Rhodium wood - -	1 lb.		4 dra.		32 *Carth.*
Roſemary in flower -	1 cwt.		8 oz.		224 *Lewis.*
Roſemary leaves - -	1 lb.		2 dra.		64 *Sala.*
Roſemary leaves - -	1 lb.		3 dra.		42⅔ *Sala.*
Roſemary leaves - -	3 lb.		3⅛dra.		121 *Neum.*
Roſemary leaves - -	1 lb.		1 dra.		128 *Carth.*
Roſemary leaves - -	1 lb.		1½dra.		82 *Carth.*
Roſemary leaves, freſh -	70 lb.		5 oz.		224 *Lewis.*
Roſes - - -	100 lb.		4 dra.		3200 *Tachen.*
Roſes - - -	100 lb.		1 oz.		1600 *Homb.*
Roſes - - -	12 lb.		30 gra.		768 *Hoff.*
Rue - - -	10 lb.		2 dra.		640 *Hoff.*
Rue - - -	10 lb.		4 dra.		320 *Hoff.*
Rue in flower - -	4 lb.		1 dra.		512 *Hoff.*
Rue in flower - -	60 lb.		2½oz.		507 *Hoff.*

Rue with the ſeeds	72 lb.	yielded of eſſential oil.	3 oz.	ſo that one part of oil was obtained from	384	*Hoff.*
Saffron	1 lb.		1½ dra.		85⅓	*Vogel.*
Sage leaves	1 lb.		5 ſcr.		77	*Carth.*
Sage in flower, freſh	34 lb.		1¼ oz.		544	*Lewis.*
Sage of virtue in flower	27 lb.		6 dra.		576	*Lewis.*
Sage of virtue in flower	8 lb.		1½ dra,		681	*Lewis.*
Saſſafras	6 lb.		1¾ oz.		55	*Hoff.*
Savin	6 lb.		2 oz.		48	*Neum.*
Saunders, yellow	2 lb.		5 oz.		6⅖	*Hoff.*
Smallage ſeeds	1 lb.		2 dra.		64	*Carth.*
Stechas in flower, freſh	1 lb.		2½ ſcr.		154	*Neum.*
Thyme in flower, freſh	5¾ lb.		2 dra.		368	*Lewis.*
Thyme in flower, dry	2 cwt.		5½ oz.		652	*Lewis.*
Lemon-thyme in flower, freſh	3¾ lb.		1½ dra.		298	*Lewis.*
Lemon-thyme in flower, freſh	51 lb.		1¼ zo.		653	*Lewis.*
Lemon-thyme, a little dried	98 lb.		2½ oz.		627	*Lewis.*
Wormwood leaves, dry	104 lb.		3 oz.		555	*Lewis.*
Wormwood leaves, dry	4 lb.		1 oz.		64	*Lewis.*
Wormwood leaves, dry	18 lb.		1½ oz.		192	*Lewis.*
Zedoary	25 lb.		3½ oz		114	*Lewis.*
	1 lb.		1 dra.		128	*Neum.*

CHAP. VII. *Salts.*

Diluted or weak vitriolic acid. L.

196 Take of vitriolic acid, one ounce by weight; diſtilled water, 8 ounces by weight. Mix them by degrees.

Weak vitriolic acid, common called *weak ſpirit of vitriol.* E.

Take of vitriolic acid, one part; water, ſeven parts. Mix them.

In the former editions of our pharmacopœias, directions were given for the preparation of the vitriolic acid by the apothecary himſelf, under the heads of *ſpirit and oil of vitriol, ſpirit or oil of ſulphur by the bell,* &c.: but as it is now found that all theſe modes are expenſive, and that this acid may be furniſhed at a cheaper rate from the trading chemiſts preparing it on a large ſcale, it is with propriety that both colleges have now rejected it from the preparations, and introduced it only into the liſt of the materia medica.

When, however, it is of the degree of concentration there required, it can be employed for very few purpoſes in medicine. The moſt ſimple form in which it can be advantageouſly employed internally, is that in which it is merely diluted with water; and it is highly proper that there ſhould be ſome fixed ſtandard in which the acid in this ſtate ſhould be kept. It is, however, much to be regretted, that the London and Edinburgh colleges have not adopted the ſame ſtandard with reſpect to ſtrength: for in the one, the ſtrong acid conſtitutes an eighth; and in the other, only a ninth of the mixture. The former proportion, which is that of the Edinburgh college, we are inclined to prefer, as it gives exactly a dram of acid to the ounce; but the dilution by means of diſtilled water, which is directed by the London, is preferable to ſpring-water: which, even in its pureſt ſtate, is rarely free from impregnations in part affecting the acid.

The acid of vitriol is the moſt ponderous of all the liquors we are acquainted with, and the moſt powerful of the acids. If any other acid be united with a fixed alkaline ſalt or earth, on the addition of the vitriolic, ſuch acid will be diſlodged, and ariſe on applying a moderate heat, leaving the vitriolic in poſſeſſion of the alkali; though without this addition it would not yield to the moſt vehement fire. Mixed with water, it inſtantly creates great heat, inſomuch that glaſs veſſels are apt to crack from the mixture, unleſs it be very ſlowly performed: expoſed to the air, it imbibes moiſture, and ſoon acquires a remarkable increaſe of weight. In medicine, it is employed chiefly as ſubſervient to other preparations: it is alſo frequently mixed with juleps and the like, in ſuch quantity as will be ſufficient to give the liquor an agreeable tartneſs, and it then is a cooling antiſeptic, a reſtringent, and a ſtomachic.

It is particularly uſeful for allaying inordinate actions of the ſtomach, when under the form of ſingultus or vomiting. For its medical properties, ſee ACIDS and VITRIOL.

Nitrous acid. L.

Take of purified nitre, by weight, 60 ounces; vitriolic acid, by weight, 29 ounces. Mix and diſtil. The ſpecific gravity of this is to the weight of diſtilled water as 1550 to 1000. 197

Nitrous acid commonly called *Glauber's ſpirit of nitre.* E.

Take of pureſt nitre, bruiſed, two pounds; vitriolic acid, one pound. Having put the nitre into a glaſs retort, pour on it the ſpirit; then diſtil in a ſand-heat, gradually increaſing the fire, till the ſand-pot becomes of a dull red colour.

Hence the vitriolic acid expels the nitrous, in red corroſive vapours, which begin to iſſue immediately on mixture; and which the operator ought cautiouſly to avoid. A pound of acid of vitriol is ſufficient to expel all the acid from about two pounds of nitre, not from more: ſome direct equal parts of the two. The ſpirit, in either caſe, is in quality the ſame; the difference, in this reſpect, affecting only the reſiduum. If two parts of nitre be taken to one of volatile acid, the remaining alkaline baſis of the nitre is completely ſaturated with the vitriolic acid; and the reſult is a neutral ſalt, the ſame with vitriolated tartar, as we ſhall ſee hereafter. If more nitre be uſed, a part of the nitre in ſubſtance will remain blended with this neutral ſalt: if leſs nitre, it cannot afford alkali enough to ſaturate the vitriolic acid, and the reſiduum will not be a neutral ſalt, but a very acid one. In this laſt caſe there is one conveniency; the acid ſalt being readily ſoluble in water, ſo as to be got out without breaking the retort, which the others are not.

Diluted or weak nitrous acid. L.

198 Take of nitrous acid, diſtilled water, each one pound. Mix them.

Weak nitrous acid. E.

Take of nitrous acid, water, equal weights. Mix them, taking care to avoid the noxious vapours.

In the old editions both of the London and Edinburgh pharmacopœias, directions were given for the preparation of aquafortis ſimplex and duplex; but theſe were no more than different forms of preparing an impure nitrous acid, unfit for medical purpoſes. They are therefore, with propriety, ſuperſeded by the more ſimple formulæ of nitrous acid and diluted or weak nitrous acid, mentioned above. In making the diluted acid, diſtilled water is preferable to common water.

The vapour ſeparated during the mixing of nitrous acid and water, is the permanently elaſtic fluid called *nitrous acid air*, which is deleterious to animal life.

The acid of nitre is next in ſtrength to the vitriolic, and diſlodges all others from alkaline ſalts or earths. It differs from all the other acids in deflagrating with inflammable matters: if a ſolution of any inflammable ſubſtance, as hartſhorn, &c. in this acid, be ſet to evaporate, as ſoon as the matter approaches to dryneſs, a violent detonation enſues. The chief uſe of this acid is as a menſtruum for certain minerals, and as the baſis of ſome particular preparations to be mentioned hereafter. It has been given likewiſe, diluted with any convenient vehicle, as a diuretic, from 10 to 50 drops.

Muriatic acid. L.

199 Take of dry ſea-ſalt, 10 pounds; vitriolic acid, ſix pounds; water, five pounds. Add the vitriolic acid firſt mixed with the water by degrees, to the ſalt; then diſtil.

The ſpecific gravity of this acid is to diſtilled water as 1170 to 1000.

Muriatic acid, commonly called *ſpirit of ſea-ſalt.* E.

Take of ſea-ſalt, two pounds; vitriolic acid, water, each one pound. Let the ſalt be firſt put into a pot, and brought to a red heat, that the oily impurities may be conſumed; then put it into the retort. Next mix the acid with the water, and when the mixture has cooled, pour it upon the ſalt. Laſtly, diſtil in a ſand heat with a middling heat, as long as any acid comes over.

The marine, or muriatic acid, ariſes, not in red fumes like the nitrous, but in white ones. The addition of water is more neceſſary here than in the foregoing proceſs; the marine vapours being ſo volatile, as ſcarcely to condenſe without ſome adventitious humidity. The acid of vitriol is moſt conveniently mixed with the water in an earthen or ſtone-ware veſſel: for unleſs the mixture be made exceedingly ſlow, it grows ſo hot as to endanger breaking a glaſs one.

The ſpirit of ſea-ſalt is the weakeſt of the mineral acids, but ſtronger than any of the vegetable: it requires a greater fire to diſtil it than that of nitre, yet it is more readily diſſipated by the action of the air. It is uſed chiefly as a menſtruum for the making of other preparations; ſometimes, likewiſe, it is given, properly diluted, as an antiphlogiſtic, aperient, and diuretic, from 10 to 60 or 70 drops.

Diſtilled vinegar.

Take of vinegar five pints. Diſtil with a gentle fire, in glaſs veſſels, ſo long as the drops fall free from empyreuma. *L.* 200

Let eight pounds of vinegar be diſtilled in glaſs veſſels with a gentle heat. Let the two firſt pounds that come over be thrown away as containing too much water; let four pounds next following be reſerved as the diſtilled vinegar. What remains is a ſtill ſtronger acid, but too much acted on by the heat. *E.*

This proceſs may be performed either in a common ſtill with its head, or in a retort. The better kinds of wine-vinegar ſhould be uſed: thoſe prepared from malt liquors, however fine and clear they may ſeem to be, contain a large quantity of a viſcous ſubſtance, as appears from the ſlimyneſs and ropyneſs to which they are very much ſubject: this not only hinders the acid parts from riſing freely, but likewiſe is apt to make the vinegar boil over into the recipient, and at the ſame time diſpoſes it to receive a diſagreeable impreſſion from the fire. And indeed, with the beſt kind of vinegar, if the diſtillation be carried on to any great length, it is extremely difficult to avoid an empyreuma. The beſt method of preventing this inconvenience is, if a retort be uſed, to place the ſand but a little way up its ſides, and when ſomewhat more than half the liquor is come over, to pour on the remainder a quantity of freſh vinegar equal to the liquor drawn off. This may be repeated three or four times; the vinegar ſupplied at each time being previouſly heated. The addition, of cold liquor would not only prolong the operation, but alſo endanger the breaking of the retort. If the common ſtill be employed, it ſhould likewiſe be occaſionally ſupplied with freſh vinegar in proportion as the ſpirit runs off; and this continued until the proceſs can be conveniently carried no farther: the diſtilled ſpirit muſt be rectified by a ſecond diſtillation in a retort or glaſs alembic; for although the head and receiver be of glaſs or ſtone ware, the acid will contract a metallic taint from the pewter worm.

The reſiduum of this proceſs is commonly thrown away as uſeleſs, although if ſkilfully managed, it might be made to turn to good account; the moſt acid parts of the vinegar ſtill remaining in it. Mixed with about three times its weight of fine dry ſand, and committed to diſtillation in a retort, with a well-regulated fire, it yields an exceeding ſtrong acid ſpirit, together with an empyreumatic oil, which taints the ſpirit with a diſagreeable odour. This acid is nevertheleſs, without any rectification, better for ſome purpoſes (as a little of it will go a great way) than the pure ſpirit; particularly for making the diuretic or acetated kali of the London College; for there the oily matter, on which its ill flavour depends, is burnt out by the calcination.

The ſpirit of vinegar is a purer and ſtronger acid than vinegar itſelf, with which it agrees in other reſpects. (See VINEGAR). Their principal difference from the mineral acid conſiſts in their being milder, leſs ſtimulating, leſs diſpoſed to affect the kidneys and promote the urinary ſecretions, or to coagulate the animal juices. The matter left after the diſtillation in glaſs veſſels, though not uſed in medicine, would doubtleſs prove a ſerviceable detergent ſaponaceous acid; and in this light ſtands recommended by Boerhaave.

Concentrated vinegar. Suec.

201 Let white wine vinegar be frozen in a wooden veſſel in cold winter weather; and let the fluid ſeparated from the ice be preſerved for uſe. It may be conſidered as ſufficiently ſtrong, if one dram of it be capable of ſaturating a ſcruple of the fixed vegetable alkali.

This is a very eaſy mode for obtaining the acid of vinegar in a concentrated ſtate, and freed from a conſiderable portion of its water. But at the ſame time we do not thus obtain the acid either ſo much concentrated, or in ſo pure a ſtate as by the following proceſs.

Acetous acid. L.

202 Take of verdegriſe, in coarſe powder, two pounds. Dry it perfectly by means of a water-bath ſaturated with ſea-ſalt; then diſtil it in a ſand-bath, and after that diſtil the liquor. Its ſpecific gravity is to that of diſtilled water as 1050 to 1000.

By this proceſs, it may be readily concluded that we obtain the acetous acid in its moſt concentrated ſtate, and with the leaſt admixture of water. And after the re-diſtillation, it may alſo be ſuppoſed that it will be free from all mixture of the copper. But the internal uſe of it has been objected to by ſome, on the ſuppoſition that it may ſtill retain a portion of the metal; and hitherto it has, we believe, been but little employed.

Cryſtallized acid of tartar. Suec.

203 Take of prepared chalk, frequently waſhed with warm water, two pounds; ſpring water, 32 pounds. After ſlight boiling, by degrees add of cream of tartar 7 pounds, or as much as is ſuffcient for ſaturation. Removing the veſſel from the fire, let it ſtand for half an hour, then cautiouſly pour off the clear liquor into a glaſs veſſel. Waſh the reſiduum or tartareous ſelenites by pouring water on it three or four times. To this reſiduum afterwards add of weak vitriolic acid 16 pounds, let it be digeſted for a day, frequently ſtirring it with a wooden ſpatula. After this pour the acid liquor into a glaſs veſſel: but with the reſiduum mix 16 pounds of ſpring water; ſtrain it through paper, and again pour water on the reſiduum till it become inſipid. Let the acid liquors mixed together in a glaſs veſſel be boiled to the conſiſtence of a thin ſyrup; which being ſtrained, muſt be ſet apart for the formation of cryſtals. Let the cryſtals collected after repeated diſtillations be dried on paper, and afterwards kept in a dry place.

If before cryſtallization a little of the inſpiſſated acid liquor be diluted with four times its quantity of pure water, and a few drops of vinegar of litharge be put into it, a white ſediment will immediately be depoſited. If a few drops of the diluted nitrous acid be then added, the mixture will become limpid, if the tartareous liquor be pure and entirely free from the vitriolic acid; but if it be not, it will become white. This fault, however, may be corrected, if the acid of tartar be diluted with ſix pounds of water and a few ounces of the tartareous ſelenites be added to it. After this it may be digeſted, ſtrained, and cryſtallized.

By this proceſs, the acid of tartar may be obtained in a pure ſolid form. It would, however, be perhaps an improvement of the proceſs, if quicklime were employed in place of chalk. For Dr Black has found that quicklime abſorbs the whole of the tartareous acid, and then the ſupernatant liquor contains only the alkaline part of the tartar; whereas, when chalk is employed, it contains a ſolution of ſoluble tartar, the chalk taking up only the ſuperabundant acid. By this method then a greater quantity of tartareous acid might be obtained from the ſediment. The tartareous acid has not hitherto been much employed in its pure ſtate. But beſides being uſeful for ſome purpoſes in medicine, for which the cream of tartar is at preſent in uſe, and where that ſuperſaturated neutral may be leſs proper, there is alſo reaſon to ſuppoſe, that from the employment of the pure acid, we ſhould arrive at more certainty in the preparation of the antimonium tartarizatum, on tartar-emetic, than by employing the cream of tartar, the proportion of acid in which varies very much from different circumſtances. The pure acid of tartar might alſo probably be employed with advantage for bringing other metallic ſubſtances to a ſaline ſtate.

Diſtilled acid of tartar. Suec.

204 Let pounded crude tartar be put into a tubulated earthen or iron retort till it fills about two-thirds of it, and let diſtillation be performed by gradually increaſing the heat. Into the recipient, which ſhould be very large, an acid liquor will paſs over together with the oil; which being ſeparated from the oil, muſt again be diſtilled from a glaſs retort. If the reſiduum contained in the earthen or iron retort be diluted with water, ſtrained through paper, and boiled to dryneſs, it gives what is called the *alkali* of tartar. If this do not appear white, it may be made ſo by burning, ſolution, ſtraining, and evaporation.

This is another mode of obtaining both the acid and alkali of tartar in a pretty pure ſtate; and, as well as the former, it is not unworthy of being adopted into our pharmacopœias.

Aerated water. Roſſ.

205 Let ſpring water be ſaturated with the fixed air, or aerial acid, ariſing from a ſolution of chalk in vitriolic acid, or in any ſimilar acid. Water may alſo be impregnated by the fixed air riſing from fermenting liquors.

The aerial acid, on which we have already had occaſion to make ſome obſervations, beſides the great influence which it has as affecting different ſaline bodies into whoſe compoſition it enters, is alſo frequently employed in medicine, with a view to its action on the human body. The late ingenious Dr Dobſon, in his Commentary on Fixed Air, has pointed out many purpoſes for which it may be uſefully employed, and ſeveral different forms under which it may be uſed. But there is no form under which it is at preſent more frequently had recourſe to than that of aerated or mephitic water, as it has often been called. And although not yet received either into the London or Edinburgh pharmacopœias, it is daily employed in practice, and is we think juſtly intitled to a place among the ſaline preparations.

The moſt convenient mode of impregnating water with the aerial acid, and thus having it in our power to exhibit that acid as it were in a diluted ſtate, is by means of a well known and ſufficiently ſimple apparatus, contrived by that ingenious philoſopher Dr Nooth. Such a machine ought, we think, to be kept in every ſhop for the more ready preparation of this fluid. Water properly impregnated with the aerial acid has an agreeable acidulous taſte. It is often employed with great advantage in the way of common drink, by thoſe who are ſubjected to ſtomach complaints, and by calculous patients. But, beſides this, it furniſhes an excellent vehicle for the exhibition of many other medicines.

Beſides the ſimple aerated water, the Pharmacopœia Roſſica contains alſo an aqua aëris fixi martialis, or ferruginous aerated water. This is prepared by ſuſpending iron wires in that water till the water be fully ſaturated with the metal. And in conſequence of this acid, ſimple water becomes a menſtruum both for different metallic and earthy ſubſtances. But water in this ſtate may be conſidered rather as fitted for thoſe purpoſes for which chalybeates are in uſe, than as a preparation of the aerial acid.

Salt and oil of amber. L.

206 Take of amber two pounds. Diſtil in a ſand heat, gradually augmented; an acid liquor, oil, and ſalt impregnated with oil, will aſcend.

On this article we have already offered ſome obſervations under the head of Eſſential Oils. The directions here given by the London college differ chiefly from thoſe of the Edinburgh college formerly mentioned, in no ſand being employed: But when care is taken that the ſand be pure, it can give no improper impregnation to the medicine, and may prevent ſome inconveniences in the diſtillation, particularly that of the amber riſing in ſubſtance into the receiver.

Purified ſalt of amber. L.

207 Take of ſalt of amber half a pound; diſtilled water, one pint. Boil the ſalt in the diſtilled water, and ſet aſide the ſolution to cryſtallize.

Salt of amber, when perfectly pure, is white, of an acid taſte, and not ungrateful. It requires, for its ſolution, of cold water, in ſummer, about twenty times its weight; and of boiling water about twice its weight; it is ſcarcely ſoluble in rectified ſpirit without the aſſiſtance of heat.

It is given as a cooling diuretic in doſes of a few grains, and alſo in hyſterical compoſitions.

Flowers of benzoin.

208 Take of benzoin, in powder, one pound. Put it into an earthen pot, placed in ſand; and, with a ſlow fire, ſublime the flowers into a paper cone fitted to the pot.

If the flowers be of a yellow colour, mix them with white clay, and ſublime them a ſecond time. *L.*

Put any quantity of powdered benzoin into an earthen pot, to which, after fitting it with a large conical paper cap, apply a gentle heat that the flowers may ſublime. If the flowers be impregnated with oil, let them be purified by ſolution in warm water and cryſtallization. *E.*

Benzoin, expoſed in a retort to a gentle fire, melts, and ſends up into the neck white, ſhining cryſtalline flowers, which are followed by an oily ſubſtance. Theſe flowers, which are at preſent conſidered as a peculiar acid, are by ſome termed *acidum benzoicum.* On raiſing the heat a little (a recipient being applied to the neck of the retort), a thin yellowiſh oil comes over, intermingled with an acid liquor, and afterwards a thick butyraceous ſubſtance: this laſt, liquified in boiling water, gives out to it a conſiderable quantity of ſaline matter (ſeparable by filtration and proper exhalation), which appears in all reſpects ſimilar to the flowers.

It appears, therefore, that the whole quantity of flowers which benzoin is capable of yielding, cannot be obtained by the above proceſſes, ſince a conſiderable portion ariſes after the time of their being diſcontinued. The greateſt part of the flowers ariſe with a leſs degree of heat than what is neceſſary to elevate the oil; but if the operation be haſtily conducted, or if the fire be not exceedingly gentle, the oil will ariſe along with the flowers, and render them foul. Hence in the way of trade, it is extremely difficult to prepare them of the requiſite whiteneſs and purity; the heat which becomes neceſſary, when large quantities of the benzoin are employed, being ſo great as to force over ſome of the oil along with them.

In order, therefore, to obtain theſe flowers in perfection, only a ſmall quantity of benzoin ſhould be put into the veſſel at a time; and that this may not be any impediment to the requiſite diſpatch, a number of ſhallow, flat bottomed, earthen diſhes may be employed, each fitted with another veſſel inverted over it, or a paper cone. With theſe you may fill a ſand furnace; having freſh diſhes charged in readineſs to replace thoſe in the furnace, as ſoon as the proceſs ſhall appear finiſhed in them: the reſiduum of the benzoin ſhould be ſcraped out of each of the veſſels before a freſh parcel be put in.

Theſe flowers, when made in perfection, have an agreeable taſte and fragrant ſmell. They totally diſſolve in ſpirit of wine; and likewiſe by the aſſiſtance of heat, in water; but ſeparate again from the latter upon the liquor's growing cold, ſhooting into ſaline ſpicula, which unite together into irregular maſſes. By the mediation of ſugar they remain ſuſpended in cold water, and thus form an elegant balſamic ſyrup. Some have held them in great eſteem as pectoral and ſudorific, in the doſe of half a ſcruple or more; but at preſent they are rarely uſed, on account of the offenſive oil which, as uſually prepared, they are tainted with, and from which a freſh ſublimation from tobacco-pipe clay, as formerly practiſed, did not free them ſo effectually as might be wiſhed. The obſervations above related, point out the method of depurating them more perfectly, viz. by ſolution, filtration, and cryſtallization.

They enter the compoſition of the paregoric elixir, or tinctura opii camphorata, as it is called.

Salt of Tartar. E.

209 Take of tartar, what quantity you pleaſe. Roll it up in a piece of moiſt bibulous paper, or put it into a crucible, and ſurrounding it with live coals, burn it to a coal; next, having beat this coal, calcine it in an open crucible with a moderate heat, taking care that it do not melt, and continue the calcination till the coal becomes of a white, or at leaſt of an aſh, colour. Then diſſolve it in warm water; ſtrain the liquor through a cloth, and evaporate it in a clean iron veſſel; diligently ſtirring it towards the end of the proceſs with an iron ſpatula, to prevent it from ſticking to the bottom of the veſſel. A very white ſalt will remain, which is to be left a little longer on the fire, till the bottom of the veſſel becomes almoſt red. Laſtly, when the ſalt is grown cold, let it be put up in glaſs veſſels well ſhut.

Native tartar is a ſaline ſubſtance, compounded of an acid, of a fixed alkali, and of oily viſcous, and colouring matter. The purpoſe of the above proceſs is, to free it from every other matter but the fixed alkali. From the miſtaken notion that tartar was eſſentially an acid mixed only with impurities, it has been generally ſuppoſed that the effect of this operation was the converſion of an acid into an aklali by means of heat. But ſince Mr Scheele has diſcovered that the proper matter of tartar, freed from the oily and colouring parts is really a ſalt compounded of an acid, which is predominant, and a fixed alkali, we have no farther need of ſuch an obſcure theory. The acid of the tartar by this proceſs is diſſipated by means of the heat; and the oily, viſcous, and colouring matters, are partly diſſipated, and partly brought to the ſtate of inſoluble earthy matter, eaſily ſeparable by the future lixiviation from the alkali, wherewith they were looſely combined. But by the laſt of thoſe proceſſes, ſomething farther is carried on than the ſeparation of the more palpable foreign matters. By allowing the ſalt, freed from the water of the lixivium, to remain on the fire till the bottom of the veſſel become almoſt red, any oily matter that may ſtill be preſent ſeems to be decompoſed by the united action of the heat and fixed alkali, forming with a part of the latter, by their reciprocal action, a volatile alkaline ſalt, which is forthwith diſcharged in elaſtic vapours. Beſides the complete diſcharge of the above principles, the remaining fixed alkali alſo ſuffers a conſiderable loſs of its fixed air, or aerial acid; with which, when fully ſaturated, it forms the imperfect neutral ſalt, denominated by Dr Black *mild fixed alkali:* on this account it is ſomewhat cauſtic, conſiderably deliqueſcent, and in proportion to its poſſeſſing theſe properties more or leſs, it more or leſs nearly approaches to the ſtate of pure alkali. It is not, however, ſo effectually deprived of fixed air as to be ſufficiently cauſtic for a number of purpoſes. Where cauſticity is not required, the ſalt thus purified is abundantly fit for moſt pharmaceutical purpoſes; but as native tartar generally contains ſmall portions of neutral ſalts beſides the foreign matters already noticed, it is neceſſary if we wiſh to have a very pure alkali for nice operations, to employ cryſtallization and other means, beſide the proceſs here directed.

The white and red ſorts of tartar are equally fit for the purpoſe of making fixed ſalt; the only difference is, that the white affords a ſomewhat larger quantity than the other; from 16 ounces of this ſort, upwards of four ounces of fixed alkaline ſalt may be obtained. The uſe of the paper is to prevent the ſmaller pieces of the tartar from dropping down into the aſh-hole, through the interſtices of the coals, upon firſt injecting it into the furnace.

The calcination of the ſalt (if the tartar was ſufficiently burnt at firſt) does not increaſe its ſtrength ſo much as is ſuppoſed: nor is the greeniſh or blue colour any certain mark either of its ſtrength, or of its having been, as was formerly ſuppoſed, long expoſed to a vehement fire: for if the crucible be perfectly clean, cloſe covered, and has ſtood the fire without cracking, the ſalt will turn out white, though kept melted and reverberated ever ſo long; while, on the other hand, a ſlight crack happening in the crucible, or a ſpark of coal falling in, will in a few minutes give the ſalt the colour admired. The colour in reality is a mark rather of its containing ſome inflammable matter than of its ſtrength.

The vegetable alkali prepared from tartar has now no place in the London pharmacopœia, or at leaſt it is included under the following article.

Prepared kali. L.

Take of pot-aſh, two pounds; boiling diſtilled water, three pints. Diſſolve and filtre through paper; evaporate the liquor till a pellicle appears on the ſurface; then ſet it aſide for a night, that the neutral-ſalts may cryſtallize; after which pour out the liquor, and boil away the whole of the water, conſtantly ſtirring, leſt any ſalt ſhould adhere to the pot. In like manner is purified impure kali from the aſhes of any kind of vegetable. The ſame ſalt may be prepared from tartar burnt till it becomes of an aſh-colour. 210

Fixed vegetable alkaline ſalt purified. E.

Let the fixed alkaline ſalt, called in Engliſh *pearl-aſhes*, be put into a crucible, and brought to a ſomewhat red heat, that the oily impurities, if there be any, may be conſumed; then having beat and agitated it with an equal weight of water, let them be well mixed. After the feces have ſubſided, pour the ley into a very clean iron pot, and boil to dryneſs, diligently ſtirring the ſalt towards the end of the proceſs, to prevent its ſticking to the veſſel. This ſalt, if it hath been rightly purified, though it be very dry, if rubbed with an equal weight of water, may be diſſolved into a liquor void of colour or ſmell. 211

The potaſh uſed in commerce is an alkali mixed with a conſiderable quantity of remaining charcoal, ſulphur, vitriolated tartar, and oily matter. In the large manufactures, the alkaline part is indeed conſiderably freed from impurities by mixing the weed-aſhes with water, evaporating the clear ley, and burning the reſiduum in an oven; but beſides that this proceſs is inſufficient for the complete ſeparation of the impurities, it alſo ſuperadds a quantity of ſtony matter, giving to the alkali the *pearl* appearance (whence its name), and rendering it altogether unfit for pharmaceutical purpoſes. By the proceſſes here directed, the alkali is effectually freed from all theſe heterogeneous matters, excepting perhaps a ſmall proportion of vitriolated tartar, or other neutral ſalts, which may very generally be neglected. As in the proceſs no after calcination is directed, it is probable that the fixed alkali thus prepared will not prove ſo cauſtic, that is to ſay, is not ſo conſiderably deprived of fixed air, as in the proceſs directed for preparing the ſalt of tartar. It is, however ſufficiently pure for moſt purpoſes; and we conſider the above proceſs as the moſt convenient and cheap method of obtaining the vegetable fixed alkali in its mild ſtate.

The purified vegetable alkali has been known in our pharmacopœias under the different names of *ſalt of wormwood*, *ſalt of tartar*, &c. But all theſe being now known to be really the ſame, the terms, as leading to error, have been with juſtice expunged; and it has been a deſideratum to diſcover ſome ſhort name equally applicable to the whole. The term employed by the Edinburgh college is too long, being rather a deſcription than a name; but to that employed by the London college, *Kali*, objections have alſo been made. And it muſt be allowed, that beſides the inconvenience which ariſes from its being an indeclinable word, the foſſil alkali is equally intitled to the ſame appellation. Beſides this, as a conſiderable portion of the foſſil alkali is prepared from burning a vegetable growing on the ſea-coaſts, which has the name of *kali*, the Kali ſpinoſum of Linné, ſome apparent contradiction and ambiguity may thence ariſe. And the London college would perhaps have done better, if they had adopted the term *Potaſſa*; a name which has been appropriated to this ſalt by ſome of the moſt eminent modern chemiſts.

The purified potaſſa is frequently employed in medicine in conjunction with other articles, particularly for the formation of ſaline neutral draughts and mixtures: But it is uſed alſo by itſelf in doſes from three or four grains to 15 or 20; and it frequently operates as a powerful diuretic, particularly when aided by proper dilution. See PEARL-*Aſh* and POT-ASH.

Water of kali. L.

212 Take of kali, one pound, ſet it by in a moiſt place till it be diſſolved, and then ſtrain it.

This article had a place in former editions of our pharmacopœias under the titles of *ley of tartar* or *oil of tartar per deliquium*, &c. It is however to be conſidered as a mere watery ſolution of the mild vegetable alkali, formed by its attracting moiſture from the air; and therefore it is with propriety ſtyled the *water of kali*.

The ſolutions of fixed alkaline ſalts, made by expoſing them to a moiſt air, are generally conſidered as being purer than thoſe made by applying water directly; for though the ſalt be repeatedly diſſolved in water, filtered, and exſiccated; yet, on being liquefied by the humidity of the air, it will ſtill depoſite a portion of earthy matter: but it muſt be obſerved, that the exſiccated ſalt leaves always an earthy matter on being diſſolved in water, as well as on being deliquated in the air. Whether it leaves more in the one way than in the other, is not determined with preciſion. The deliquated lixivium is ſaid to contain nearly one part of alkaline ſalt to three of an aqueous fluid. It is indifferent, in regard to the lixivium itſelf, whether the white aſhes of tartar, or the ſalts extracted from them, be uſed; but as the aſhes leave a much greater quantity of earth, the ſeparation of the ley proves more troubleſome.

The water of kali of the preſent edition of the London pharmacopœia, then may be conſidered as an improvement of the lixivium tatari of their former edition. But the Edinburgh college, conſidering this ſolution as being in no reſpect different from that made by pure water, have entirely rejected this preparation from their pharmacœpœia, and probably with juſtice.

Water of pure kali. L.

Take of kali, four pounds; quicklime, ſix pounds; diſtilled water four gallons. Put four pints of water to the lime, and let them ſtand together for an hour; after which, add the kali and the reſt of the water; then boil for a quarter of an hour: ſuffer the liquor to cool, and ſtrain. A pint of this liquor ought to weigh 16 ounces. If the liquor efferveſces with any acid, add more lime. 213

A preparation ſimilar to this had a place in the former edition of the London pharmacopœia, under the title of *ſoap-ley*. Quicklime, by depriving the mild alkali of its aerial acid, renders it cauſtic; hence this ley is much more acrimonious, and acts more powerfully as a menſtrum of oils, fats, &c. than a ſolution of the potaſſa alone. The lime ſhould be uſed freſh from the kiln; by long keeping, even in cloſe veſſels, it loſes its ſtrength; ſuch ſhould be made choice of as is thoroughly burnt or calcined, which may be known by its comparative lightneſs.

All the inſtruments employed in this proceſs ſhould be either of wood, earthen ware, or glaſs; the common metallic ones would be corroded by the ley, ſo as either to diſcolour or communicate diſagreeable qualities to it. If it ſhould be needful to filter or ſtrain the liquor, care muſt be taken that the filter or ſtrainer be of vegetable matter: woollen, ſilk, and that ſort of filtering paper which is made of animal ſubſtances, are quickly corroded and diſſolved by it.

The liquor is moſt conveniently weighed in a narrow-necked glaſs bottle, of ſuch a ſize, that the meaſure of a wine pint way ariſe ſome height into its neck; the place to which it reaches being marked with a diamond. A pint of the common leys of our ſoap-makers weighs more than 16 ounces; it has been found that their ſoap-ley will be reduced to the ſtandard here propoſed, by mixing it with ſomething leſs than an equal meaſure of water.

Although this liquor is indeed pure alkali diſſolved in water, yet we are inclined to give the preference to the name employed by the Edinburgh college, as well as to the modes of preparing it, directed in the following formula.

Cauſtic ley. E.

214 Take of freſh burnt quicklime, eight ounces; purified fixed vegetable alkaline ſalt, ſix ounces. Throw the quicklime, with 28 ounces of warm water, into an iron or earthen veſſel. The ebullition, and extinction of the lime being perfectly finiſhed, inſtantly add the alkaline ſalt; and having thoroughly mixed them, ſhut the veſſel till it cools. Stir the cooled matter, and pour out the whole into a glaſs funnel, whoſe throat muſt be ſtopped up with a piece of clean rag. Let the upper mouth of the funnel be covered, while the tube of it is inſerted into a glaſs veſſel, ſo that the ley may gradually drop through the rag into that veſſel. When it firſt gives over dropping, pour into the funnel ſome ounces of water; but cautiouſly, and in ſuch a manner, that the water ſhall ſwim above the matter. The ley will again begin to drop, and the affuſion of water is to be repeated in the ſame manner, until three pounds have dropped, which takes up the ſpace of two or three days; then agitating the ſuperior and inferior parts of the ley together, mix them, and put up the liquor in a well-ſhut veſſel.

If the ley be rightly prepared, it will be void of colour or ſmell: nor will it raiſe an efferveſcence with acids except perhaps a very ſlight one. Colour and odour denote the ſalt not ſufficiently calcined; and efferveſcence, that the quicklime has not been good.

The reaſons and propriety of the different ſteps in the above proceſs will be beſt underſtood by ſtudying the theory on which it is founded. The principle of mildneſs in all alkaline ſalts, whether fixed or volatile, vegetable or foſſil, is very evidently fixed air, or the aerial acid: But as quicklime has a greater attraction for fixed air than any of theſe ſalts, ſo if this ſubſtance be preſented to any of them, they are thereby deprived of their fixed air, and forthwith become cauſtic. This is what preciſely happens in the above proceſſes. The propriety of cloſely ſhutting the veſſels through almoſt every ſtep of the operation, is ſufficiently obvious; viz. to prevent the abſorption of fixed air from the atmoſphere, which might defeat our intentions. When only a piece of cloth is put into the throat of the funnel, the operation is much more tedious, becauſe the pores of the cloth are ſoon blocked up with the wet powdery matter. To prevent this, it may be convenient to place above the cloth a piece of fine Fly's wirework; but as metallic matters are apt to be corroded, the method uſed by Dr Black is the moſt eligible. The doctor firſt drops a rugged ſtone into the tube of the funnel, in a certain place of which it forms itſelf a firm bed, while the inequalities on its ſurface afford interſtices of ſufficient ſize for the paſſage of the filtering liquor. On the upper ſurface of this ſtone he puts a thin layer of lint or clean tow; immediately above this, but not in contact with it, he drops a ſtone ſimilar to the former and of a ſize proportioned to the ſwell in the upper part of the tube of the funnel. The interſtices between this ſecond ſtone and the funnel are filled up with ſtones of a leſs dimenſion, and the gradation uniformly continued till pretty ſmall ſand is employed. Finally, this is covered with a layer of coarſer ſand and ſmall ſtones to ſuſtain the weight of the matter, and to prevent its being inviſcated in the minute interſtices of the fine ſand. The throat of the funnel being thus built up, the ſtony fabric is to be freed of clay and other adhering impurities, by making clean water paſs through it till the water comes clear and tranſparent from the extremity of the funnel. It is obvious, that in this contrivance, the author has, as uſual copied nature in the means ſhe employs to depurate watery matters in the bowels of the earth; and it might be uſefully applied for the filtration of various other fluids.

It is a very neceſſary caution to pour the water gently into the funnel: for if it be thrown in a forcible ſtream, a quantity of the powdery matter will be waſhed down, and render all our previous labour uſeleſs. That part of the ley holding the greateſt quantity of ſalt in ſolution will no doubt be heavieſt, and will conſequently ſink loweſt in the veſſel: the agitation of the ley is therefore neceſſary, in order to procure a ſolution of uniform ſtrength through all its parts. If the ſalt has been previouſly freed of oily and other inflammable matters, this ley will be colourleſs and void of ſmell. If the quicklime has been ſo effectually deprived of its own fixed air, as to be able to abſorb the whole of that in the alkali, the ley will make no efferveſcence with acids, being now deprived of fixed air, to the diſcharge of which by acids this appearance is to be aſcribed in the mild or aerated alkalis.

The cauſtic ley is therefore to be conſidered as a ſolution of pure alkali in water. See the article Fixed Air.

It may be proper to obſerve, for the ſake of underſtanding the whole of the theory of the above proceſs, that while the alkali has become cauſtic, from being deprived of fixed air by the quicklime, the lime has in its turn become mild and inſoluble in water from having received the fixed air of the alkali.

The cauſtic ley, under various pompous names, has been much uſed as a lithontriptic; but its fame is now beginning to decline. In acidities in the ſtomach, attended with much flatulence and laxity, the cauſtic ley is better adapted than mild alkalis; as in its union with the acid matter it does not ſeparate air. When covered with mucilaginous matters, it may be ſafely taken into the ſtomach: and by ſtimulating, it coincides with the other intentions of cure; by ſome dyſpeptic patients it has been employed with advantage.

Pure kali. L.

215 Take of water of pure kali, one gallon. Evaporate it to dryneſs; after which let the ſalt melt on the fire, and pour it out.

The ſtrongeſt common cauſtic. E.

216 Take of cauſtic ley, what quantity you pleaſe. Evaporate it in a very clean iron veſſel on a gentle fire

till, on the ebullition ceaſing, the ſaline matter gently flows like oil, which happens before the veſſel becomes red. Pour out the cauſtic thus liquefied on a ſmooth iron plate; let it be divided into ſmall pieces before it hardens, which are to be kept in well-ſhut phials.

Theſe preparations may be conſidered as differing in no eſſential particular. But the directions given by the Edinburgh college are the moſt preciſe and diſtinct.

The effect of the above proceſſes is ſimply to diſcharge the water of the ſolution, whereby the cauſticity of the alkali is more concentrated in any given quantity. Theſe preparations are ſtrong and ſudden cauſtics. The cauſtic prepared in this way has an inconvenience of being apt to liquefy too much on the part to which it is applied, ſo that it is not eaſily confined within the limits in which it is intended to operate; and indeed the ſuddenneſs of its action depends on this diſpoſition to liquefy.

Lime with pure kali. L.

217 Take of quicklime, five pounds and four ounces; water of pure kali, 16 pounds by weight. Boil away the water of pure kali to a fourth part; then ſprinkle in the lime, reduced to powder by the affuſion of water. Keep it in a veſſel cloſe ſtopped.

The milder common cauſtic. E.

218 Take of cauſtic ley, what quantity you pleaſe. Evaporate in an iron veſſel till one third remains; then mix with it as much new ſlaked quicklime as will bring it to the conſiſtence of pretty ſolid pap, which is to be kept in a veſſel cloſely ſtopped.

Theſe preparations, do not eſſentially differ from each other, while the chief difference between the preſent formula, and that which ſtood in the laſt edition of the London pharmacopœia is in the name. It was then ſtyled the *ſtrongeſt common cauſtic*.

Here the addition of lime in ſubſtance renders the preparation leſs apt to liquefy than the foregoing, and conſequently it is more eaſily confinable within the intended limits, but proportionally ſlower in its operation. The deſign of keeping or of ſlaking the lime is, that its acrimony may be ſomewhat abated.

Expoſed long to the air, theſe preparations gradually reſume their power of effervеſcence, and loſe proportionally the additional activity which the quicklime had produced in them.

Prepared natron. L.

219 Take of barilla, powdered, two pounds; diſtilled water, one gallon. Boil the barilla in four pints of water for half an hour, and ſtrain. Boil that part which remains after ſtraining with the reſt of the water, and ſtrain. Evaporate the mixed liquors to two pints, and ſet them by for eight days; ſtrain this liquor again; and, after due boiling, ſet it aſide to cryſtalize. Diſſolve the cryſtals in diſtilled water; ſtrain the ſolution, boil, and ſet it aſide to cryſtallize.

The name of *natron*, here uſed by the London college for the fixed foſſil alkali, has, as well as their name for the vegetable alkali, been objected to. And though they are here ſupported by the authority of the ancients, yet perhaps they would have done better in following the beſt modern chemiſts by employing the term *ſalt of ſoda*. This article differs in name only from the following.

Fixed foſſil alkaline ſalt purified. E.

220 Take of aſhes of Spaniſh kali, commonly called *ſoda* or *barilla*, as much as you pleaſe. Bruiſe them; then boil in water till all the ſalt be diſſolved. Strain this through paper, and evaporate in an iron veſſel, ſo that after the liquor has cooled the ſalt may concrete into cryſtals.

By the above proceſſes, the foſſil alkali is obtained ſufficiently pure, being much more diſpoſed to cryſtallize than the vegetable alkali; the admixture of this laſt, objected to by Dr Lewis, is hereby in a great meaſure prevented.

It is with great propriety, that in this, as well as many other proceſſes, the London college direct the uſe of diſtilled water, as being free from every impregnation.

The natron, or foſſil alkali, is found lying on the ground in the iſland of Teneriffe, and ſome other countries. The native productions, of this ſalt ſeem to have been better known to the ancients than to late naturaliſts; and it is, with good reaſon, ſuppoſed to be the nitre of the Bible. How far the native natron may ſuperſede artificial means to procure it from mixed bodies, we have not been able to learn with certainty.

The foſſil alkali is not only a conſtituent of different neutrals, but is alſo ſometimes employed as a medicine by itſelf. And in its purified ſtate it has been by ſome reckoned uſeful in affections of the ſcrofulous kind. See NATRUM.

Prepared ammonia. L.

221 Take of ſal ammoniac, powdered one pound; prepared chalk, two pounds. Mix and ſublime.

Water of ammonia. L.

222 Take of ſal ammoniac, one pound; pot-aſh, one pound and a half; water, four pints. Draw off two pints by diſtillation, with a ſlow fire.

Volatile alkali from ſal ammoniac, commonly called *volatile ſal ammoniac*.

223 Take of ſal ammoniac, one pound; chalk, very pure and dry, two pounds; mix them well, and ſublime from a retort into a refrigerated receiver.

Spirit of Sal ammoniac. E.

224 Take ſal ammoniac, purified vegetable fixed alkali, of each ſixteen ounces; water, two pounds. Having mixed the ſalts, and put them into a glaſs retort, pour in the water; then diſtil to dryneſs with a ſand-bath, gradually raiſing the heat.

Theſe articles, which in the laſt edition of the London pharmacopœia were ſtyled *the volatile ſalt and ſpirit of ſal ammoniac*, were then directed to be prepared in the ſame manner.

Sal ammoniac is a neutral ſalt, compoſed of volatile alkali and marine acid. In theſe proceſſes the acid is abſorbed by the fixed alkali or chalk; and the volatile alkali is of courſe ſet at liberty.

The volatile alkali is, however, in its mild-ſtate, being combined with the fixed air, or diſcharged from the fixed alkali or chalk on their uniting with the muriatic acid.

The fixed alkali begins to act on the ſal ammoniac, and extricates a pungent urinous odour as ſoon as they are mixed. Hence it is moſt convenient not to mix them till put into the diſtilling veſſel. The two ſalts may be diſſolved ſeparately in water, the ſolutions poured into a retort, and a receiver immediately fitted on. An equal weight of the fixed ſalt is fully, perhaps more than ſufficient to extricate all the volatile.

Chalk does not begin to act on the ſal ammoniac till a conſiderable heat be applied. Hence they may be without inconvenience, and indeed ought to be thoroughly mixed together before they are put into the retort. The ſurface of the mixture may be covered with a little more powdered chalk, to prevent ſuch particles of the ſal ammoniac as may happen to lie uppermoſt from ſubliming unchanged. Though the fire muſt here be much greater than when fixed alkaline ſalt is uſed, it muſt not be ſtrong, nor ſuddenly raiſed; for if it be, a part of the chalk (though of itſelf not capable of being elevated by any degree of heat) will be carried up along with the volatile ſalt. M. du Hamel experienced the juſtneſs of this obſervation. He relates in the Memoirs of the French Academy of Sciences for the year 1735, that he frequently found his volatile ſalt, when a very ſtrong fire was uſed in the ſublimation, amount to more, ſometimes by a half, than the weight of the crude ſal ammoniac employed; and although not three fourths of this concrete are pure volatile ſalt, yet the fixed earthy matter, when once volatilized by the alkali, roſe along with it again on the gentleſt reſublimation, diſſolved with it in water, and exhaled with it in the air.

When all the ſalt has ſublimed, and the receiver grown cool, it may be taken off, and luted to another retort charged with freſh materials. This proceſs may be repeated till the recipient appears lined with volatile ſalt to a conſiderable thickneſs: the veſſel muſt then be broken in order to get out the ſalt.

The volatile ſalt and ſpirit of ſal ammoniac are the pureſt of all the medicines of this kind. They are ſomewhat more acrimonious than thoſe produced directly from animal ſubſtances, which always contain a portion of the oil of the ſubject, and receive from thence ſome degree of a ſaponaceous quality. Theſe laſt may be reduced to the ſame degree of purity by combining them with acids into ammoniacal ſalts, and afterwards recovering the volatile alkali from theſe compounds by the proceſſes above directed.

The matter which remains in the retort after the diſtillation of the ſpirit, and ſublimation of the volatile ſal ammoniac, is found to conſiſt of marine acid united with the fixed alkali or chalk employed. When fixed alkaline ſalt has been uſed as the intermedium, the reſiduum, or *caput mortuum* as it is called, yields, on ſolution and cryſtallization, a ſalt exactly ſimilar to the ſpirit of ſea-ſalt coagulated afterwards deſcribed; and hence we may judge of the extraordinary virtues formerly attributed to this ſalt under the names of *ſal antyhyſtericum, antihypochondriacum, febrifugum, digeſticum Sylvii*, &c.

The caput mortuum of the volatile ſalt, where chalk is employed as an intermedium, expoſed to a moiſt air, runs into a pungent liquor, which proves nearly the ſame with a ſolution of chalk made directly in the marine acid. It is called by ſome *oleum cretæ*, oil of chalk. If calcined ſhells, or other animal limes, be mingled with ſal ammoniac, a maſs will be obtained, which likewiſe deliqueſces in the air, and forms a liquor of the ſame kind.

Water of pure ammonia. L.

225 Take of ſal ammoniac, one pound; quicklime, two pounds; water one galllon. Add to the lime two pints of the water. Let them ſtand together an hour: then add the ſal ammoniac and the other ſix pints of water, boiling, and immediately cover the veſſel. Pour out the liquor when cold, and diſtil off with a ſlow fire one pint.

Cauſtic volatile alkali, commonly called *ſpirit of ſal ammoniac with quicklime.* E.

226 Take of quicklime, freſh burnt, two pounds; water, one pound. Having put the water into an iron or ſtone-ware veſſel, add the quicklime previouſly beat; cover the veſſel for 24 hours; when the lime has fallen into a fine powder, put it into the retort; then add 16 ounces of ſal ammoniac, diluted with four times its weight of water; and, ſhutting the mouth of the retort, mix them together by agitation. Laſtly, diſtil it into a refrigerated receiver, with a very gentle heat, ſo that the operator can eaſily bear the heat of the retort applied to his hands. Twenty ounces of liquor are to be drawn off. In this diſtillation the veſſels are to be ſo luted as thoroughly to exclude the vapours, which are very penetrating. After the diſtillation, however, they are to be opened, and the alkali poured out before the retort hath altogether cooled.

The theory of this proceſs is preciſely the ſame with that directed for the preparation of cauſtic ley. The effect of the quicklime on the ſal ammoniac is very different from that of the chalk and fixed alkali in the foregoing proceſs. Immediately on mixture a very penetrating vapour exhales; and in diſtillation the whole of the volatile ſalt ariſes in a liquid form, no part of it appearing in a concrete ſtate, how gently ſoever the liquor be re-diſtilled. This ſpirit is far more pungent than the other both in ſmell and taſte; and, like fixed alkalis rendered cauſtic by the ſame intermedium, it raiſes no effervеſcence on mixture with acids. The whole of the phenomena are to be aſcribed to the abſorption of fixed air from the alkali by means of the quicklime; and from being thus deprived of the aerial acid the volatile alkali is brought to a cauſtic ſtate.

This ſpirit is held to be too acrimonious for internal uſe, and has therefore been chiefly employed for ſmelling to in faintings, &c. though when properly diluted it may be given inwardly with ſafety. It is a powerful menſtruum for ſome vegetable ſubſtances, as Peruvian bark, from which the other ſpirits extract little. It is alſo moſt convenient for the purpoſe of rendering oils miſcible with water, as in the preparation of what is called in extemporaneous practice *the oily mixture*.

Some have mixed a quantity of this with the officinal ſpirits both of ſal ammoniac and of hartſhorn; which thus become more pungent, ſo as to bear an addition a conſiderable quantity of water, without any danger of the diſcovery from the taſte or ſmell. This abuſe would be prevented, if what has been formerly laid down as a mark of the ſtrength of theſe ſpirits) ſome of the volatile ſalt remaining undiſſolved in them, were attended to. It may be detected by adding to a little of the ſuſpected ſpirit about one-fourth its quantity or more of rectified ſpirit of wine; which, if the volatile ſpirit be genuine, will precipitate a part of its volatile ſalt, but occaſions no viſible ſeparation or change in the cauſtic ſpirit, or in thoſe which are ſophiſticated with it.

Others have ſubſtituted for the ſpirit of ſal ammoniac a ſolution of crude ſal ammoniac and fixed alkaline ſalt mixed together. This mixture depoſits a ſaline matter on the addition of ſpirit of wine, like the genuine ſpirit; from which, however, it may be diſtinguiſhed, by the ſalt which is thus ſeparated not being a volatile alkaline, but a fixed neutral ſalt. The abuſe may be more readily detected by a drop or two of ſolution of ſilver in aquafortis, which will produce no change in the appearance of the true ſpirit, but will render the counterfeit turbid and milky.

The volatile liquor, ſalt, and oil, of hartſhorn. L.

227 Take of hartſhorn, ten pounds. Diſtil with a fire gradually increaſed. A volatile liquor, ſalt, and oil, will aſcend. The oil and ſalt being ſeparated, diſtil the liquor three times. To the ſalt add an equal weight of prepared chalk, and ſublime thrice, or till it become white.

The ſame volatile liquors, ſalt and oil, may be obtained from any parts (except the fat) of all kinds of animals.

The volatile alkali obtained from hartſhorn, whether in a ſolid or fluid ſtate, is preciſely the ſame with that obtained from ſal ammoniac. And as that proceſs is the eaſieſt, the Edinburgh college have entirely rejected the preſent. While, however, the names of ſpirit and ſalt of hartſhorn are ſtill in daily uſe, ammonia, or the volatile alkali, is ſtill prepared from bones and other animal ſubſtances by ſeveral very extenſive traders.

The wholeſale dealers have very large pots for the diſtillation of hartſhorn, with earthen heads almoſt like thoſe of the common ſtill; for receivers, they uſe a couple of oil jars, the mouths of which are luted together; the pipe that comes from the head enters the lowermoſt jar through a hole made on purpoſe in its bottom. When a large quantity of the ſubject is to be diſtilled, it is cuſtomary to continue the operation for ſeveral days ſucceſſively; only unluting the head occaſionally to put in freſh materials.

When only a ſmall quantity of ſpirit or ſalt is wanted, a common iron pot, ſuch as is uſually fixed in ſand furnaces, may be employed, an iron head being fitted to it. The receiver ought to be large, and a glaſs, or rather tin adopter, inſerted between it and the pipe of the head.

The diſtilling veſſel being charged with pieces of the horn, a moderate fire is applied, which is ſlowly increaſed, and raiſed at length almoſt to the utmoſt degree. At firſt a watery liquor ariſes, the quantity of which will be ſmaller or greater according as the horns were more or leſs dry; this is ſucceded by the ſalt and oil: the ſalt at firſt diſſolves as it comes over in the phlegm, and thus forms what is called *ſpirit*. When the phlegm is ſaturated, the remainder of the ſalt concretes in a ſolid form to the ſides of the recipient. If it be required to have the whole of the ſalt ſolid and undiſſolved, the phlegm ſhould be removed as ſoon as the ſalt begins to ariſe, which may be known by the appearance of white fumes; and that this may be done the more commodiouſly, the receiver ſhould be left unluted till this firſt part of the proceſs be finiſhed. The white vapours which now ariſe ſometimes come with ſuch vehemence as to throw off or burſt the receiver. To prevent this accident, it is convenient to have a ſmall hole in the luting, which may be occaſionally ſtopped with a wooden peg, or opened, as the operator ſhall find proper. After the ſalt has all ariſen, a thick dark-coloured oil comes over. The proceſs is now to be diſcontinued; and the veſſels, when grown cold, unluted.

All the liquid matters being poured out of the receiver, the ſalt which remains adhering to its ſides is to be waſhed out with a little water and added to the reſt. It is convenient to let the whole ſtand for a few hours, that the oil may the better diſengage itſelf from the liquor, ſo as to be firſt ſeparated by a funnel, and afterwards more perfectly by filtration through wet paper. The ſalt and ſpirits are then to be farther purified as above directed.

The ſpirit of hartſhorn met with in the ſhops is extremely precarious in point of ſtrength; the quantity of ſalt contained in it (on which its efficacy depends) varying according as the diſtillation in rectifying it is continued for a longer or ſhorter time. If after the volatile ſalt has ariſen, ſo much of the phlegm or watery part be driven over as is juſt ſufficient to diſſolve it, the ſpirit will be fully ſaturated, and as ſtrong as it can be made. If the proceſs be not at this inſtant ſtopped, the phlegm, continuing to ariſe, muſt render the ſpirit continually weaker and weaker. The diſtillation therefore ought to be diſcontinued at this period, or rather while ſome of the ſalt ſtill remains undiſſolved; the ſpirit will thus prove always equal, and the buyers be furniſhed with a certain criterion of its ſtrength. Very few have taken any notice of the abovementioned inconvenience of theſe kinds of ſpirits; and the remedy is firſt hinted at in the *Pharmacopœia Reformata*. The purity of the ſpirit is eaſily determined from its clearneſs and grateful odour.

Volatile alkaline ſalts, and their ſolutions called *ſpirits*, agree in many reſpects with fixed alkalies, and their ſolutions or leys; as in changing the colour of blue flowers to a green; efferveſcing, when in their mild ſtate, with and neutralizing acids: liquefying the animal juices: and corroding the fleſhy parts, ſo as, when applied to the ſkin, and prevented from exhaling by a proper covering, to act as cauſtics; diſſolving oils and ſulphur, though leſs readily than the fixed alkalis, on account probably of their not being able to bear any conſiderable heat, by which their activity might be promoted. Their principle difference from the other alkalis ſeems to conſiſt in their volatility. They exhale or emit pungent vapours in the coldeſt ſtate of the atmoſphere; and by their ſtimulating ſmell they prove ſerviceable in languors and faintings. Taken internally, they diſcover a greater colliquating as well as ſtimulating power: the blood drawn from a vein after their uſe has been continued for ſome time, is ſaid to be remarkably more fluid than before; they are likewiſe more diſpoſed to operate by perſpiration, and to act on the nervous ſyſtem. They are particularly uſeful in lethargic caſes; in hyſterical and hypochondriacal diſorders; and in the languors, headachs, inflations of the ſtomach, flatulent colics, and other ſymptoms which attend them. They are generally found more ſerviceable to aged perſons, and in phlegmatic habits, than in the oppoſite circumſtances. In ſome fevers, particularly thoſe of the low kind, accompanied with a cough, hoarſeneſs, and a redundance of phlegm, they are of great utility, raiſing the *vis vitæ*, and exciting a ſalutary diaphoreſis; but in putrid fevers, ſcurvies, and wherever the maſs of blood is thin and acrimonious, their uſe is ambiguous. As they are more powerful than the fixed in liqueſying tenacious humours, ſo they prove more hurtful where the fluids are already in a colliquated ſtate. In vernal intermittents, particularly thoſe of the ſlow kind, they are often the moſt efficacious remedy. Dr Biſſet obſerves, in his Eſſay on the Medical Conſtitution of Great Britain, that though many caſes occur which will yield to no other medicine than the bark, yet he has met with many which were only ſuppreſſed from time to time by the bark, but were completely cured by alkaline ſpirits. He tell us, that theſe ſpirits will often carry off vernal intermittents without any previous evacuation: but that they are generally more effectual if a purge be premiſed; and in plethoric or inflammatory caſes, or where the fever perſonates a remittent, veneſection is neceſſary.

Theſe ſalts are moſt commodiouſly taken in a liquid form, largely diluted: or in that of a bolus, which ſhould be made up only as it is wanted. The doſe is from a grain or two to ten or twelve. Ten drops of a well made ſpirit, or ſaturated ſolution, are reckoned to contain about a grain of the ſalt. In intermittents, 15 or 20 drops of the ſpirit are given in a tea-cupful of cold ſpring water, and repeated five or ſix times in each intermiſſion.

The volatile ſalts and ſpirits prepared from different animal ſubſtances, have been ſuppoſed capable of producing different effects on the human body, and to receive ſpecific virtues from the ſubject. The ſalt of vipers has been eſteemed particularly ſerviceable in diſorders occaſioned by the bite of that animal; and a ſalt drawn from the human ſkull, in diſeaſes of the head. But modern practice acknowledges no ſuch different effects from theſe preparations; and chemical experiments have ſhown their identity. There is indeed when not ſufficiently purified, a very perceptible difference in the ſmell, taſte, degree of pungency, and volatility of theſe ſalts; and in this ſtate their medicinal virtues vary conſiderable enough to deſerve notice: but this difference they have in common, according as they are more or leſs loaded with oil, not as they are produced from this or that animal ſubſtance. At firſt diſtilled, they may be looked on as a kind of volatile ſoap, in which the oil is the prevailing principle; in this ſtate they have much leſs of the proper alkaline acrimony and pungency than when they have undergone repeated diſtillations, and ſuch other operations as diſengage the oil from the ſalt; for by thoſe means they loſe their ſaponaceous quality, and acquiring greater degrees of acrimony, become medicines of a different claſs. Theſe preparations therefore do not differ near ſo much from each other, as they do from themſelves in different ſtates of purity. To which may be added, that when we conſider them as loaded with oil, the virtues of a diſtilled animal oil itſelf are likewiſe to be brought into the account.

Theſe oils, as firſt diſtilled, are highly fetid and offenſive, of an extremely heating quality, and of ſuch activity, that, according to Hoffman's account, half a drop diſſolved in a dram of ſpirit of wine is ſufficient to raiſe a copious ſweat. By repeated rectifications, they loſe their offenſiveneſs, and at the ſame time become mild in their medicinal operation. The rectified oils may be given to the quantity of twenty or thirty drops, and are ſaid to be anodyne and antiſpaſmodic, to procure a calm ſleep and gentle ſweat, without heating or agitating the body, as has been obſerved in treating of the animal oil. It is obvious, therefore, that the ſalts and ſpirits muſt differ, not only according to the quantity of oil they contain, but according to the quality of the oil itſelf in its different ſtates.

The volatile ſalt and ſpirits, as firſt diſtilled, are of a brown colour, and a very offenſive ſmell; by repeated rectification, as directed in the proceſſes above ſet down, they loſe great part of the oil on which theſe qualities depend, the ſalt becomes white, the ſpirit limpid as water, and of a grateful odour; and this is the mark of ſufficient rectification.

It has been objected to the repeated rectification of theſe preparations, that, by ſeparating the oil, it renders them ſimilar to the pure ſalt and ſpirit of ſal ammoniac, which are procurable at an eaſier rate. But the intention is not to purify them wholly from the oil, but to ſeparate the groſſer part, and to ſubtilize the reſt, ſo as to bring it towards the ſame ſtate as when the oil is rectified by itſelf. The rectification of ſpirit of hartſhorn has been repeated twenty times ſucceſſively, and found ſtill to participate of oil, but of an oil very different from what it was in the firſt diſtillation.

The rectified oils, in long-keeping, become again fetid. The ſalt and ſpirits alſo, however carefully rectified, ſuffer in length of time the ſame change; reſuming their original brown colour and ill ſmell; a proof that the rectification is far from having diveſted them of oil. Any intentions however, which they are thus capable of anſwering, may be as effectually accompliſhed by a mixture of the volatile alkali with the animal oil, in its rectified ſtate, to any extent that may be thought neceſſary.

Vitriolated kali. L.

238 Take of the ſalt which remains after the diſtillation of the nitrous acid, two pounds. Diſtilled water, two gallons. Burn out the ſuperfluous acid with a ſtrong fire in an open veſſel: then boil it a little while in the water; ſtrain and ſet the liquor aſide to cryſtallize.

The ſalt thus formed is the ſame with the vitriolated tartar of the laſt edition of the London pharmacopœia; but it is now prepared in a cheaper and eaſier manner, at leaſt for thoſe who diſtil the nitrous acid. In both ways a neutral is formed, conſiſting of the fixed vegetable alkali, united to the vitriolic acid. But a ſimilar compound may alſo be obtained by the following proceſs of the Edinburgh pharmacopœia.

Vitriolated fixed vegetable alkali, commonly called *vitriolated tartar*. E.

229 Take of vitriolic acid, diluted with ſix times its weight of water, as much as you pleaſe. Put it into a capacious glaſs veſſel, and gradually drop into it, of purified fixed vegetable alkali, diluted with ſix times its weight of water, as much as is ſufficient thoroughly to neutralize the acid. The efferveſcence being finiſhed, ſtrain the liquor through paper; and after proper evaporation, ſet it aſide to cryſtallize.

The operator ought to take care that the vapour ſeparated during the efferveſcence ſhall not be applied to his noſtrils; as fixed air, when applied to the olfactory nerves, is highly deleterious to life.

This is an elegant and one of the leaſt troubleſome ways of peparing this ſalt. The Edinburgh college, in their former editions, ordered the acid liquor to be dropped into the alkaline; by the converſe procedure now received, it is obviouſly more eaſy to ſecure againſt a redundance of acidity: and for the greater certainty in this point it may be expedient, as in the foregoing proceſs, to drop in a little more of the alkaline ley than the ceſſation of the efferveſcence ſeems to require.

In a former edition of the ſame pharmacopœia, the acid was directed to be diluted only with its equal weight of water, and the alkali with that quantity of water which it is capable of imbibing from the atmoſphere. By that imperfection there was not water enough to keep the vitriolated tartar diſſolved; on which account, as faſt as the alkali was neutralized by the acid, a great part fell to the bottom in a powdery form. In order to obtain perfect and well formed cryſtals, the liquor ſhould not be ſet in the cold, but continued in moderate heat, ſuch as the hand can ſcarcely bear, that the water may ſlowly evaporate.

It is remarkable, that although the vitriolic acid and fixed alkaline ſalt do each readily unite with water, and ſtrongly attract moiſture, even from the air, yet the neutral reſulting from the combination of theſe two, vitriolated tartar, is one of the ſalts moſt difficult of ſolution, very little of it being taken up by cold water.

Vitriolated tartar, in ſmall doſes, as a ſcruple or half a dram, is an uſeful aperient; in large ones, as four or five drams, a mild cathartic, which does not paſs off ſo haſtily as the bitter cathartic ſal or ſalt of Glauber, and ſeems to extend its action further. The wholeſale dealers in medicines have commonly ſubſtituted for it an article otherwiſe almoſt uſeleſs in their ſhops, the reſiduum of Glauber's ſpirit of nitre. This may be looked on as a venial fraud, if the ſpirit has been prepared as formerly directed, and the reſiduum diſſolved and cryſtallized: but it is a very dangerous one if the vitriolic acid has been uſed in an over proportion, and the caput mortuum employed without cryſtallization; the ſalt in this caſe, inſtead of a mild neutral one, of a moderately bitter taſte, proving highly acid. The purchaſer ought therefore to inſiſt on the ſalt being in a cryſtalline form. The cryſtals when perfect are oblong, with ſix flat ſides, and terminated at each end by a ſix-ſided pyramid; ſome appear compoſed of two pyramids joined together by the baſes; and many, in the moſt perfect cryſtallizations we have ſeen, are very irregular. They decrepitate in the fire, ſomewhat like thoſe of ſea-ſalt, for which they have ſometimes been miſtaken.

Salt of many virtues. E.

230 Take nitre in powder, flowers of ſulphur, of each equal parts. Mix them well together, and inject the mixture by little and little at a time into a red-hot crucible: the deflagration being over, let the ſalt cool, after which it is to be put up in a glaſs veſſel well ſhut. The ſalt may be purified by diſſolving it in warm water, filtering the ſolution, and exhaling it to dryneſs, or by cryſtallization.

This is another method of uniting the vitriolic acid with the common vegetable fixed alkali. Both the nitre and the ſulphur are decompounded in the operation: the acid of the nitre, and the inflammable principle of the ſulphur, detonate together, and are diſſipated; while the acid of the ſulphur, (which, as we have already ſeen, is no other than the vitriolic acid) remains combined with the alkaline baſis of the nitre. The ſhops accordingly have ſubſtituted the foregoing preparation for the ſal pochyreſt.

Vitriolated natron. L.

231 Take of the ſalt which remains after the diſtillation of the muriatic acid, two pounds; diſtilled water, two pints and an half. Burn out the ſuperfluous acid with a ſtrong fire in an open veſſel; then boil it for a little in the water; ſtrain the ſolution, and ſet it by to cryſtallize.

Vitriolated ſoda, commonly called *cathartic ſalt of Glauber*. E.

232 Diſſolve in warm water the maſs which remains after the diſtillation of ſpirit of ſea-ſalt: filtre the ſolution, and cryſtallize the ſalt.

The directions given for the preparation of this ſalt, long known by the name of *ſal mirabile Glauberi*, are nearly the ſame in the pharmacopœias of both colleges; but thoſe of the London college are to be preferred, as being moſt accurate and explicit.

In a former edition of the Edinburgh pharmacopœia, it was ordered, that if the cryſtals (obtained as above) proved too ſharp, they ſhould again be diſſolved in water, and the filtered liquor evaporated to ſuch a pitch only as may diſpoſe the ſalt to cryſtallize. But there is no great danger of the chryſtals proving too ſharp, even when the ſpirit of ſalt is made with the largeſt proportion of oil of vitriol directed under that proceſs. The liquor which remains after the cryſtallization is indeed very acid; and with regard to this preparation, it is convenient it ſhould be ſo; for otherwiſe the cryſtals will be very ſmall, and likewiſe in a ſmall quantity. Where a ſufficient proportion of oil of vitriol has not been employed in the diſtillation of the ſpirit, it is neceſſary to add ſome to the liquor, in order to promote cryſtallization of the ſalt.

The title of *cathartic ſalt*, which this ſalt has often had, expreſſes its medical virtues. Taken from half an ounce to an ounce, or more, it proves a mild and uſeful purgative; and in ſmaller doſes, largely diluted, a ſerviceable aperient and diuretic. The ſhops frequently ſubſtitute for it the bitter cathartic ſalt, which is nearly of the ſame quality, but ſomewhat more unpleaſant, and, as is ſaid, leſs mild in operation. They are very eaſily diſtinguiſhable from each other, by the effect of alkaline ſalts upon ſolutions of them. The ſolutions of Glauber's ſalt ſuffer no viſible change from this addition, its own baſis being a true fixed alkali: but the ſolution of the bitter cathartic ſalt grows inſtantly white and turbid; its baſis, which is an earth, being extricated copiouſly by the alkaline ſalt.

Purified nitre. L.

433 Take of nitre two pounds; diſtilled water, four pints.

Boil the nitre in the water till it be diſſolved; ſtrain the ſolution, and ſet it aſide to cryſtallize.

Common nitre contains uſually a conſiderable portion of a ſea-ſalt, which in this proceſs is ſeparated, the ſea-ſalt remaining diſſolved after the greateſt part of the nitre has cryſtallized. The cryſtals which ſhoot after the firſt evaporation are large, regular, and pure: but when the remaining liquor is further evaporated, and this repeated a ſecond or third time, the cryſtals prove at length ſmall, imperfect, and tipt with little cubical cryſtals of ſea-ſalt.

When rough nitre, in the ſtate wherein it is firſt extracted from the earths impregnated with it, is treated in this manner, there remains at laſt a liquor called *mother-ley*, which will no longer afford any cryſtals. This appears to participate of the nitrous and marine acids, and to contain an earthy matter diſſolved by theſe acids. On adding alkaline lixivia, the earth is precipitated; and when thoroughly waſhed with water, proves inſipid. If the liquor be evaporated to dryneſs, a bitteriſh ſaline matter is left; which being ſtrongly calcined in a crucible, parts with the acids, and becomes, as in the other caſe, inſipid.

This earth has been celebrated as an excellent purgative, in the doſe of a dram or two: and in ſmaller doſes, as an alterant in hypochondriacal and other diſorders. This medicine was for ſome time kept a great ſecret, under the name of *magneſia alba*, *nitrous panacea*, *Count Palma's powder*, *il polvere albo Romano*, *poudre de Sentinelli*, &c. till Lanciſi made it public in his notes on the *Metallotheca Vaticana*. It has been ſuppoſed, that this earth is no other than a portion of the lime commonly added in the elixation of the nitre at the European nitre works: but though the ſpecimens of magneſia examined by Neumann, and ſome of that which has lately been brought hither from abroad, gave plain marks of a calcareous nature; yet the true magneſia muſt be an earth of a different kind, calcareous earths being rather aſtringent than purgative. The earthy baſis of the bitter cathartic ſalt is found to have the properties aſcribed to the true magneſia of nitre, and appears to be the very ſame ſpecies of earth: from that ſalt therefore this medicine is now prepared, as will be ſeen hereafter. The magneſia alba differs from calcareous earths, in having a leſs powerful attraction for fixed air, and in not becoming cauſtic by calcination.

Acetated kali. L.

Take of kali one pound; boil it with a ſlow fire in four or five times its quantity of diſtilled vinegar; the effervescence ceaſing, let there be added at different times more diſtilled vinegar, until the laſt vinegar being nearly evaporated, the addition of freſh will excite no effervescence, which will happen when about twenty pounds of diſtilled vinegar are conſumed: afterwards let it be dried ſlowly. An impure ſalt will be left, which melts for a little while with a ſlow fire; then let it be diſſolved in water, and filtered through paper. If the fuſion has been rightly performed, the ſtrained liquor will be colourleſs; if otherwiſe, of a brown colour. Laſtly, evaporate this liquor, with a ſlow fire, in a very ſhallow glaſs veſſel; frequently ſtirring the maſs, that the ſalt may be more completely dried, which ſhould be kept in a veſſel cloſe ſtopped. The ſalt ought to be very white, and diſſolve wholly, both in water and ſpirit of wine, without leaving any feces. If the ſalt although white, ſhould depoſite any feces in ſpirit of wine, that ſolution in the ſpirit ſhould be filtered through paper, and the ſalt again dried. 434

Acetated fixed vegetable alkali, commonly called *regenerated tartar.* E.

435 Take of ſalt of tartar one pound; boil it with a very gentle heat in four or five times its quantity of diſtilled vinegar; add more diſtilled vinegar at different times, till on the watery part of the former quantity being nearly diſſipated by evaporation, the new addition of vinegar ceaſes to raiſe any effervescence. This happens when about twenty pounds by weight of diſtilled vinegar has been conſumed. The impure ſalt remaining after the exſiccation, is to be liquefied with a gentle heat for a ſhort time, and it is proper that it ſhould only be for a ſhort time; then diſſolve it in water, and ſtrain through paper. If the liquefaction has been properly performed the ſtrained liquor will be limpid, but if otherwiſe, of a brown colour. Evaporate this liquor with a very gentle heat in a ſhallow glaſs veſſel, occaſionally ſtirring the ſalt as it becomes dry, that its moiſture may ſooner be diſſipated. Then put it up into a veſſel very cloſely ſtopped, to prevent it from liquefying in the air.

This ſalt had formerly the name of *diuretic ſalt* in the London pharmacopœia; but that which they now employ, or perhaps in preference to it, the name of *potaſſa acetata*, gives a clearer idea of its nature.

The purification of this ſalt is not a little troubleſome. The operator muſt be particularly careful, in melting it, not to uſe a great heat, or to keep it long liquefied: a little ſhould be occaſionally taken out, and put into water; and as ſoon as it begins to part freely with its black colour, the whole is to be removed from the fire. In the laſt drying, the heat muſt not be ſo great as to melt it; otherwiſe it will not prove totally ſoluble. If the ſolution in ſpirit of wine be exſiccated, and the remaining ſalt liquefied with a very gentle fire, it gains the leafy appearance which has procured it the name *terra foliata*.

In the fourth volume of the Memoirs of the correſpondents of the French Academy, lately publiſhed, Mr Cadet has given a method of making the ſalt white at the firſt evaporation, without the trouble of any farther purification. He obſerves that the brown colour depends on the oily matter of the vinegar being burnt by the heat commonly employed in the evaporation: and his improvement conſiſts in diminiſhing the heat at the time that this burning is liable to happen. The proceſs he recommends is as follows:

Diſſolve a pound of ſalt of tartar in a ſufficient quantity of cold water; filter the ſolution, and add by degrees as much diſtilled vinegar as will ſaturate it, or a little more. Set the liquor to evaporate in a ſtone-ware veſſel in a gentle heat, not ſo ſtrong as to make it boil. When a pellicle appears on the ſurface, the reſt of the proceſs muſt be finiſhed in a water-bath. The liquor acquires by degrees an oily conſiſtence, and a pretty deep brown colour; but the pellicle or ſcum on the top looks whitiſh, and when taken off and cooled, appears a congeries of little brilliant ſilver-like plates. The matter is to be kept continually ſtirring, till it be wholly changed into this white flaky matter; the complete drying of which is moſt conveniently effected in a warm oven.

We ſhall not take upon us to determine whether the pure or impure ſalt is preferable as a medicine; obſerving only, that the latter is more of a ſaponaceous nature, the former more acrid, though ſomewhat more agreeable to the ſtomach. Mr Cadet reckons the ſalt prepared in his method ſuperior both to the brown and white ſorts made in the common way, as poſſeſſing both the oily quality of the one and the agreeableneſs of the other, and as being always uniform or of the ſame power: whereas the others are liable to vary conſiderably, according to the degree of heat employed in the evaporation. They are all medicines of great efficacy, and may be ſo doſed and managed as to prove either mildly cathartic, or powerfully diuretic; few of the ſaline deobſtruents come up to them in virtue. The doſe is from half a ſcruple to a dram or two. A bare mixture, however, of alkaline ſalt and vinegar, with exſiccation, is not perhaps much inferior as a medicine to the more elaborate ſalt. Two drams of the alkali, ſaturated with vinegar, have been known to occaſion ten or twelve ſtools in hydropic caſes, and a plentiful diſcharge of urine, without any inconvenience.

Water of acetated ammonia. L.

236 Take of ammonia, by weight, two ounces; diſtilled vinegar, four pints; or as much as is ſufficient to ſaturate the ammonia. Mix.

Spirit of Mindererus. E.

237 Take any quantity of the volatile alkaline ſalt of ſal ammoniac, and gradually pour upon it diſtilled vinegar till the effervеſcence ceaſes; occaſionally ſtirring the mixture to promote the action of the vinegar on the ſalt.

Though this article has long been known by the name of Spiritus Mindereri, ſo called from the inventor; yet that employed by the London college is undoubtedly preferable, as giving a proper idea of its conſtituent parts.

This is an excellent aperient ſaline liquor. Taken warm in bed, it proves commonly a powerful diaphoretic or ſudorific; and as it operates without heat, it has place in febrile and inflammatory diſorders, where medicines of the warm kind, if they fail of procuring ſweat, aggravate the diſtemper. Its action may likewiſe be determined to the kidneys, by walking about in a cool air. The common doſe is half an ounce, either by itſelf, or along with other medicines adapted to the intention. Its ſtrength is not a little precarious, depending much on that of the vinegar: an inconvenience which cannot eaſily be obviated, for the ſaline matter is not reducible to the form of a concrete ſalt.

Tartarized kali. L.

Take of kali one pound; cryſtals of tartar, three pounds; diſtilled water, boiling, one gallon. To the ſalt, diſſolved in water, throw in gradually the cryſtals of tartar, powdered; filter the liquor, when cold, through paper: and, after due evaporation, ſet it apart to cryſtallize. 238

Tartarized vegetable fixed alkali, commonly called *ſoluble tartar.* E.

Take of purified fixed vegetable alkaline ſalt one pound; water, 15 pounds. To the ſalt diſſolved in the boiling water gradually add cryſtals of tartar in fine powder, as long as the addition thereof raiſes any effervеſcence, which almoſt ceaſes before three times the weight of the alkaline ſalt hath been injected; then ſtrain the cooled liquor through paper, and after due evaporation ſet it aſide to cryſtallize. 239

Common white tartar is perhaps preferable for this operation to the cryſtals uſually met with. Its impurities can here be no objection; ſince it will be ſufficiently depurated by the ſubſequent filtration.

The preparation of this medicine by either of the above methods is very eaſy; though ſome chemiſts have rendered it ſufficiently troubleſome, by a nicety which is not at all wanted. They inſiſt upon hitting the very exact point of ſaturation between the alkaline ſalt and the acid of the tartar; and caution the operator to be extremely careful, when he comes near this mark, leſt by imprudently adding too large a portion of either, he render the ſalt too acid or too alkaline. If the liquor be ſuffered to cool a little before it be committed to the filter, and then properly exhaled and cryſtallized, no error of this kind can happen, though the ſaturation ſhould not be very exactly hit; for ſince cryſtals of tartar are very difficultly ſoluble even in boiling water, and when diſſolved therein concrete again upon the liquor's growing cold, if any more of them has been employed than is taken up by the alkali, this ſuperfluous quantity will be left upon the filter; and, on the other hand, when too much of the alkali has been uſed, it will remain uncryſtallized. The cryſtallization of this ſalt indeed cannot be effected without a good deal of trouble: it is therefore moſt convenient to let the acid ſalt prevail at firſt; to ſeparate the ſuperfluous quantity, by ſuffering the liquor to cool a little before filtration; and then proceed to the total evaporation of the aqueous fluid, which will leave behind it the neutral ſalt required. The moſt proper veſſel for this purpoſe is a ſtone-ware one; iron diſcolours the ſalt.

Soluble tartar, in doſes of a ſcruple, half a dram, or a dram, is a mild cooling aperient: two or three drams commonly looſen the belly; and an ounce proves pretty ſtrongly purgative. It has been particularly recommended as a purgative for maniacal and melancholic patients. Malouin ſays, it is equal in purgative virtue to the cathartic ſalt of Glauber. It is an uſeful addition to the purgatives of the reſinous kind, as it promotes their operation, and at the ſame time tends to correct their griping quality. But it muſt never be given in conjunction with any acid; for all acids decompound it, abſorbing its alkaline ſalt, and precipitating the tartar. On this account it is improper to join it to tamarinds, or ſuch like acid fruits; which is too often done in the extemporaneous practice of thoſe phyſicians who are fond of mixing different cathartics together.

Tartarized natron. L.

240 Take of natron, 20 ounces; cryſtals of tartar, powdered, 2 pounds; diſtilled water, boiling, 10 pints. Diſſolve the natron in the water, and gradually add the cryſtals of tartar: filter the liquor through paper: evaporate and ſet it aſide to cryſtallize.

Tartarized ſoda, commonly called *Rochel ſalt*. E.

241 The Rochel ſalt may be prepared from purified foſſil alkaline ſalt and cryſtals of tartar, in the ſame manner as directed for the ſoluble tartar.

This is a ſpecies of ſoluble tartar, made with the ſalt of kali or ſoda, which is the ſame with the mineral alkali, or baſis of ſea ſalt. It cryſtallizes far more eaſily than the preceding preparation, and does not, like it, grow moiſt in the air. It is alſo conſiderably leſs purgative, but is equally decompounded by acids. It appears to be a very elegant ſalt, and begins now to come into eſteem in this country, as it has long been in France.

Purification of alum. L.

242 Take of alum, one pound; chalk one dram by weight; diſtilled water, one pint. Boil them a little, ſtrain, and ſet the liquor aſide to cryſtallize.

We have already offered ſome obſervations on alum (ſee ALUM); and in general we may ſay that it comes from the alum works in England in a ſtate of ſuch purity as to be fit for every purpoſe in medicine; accordingly we do not obſerve that the purification of alum has a place in any other pharmacopœias; but by the preſent proceſs it will be freed, not only from different impurities, but alſo from ſuperabundant acid.

Burnt alum. L. E.

243 Take of alum, half a pound. Burn it in an earthen veſſel ſo long as it bubbles.

This, with ſtrict propriety, ought rather perhaps to be called dried alum than burnt alum: for the only effect of the burning here directed is to expel the water. In this ſtate it is ſo acrid as to be frequently employed as an eſcharotic; and it is with this intention chiefly that it has a place in our pharmacopœias: but it has ſometimes alſo been taken internally, particularly in caſes of cholic.

Salt or ſugar of milk. Suec.

244 Take of the whey of milk, prepared by runnet, any quantity; let it be boiled over a moderate fire to the conſiſtence of a ſyrup; then put it in a cold place, that cryſtals may be formed. Let the fluid which remains be again managed in the ſame manner, and let the cryſtals formed be waſhed with cold water.

It has been by ſome imagined, that the ſuperiority of one milk over another depends on its containing a larger proportion of this ſaline or ſaccharine part; and particularly that upon this the reputed virtues of aſs milk depend. Hence this preparation has been greatly celebrated in diſorders of the breaſt, but it is far from anſwering what has been expected from it. It has little ſweetneſs, and is difficult of ſolution in water. A ſaline ſubſtance, much better deſerving the name of ſugar, may be obtained by evaporating new milk, particularly that of the aſs, to dryneſs, digeſting the dry matter in water till the water has extracted its ſoluble parts, and then inſpiſſating the filtered liquor. This preparation is of great ſweetneſs, though neither white nor cryſtalline; nor is it perhaps in the pure cryſtallizable parts of milk that its medicinal virtues reſide; and ſo little reliance is put on it as a medicine, that it has no place in the London or Edinburgh pharmacopœias; although it long has ſtood, and ſtill ſtands, in the foreign ones.

Salt of ſorrel. Suec.

245 Take any quantity of the expreſſed juice of the leaves of wood ſorrel; let it boil gently, that the feculent matter may be ſeparated; then ſtrain it till it be clear, and after this boil it on a moderate fire to the conſiſtence of a ſyrup. Put it into long-necked glaſs veſſels, and place it in a cold ſituation that it may cryſtallize. Let theſe cryſtals be diſſolved in water, and again formed into purer ones.

To make the ſorrel yield its juice readily, it ſhould be cut to pieces, and well bruiſed in a ſmall mortar, before it be commited to the preſs. The magma which remains in the bag ſtill retaining no inconſiderable quantity of ſaline matter, may be advantageouſly boiled in water, and the decoction added to the expreſſed juice. The whole may be afterwards depurated together, either by the method above directed, or by running the liquor ſeveral times through a linen cloth. In ſome caſes the addition of a conſiderable portion of water is neceſſary, that the juice, thus diluted may part the more freely with its feculencies; on the ſeparation of which the ſucceſs of the proceſs much depends.

The evaporation ſhould be performed either in ſhallow glaſs baſons, or in ſuch earthen ones as are of a compact cloſe texture; ſuch are thoſe uſually called *ſtone-ware*. The common earthen veſſels are ſubject to have their glazing corroded, and are ſo extremely porous, as readily to imbibe and retain a good quantity of the liquor; metallic veſſels are particularly apt to be corroded by theſe acid kinds of juices.

Theſe juices are ſo viſcid, and abound ſo much with heterogeneous matter, of a quite different nature from any thing ſaline, that a pellicle, or pure ſaline incruſtation upon the ſurface, is in vain expected. Boerhaave, therefore, and the more expert writers in pharmaceutical chemiſtry, with great judgment direct the evaporation of the ſuperfluous moiſture to be continued until the matter has acquired the conſiſtence of cream. If it be now ſuffered to ſtand for an hour or two in a warm place, it will, notwithſtanding the former depurations, depoſite a freſh ſediment, from which it ſhould be warily decanted before it be put into the veſſel in which it is deſigned to be cryſtallized.

Some recommend an unglazed earthen veſſel as preferable for this purpoſe to a glaſs one; the ſmoothneſs of the latter being ſuppoſed to hinder the ſalt from ſticking thereto; while the juice eaſily inſinuating itſelf into the pores of the former, has a great advantage of ſhooting its ſaline ſpicula to the ſides. Others ſlightly incruſtate the ſides and bottom of whatever veſſel they employ with a certain mineral ſalt, which greatly diſpoſes the juice to cryſtallize, to which of itſelf it is very averſe; but this addition is, with regard to its medical virtue, quite different from the ſalt here intended.

The liquor which remains after the cryſtallization may be depurated by a gentle colature, and after due inſpiſſation ſet to ſhoot again; when a farther produce of cryſtals will be obtained.

The proceſs for obtaining this ſalt is very tedious; and the quantity of ſalt which the juices afford is extremely ſmall: hence they are hardly ever made or expected in the ſhops. They may be ſomewhat ſooner ſeparated from the mucilage and other feculencies, by clarification with whites of eggs, and by adding very pure white clay.

In the manner above deſcribed, ſalts may alſo be obtained from other acid, auſtere, and bitteriſh plants, which contain but a ſmall quantity of oil.

The virtues of the eſſential ſalts have not been ſufficiently determined from experience. This much, however, is certain, that they do not, as has been ſuppoſed, poſſeſs the virtues of the ſubjects entire, excepting only the acids and ſweets. The others ſeem to be almoſt all of them nearly ſimilar, whatever plant they were obtained from. In watery extracts of wormwood, carduus, camomile, and many other vegetables, kept for ſome time in a ſoft ſtate, there may be obſerved fine ſaline effloreſcences on the ſurface, which have all nearly the ſame taſte, ſomewhat of the nitrous kind. They are ſuppoſed by ſome to be in reality no more than an impure ſpecies of volatile nitre (that is, a ſalt compoſed of the nitrous acid and volatile alkali): thoſe which were examined by the chemiſts of the French academy deflagrated in the fire, and being triturated with fixed alkali, exhaled an urinous odour; plain marks of their containing thoſe two ingredients.

Acid ſalt of borax. Suec.

246 Take of borax an ounce and a half; warm ſpring-water, one pound. Mix them in a glaſs veſſel, that the borax may be diſſolved; then pour into it three drams of the concentrated acid of vitriol: evaporate the liquor till a pellicle appears upon it; after this let it remain at reſt till the cryſtals be formed. Let them be waſhed with cold water, and kept for uſe.

This ſalt, which has long been known by the title of the *ſedative ſalt of Homberg*, is not unfrequently formed by ſublimation: but the proceſs by cryſtallization here directed is leſs troubleſome, though the ſalt proves generally leſs white, and is apt likewiſe to retain a part of Glauber's ſalt, eſpecially if the evaporation be long protracted.

The ſalt of borax to the taſte appears to be a neutral; but when it is examined by alkalis, it ſhows the properties of an acid, efferveſcing, uniting, and cryſtallizing with them, and it deſtroys their alkaline quality. It diſſolves both in water and ſpirit of wine, although not very readily in either.

The virtues attributed to it may in ſome degree be inferred from the name of *ſedative*, by which it was long diſtinguiſhed. It has been ſuppoſed to be a mild anodyne, to diminiſh febrile heat, to prevent or remove delirium, and to allay, at leaſt for ſome time, ſpaſmodical affections, particularly thoſe which are the attendants of hypochondriaſis and hyſteria. It may be given in doſes from two to twenty grains.

Purified ſal ammoniac. Suec.

247 Diſſolve ſal ammoniac in ſpring water; ſtrain the liquor through paper; evaporate it to dryneſs in a glaſs veſſel by means of a moderate fire.

The ſal ammoniac imported from the Mediterranean often contains ſuch impurities as to render the above proceſs neceſſary; but that which is prepared in Britain from ſoot and ſea-ſalt, is in general brought to market in a ſtate of very great purity. Hence this proceſs is now altogether omitted both in the London and Edinburgh Pharmacopœias. It furniſhes, however, when neceſſary, an eaſy and effectual mode of obtaining a pure ammonia muriata.

CHAP VIII. *Magneſia.*

White magneſia.

248 Take of bitter purging ſalt, kali, each two pounds; diſtilled water, boiling, 20 pints. Diſſolve the bitter ſalt and the kali ſeparately in 10 pints of water, and filter through paper; then mix them. Boil the liquor a little while, and ſtrain it while hot through linen, upon which will remain the white magneſia; then waſh away, by repeated affuſions of diſtilled water, the vitriolated kali. *L.*

Take of bitter purging ſalt, and purified fixed vegetable alkali, equal weights. Diſſolve them ſeparately in double their quantity of warm water, and let the liquor be ſtrained or otherwiſe freed from the feces; then mix them, and inſtantly add eight times their quantity of warm water. Let the liquor boil a little, ſtirring it very well at the ſame time: then let it reſt till the heat be ſomewhat diminiſhed; after which ſtrain it through a cloth: the magneſia will remain upon the cloth, and it is to be waſhed with pure water till it be altogether void of ſaline taſte. *E.*

The proceſſes here directed by the London and Edinburgh colleges are nearly the ſame; but the former ſeem to have improved ſomewhat on the latter, both in ſimplifying the proceſs, and in the employment of diſtilled water.

The *bitter cathartic ſalt*, or *Epſom ſalt*, is a combination of the vitriolic acid and magneſia. In this proceſs, then, a double elective attraction takes place: the vitriolic acid forſakes the magneſia, and joins the mild alkali, for which it has a greater attraction; while the magneſia in its turn unites with the fixed air diſcharged from the mild alkali, and ready to be abſorbed by any ſubſtance with which it can combine.

We have therefore two new products, viz. a vitriolated tartar, and magneſia united with fixed air. The former is diſſolved in the water, and may be preſerved for uſe; the latter, as being much leſs ſoluble, ſinks to the bottom of the veſſel. The intention of employing ſuch a large quantity of water and of the boiling is, that the vitriolated tartar may be all thoroughly diſſolved; this ſalt being ſo ſcarcely ſoluble in water, that without this expedient a part of it might be precipitated along with the magneſia. It might perhaps be more convenient to employ the mineral alkali; which forming a Glauber's ſalt with the vitriolic acid, would require leſs water for its ſuſpenſion. By the after ablutions, however, the magneſia is ſufficiently freed from any portion of vitriolated tartar which may have adhered to it.

The ablutions ſhould be made with very pure water; for nicer purpoſes diſtilled water may be uſed with advantage; and ſoft water is in every caſe neceſſary. Hard water for this proceſs is peculiarly inadmiſſible, as the principle in waters giving the property called *hardneſs* is generally owing to an imperfect nitrous ſelenite, whoſe baſe is capable of being diſengaged by magneſia united with fixed air. For though the attraction of magneſia itſelf to the nitrous acid is not greater than that of calcareous earths; yet when combined with fixed air, a peculiar circumſtance intervenes; whence it is deducible, that the ſum of the forces tending to join the calcareous earth with the air of the magneſia, and the magneſia with the acid. is greater than the ſum of the forces tending to join the calcareous earth with the acid, and the magneſia with the fixed air.

This phenomenon muſt therefore depend on the preſence of fixed air, and its greater attraction for lime than for magneſia. On this account, if hard water be uſed, a quantity of calcareous earth muſt infallibly be depoſited on the magneſia; while the nitrous acid with which it was combined in the water, will in its turn attach itſelf to a portion of the magneſia, forming what may be called a *nitrous magneſia*.

All the alkalis, and alſo calcareous earths, have a greater attraction for fixed air than magneſia has: Hence, if this laſt be precipitated from its ſolution in acids by cauſtic alkali, it is then procured free from fixed air: but for this purpoſe calcination is more generally employed in the manner deſcribed in the proceſs which next follows. Magneſia is ſcarcely at all ſoluble in water: the infinitely ſmall portion which this fluid is capable of taking up, is owing to the fixed air of the magneſia; and it has been lately diſcovered, that water impregnated with this acid is capable of diſſolving a conſiderable portion; for this purpoſe it is neceſſary to employ magneſia already ſaturated with fixed air, as magneſia deprived of this air would quickly abſtract it from the water, whereby the force of the latter would be very conſiderably diminiſhed. Such a ſolution of magneſia might be uſeful for ſeveral purpoſes in medicine.

Magneſia is the ſame ſpecies of earth with that obtained from the mother-ley of nitre, which was for ſeveral years a celebrated ſecret in the hands of ſome particular perſons abroad. Hoffman, who deſcribes the preparations of the nitrous magneſia, gives it the character of an uſeful antacid, a ſafe and inoffenſive laxative in doſes of a dram or two, and a diaphoretic and diuretic when given in ſmaller doſes of 15 or 20 grains. Since his time, it has had a conſiderable place in the practice of foreign phyſicians; and is now in great eſteem among us, particularly in heart-burns, and for preventing or removing the many diſorders which children are ſo frequently thrown into from a redundance of acid humours in the firſt paſſages; it is preferred, on account of its laxative quality, to the common abſorbents, which, unleſs gentle purgatives be occaſionally given to carry them off, are apt to lodge in the body, and occaſion a coſtiveneſs very detrimental to infants.

Magneſia alba, when prepared in perfection, is a white and very ſubtile earth, perfectly void of ſmell or taſte, of the claſs of thoſe which diſſolve in acids. It diſſolves freely even in the vitriolic acid; which, in the common way of making ſolutions, take up only an inconſiderable portion of other earths. Combined with this acid, it forms the bitter purging or Epſom ſalt, very eaſily ſoluble in water: while the common abſorbents form with the ſame acid almoſt inſipid concretes, very difficult of ſolution. Solutions of magneſia in all acids are bitter and purgative, while thoſe of the other earths are more or leſs auſtere and aſtringent. A large doſe of magneſia, if the ſtomach contain no acid to diſſolve it, does not purge or produce any ſenſible effect; a moderate one, if an acid be lodged there, or if acid liquors be taken after it, procures ſeveral ſtools; whereas the common abſorbents, in the ſame circumſtances, inſtead of looſening, bind the belly. It is obvious, therefore, that magneſia is ſpecifically different from the other earths, and that it is applicable to ſeveral uſeful purpoſes in medicine.

Magneſia was formerly made with the mother-water of nitre evaporated to dryneſs, or precipitated by a fixed alkali. It has gone under different names, as the *white Powder of the Count of Palma*, *powder of ſentinelle*, *polychreſt*, *laxative powder*, &c. It ſeems to have got the character *white*, to diſtinguiſh it from the dark coloured mineral called alſo *magneſia* or *manganeſe*; a ſubſtance poſſeſſing very different proprieties. We have not heard that pure native magneſia has been found in its uncombined ſtate. A combination of it with ſubphur has been diſcovered to cover a ſtratum of coal at Littry in Lower Normandy. It has alſo been found in certain ſerpentine earths in Saxony, and in marly and alum earths.

Calcined magneſia.

249 Take of white magneſia, four ounces. Expoſe it to a ſtrong heat for two hours; and, when cold, ſet it by. Keep it in a veſſel cloſely ſtopped. *L.*

Let magneſia, put into a crucible, be continued in a red heat for two hours; then put it up in cloſe glaſs veſſels. *E.*

By this proceſs the magneſia is freed of fixed air; which, according to Dr Black's experiments, conſtitutes about $\frac{7}{12}$ths of its weight. A kind of opaque foggy vapour is obſerved to eſcape during the calcination, which is nothing elſe than a quantity of fine particles of magneſia buoyed off along with a ſtream of the diſengaged air. About the end of the operation, the magneſia exhibits a kind of luminous or phoſphoreſcent property; and this may be conſidered as a pretty exact criterion of its being deprived of air.

Calcined magneſia is equally mild as when ſaturated with fixed air; and this circumſtance is ſufficient to eſtabliſh a difference between it and calcareous earths, all of which are converted by calcination into cauſtic quicklime.

The calcined magneſia is uſed for the ſame general purpoſes as the magneſia combined with fixed air. In certain affections of the ſtomach, accompanied with much flatulance, the calcined magneſia is found preferable, not only as containing more of the real earth of magneſia in a given quantity, but as being alſo deprived of its air. It neutralizes the acid of the ſtomach without that extrication of air which is often a troubleſome conſequence in employing the aerated magneſia in theſe complaints. It is proper to obſerve, that magneſia, whether combined with or deprived of fixed air, is ſimilar to the mild calcareous earths in promoting and increaſing putrefaction. The ſame has even been obſerved with reſpect to the Epſom and ſome other ſalts which have this earth for their baſe.

CHAP. IX. *Preparations of Sulphur.*

Waſhed flowers of Sulphur. L.

250 Take of flowers of ſulphur, one pound; diſtilled water, four pints. Boil the flowers of ſulphur a little while in the diſtilled water; then pour off this water, and waſh off the acid with cold water; laſtly, dry the flowers.

In the former editions of our pharmacopœias directions were given for the preparation of the flowers of ſulphur themſelves; but as a large apparatus is neceſſary for doing it with any advantage, it is now ſcarcely ever attempted by the apothecaries. When the flowers are properly prepared, no change is made on the qualities of the ſulphur. Its impurities only are ſeparated; and at the ſame time it is reduced to a finer powder than it can eaſily be brought to by any other means. But as the flowers of ſulphur are generally ſublimed in very capacious rooms, which contain a large quantity of air, or in veſſels not perfectly cloſe, ſome of thoſe that ariſe at firſt are apt to take fire, and thus are changed into a volatile acid vapour, which mingling with the flowers that ſublime afterwards, communicates to them a conſiderable degree of acidity. In this caſe the ablution here directed is for the general uſe of the medicine abſolutely neceſſary; for the flowers thus tainted with acid ſometimes occaſion gripes, and may in other reſpects be productive of effects different from thoſe of pure ſulphur. There are, however, ſome particular combinations to which they are ſuppoſed to be better adapted when unwaſhed, ſuch as their union with mercury into æthiops mineral; and accordingly for that preparation the unwaſhed flowers are directed by the London college.

Sulphurated kali. L.

251 Take of flowers of ſulphur, one ounce; kali, five ounces. Mix the ſalt with the melted ſulphur, by frequently ſtirring, until they unite into an uniform maſs.

This preparation, in the former editions of our pharmacopœias, had the name of *hepar ſulphuris* or *liver of ſulphur*.

It is much more convenient to melt the ſulphur firſt by itſelf, and add the ſalt of tartar by degrees, as here directed, than to grind them together, and afterwards endeavour to melt them, as ordered in former editions; for in this laſt caſe the mixture will not flow ſufficiently thin to be properly united by ſtirring; and the ſulphur either takes fire or ſublimes in flowers, which probably has been the reaſon why ſo large a proportion of it has been commonly directed. Even in the preſent method a conſiderable part of the ſulphur will be diſſipated; and if it were not, the hepar would not be of its due quality: for one part of ſulphur requires two of the alkaline ſalt to render it perfectly ſoluble in water, which this preparation ought to be.

The hepar ſulphuris has a fetid ſmell and a nauſeous taſte. Solutions of it in water, made with ſugar into a ſyrup, have been recommended in coughs and other diſorders of the breaſt. Our pharmacopœias, nevertheleſs, have deſervedly rejected this ſyrup, as common practice has almoſt done the balſams. Solutions of the hepar in water have been alſo recommended in herpetic and other cutaneous affections. Some phyſicians have even employed this ſolution, in a large quantity, as a bath for the cure of pſora; and in caſes of tinea capitis it has often been uſed by way of lotion.

The hepar, digeſted in rectified ſpirit of wine, imparts a rich gold colour, a warm, ſomewhat aromatic taſte, and a peculiar, not ungrateful ſmell. A tincture of this kind is kept in the ſhops under the name of another mineral. The hepar ſulphuris has been by ſome ſtrongly recommended to prevent the effects of mineral poiſon.

Sulphurated oil and ſulphurated petroleum. L.

252 Take of flowers of ſulphur, four ounces; olive oil, ſixteen ounces. Boil the flowers of brimſtone with the oil, in a pot ſlightly covered, until they be united. In the ſame manner is made *ſulphurated petroleum.*

Theſe articles are analogous to what had formerly a place in our pharmacopœias under the titles of *balſamum ſulphuris ſimplex, craſſum, et Barbadenſe.* And beſides theſe a place was alſo given to the *balſamum ſulphuris aniſatum, terebinthinatum,* &c. While theſe articles, however, are now baniſhed from our pharmacopœias, even thoſe retained are leſs in uſe than formerly.

Theſe preparations are more conveniently and ſafely made in a tall glaſs body, with the mouth at leaſt an inch in diameter, than in the circulatory or cloſe veſſels in which they have commonly been directed to be prepared: for when the ſulphur and oil begin to act vehemently upon each other, they not only rarify into a large volume, but likewiſe throw out impetuouſly great quantities of an elaſtic vapour; which, if the veſſels be cloſed, or the orifices not ſufficient to allow it a free exit, will infallibly burſt them. Hoffman relates a very remarkable hiſtory of the effects of an accident of this kind. In the veſſel above recommended the proceſs may be completed, without danger, in four or five hours, by duly managing the fire, which ſhould be very gentle for ſome time, and afterwards increaſed ſo as to make the oil juſt bubble or boil; in which ſtate it ſhould be kept till all the ſulphur appears to be taken up.

Eſſential oils, employed as menſtrua for ſulphur, undergo a great alteration from the degree of heat neceſſary for enabling them to diſſolve the ſulphur; and hence the balſams have not near ſo much of their flavour as might be expected. It ſhould therefore ſeem more eligible to add a proper quantity of the eſſential oils to the ſimple balſam: theſe readily incorporate by a gentle warmth, if the veſſel be now and then ſhaken. We may thus compoſe a balſam more elegant than thoſe made in the manner formerly recommended, and which retains ſo much of the flavour of the oil as is in ſome meaſure ſufficient to cover the taſte of the ſulphur, and render it ſupportable.

The balſams of ſulphur have been ſtrongly recommended in coughs, conſumptions, and other diſorders of the breaſt and lungs; but the reputation which they have had in theſe caſes does not appear to have been built on any fair trial or experience of their virtues. They are manifeſtly hot, acrimonious, and irritating; and therefore ſhould be uſed with the utmoſt caution. They have frequently been found to injure the appetite, offend the ſtomach and viſcera, parch the body, and occaſion thirſt and febrile heats. The doſe of the ſimple balſam is from ten to forty drops: thoſe with eſſential oils are not given in above half theſe quantities. Externally, they are employed for cleanſing and healing foul running ulcers. Boerhaave conjectures that their uſe in theſe caſes gave occaſion to the virtues aſcribed to them when taken internally.

Precipitated ſulphur. L.

253 Take of ſulphurated kali, ſix ounces; diſtilled water one pound and a half; vitriolic acid, diluted, as much as is ſufficient. Boil the ſulphurated kali in the diſtilled water until it be diſſolved. Filter the liquor through paper, to which add the vitriolic acid. Waſh the precipitated powder by often pouring on water till it becomes inſipid

This preparation is not ſo white as that of the laſt pharmaeopœia, which was made with quicklime; and which in ſome pharmacopœias had the name of *milk of ſulphur*.

Pure milk of ſulphur is not different in quality from pure ſulphur itſelf; to which it is preferred in unguents, &c. only on account of its colour. The whiteneſs does not proceed from the ſulphur having loſt any of its parts in the operation, or from any new matter ſuperadded: for if common ſulphur be ground with alkaline ſalts, and ſet to ſublime, it riſes of a white like colour, the whole quantity of the alkali remaining unchanged; and if the milk be melted with a gentle fire, it returns into yellow ſulphur again.

It may be obſerved, that the name *lac ſulphuris*, or *milk of ſulphur*, applied among us to the precipitate, is by the French writers confined to the white liquor before the precipitate has fallen from it.

CHAP. X. *Preparations of Antimony.*

ANTIMONY is compoſed of a metal, united with ſulphur or common brimſtone.

254 If powdered antimony be expoſed to a gentle fire, the ſulphur exhales; the metallic part remaining in form of a white calx, reducible, by proper fluxes, into a whitiſh brittle metal, called *regulus*. This is readily diſtinguiſhed from the other bodies of that claſs, by its not being ſoluble in aquafortis; its proper menſtruum is aqua-regia.

If aqua-regia be poured on crude antimony, the metallic part will be diſſolved; and the ſulphur thrown out, partly to the ſides of the veſſel and partly to the ſurface of the liquor, in the form of a greyiſh yellow ſubſtance. This, ſeparated and purified by ſublimation, appears on all trials the ſame with pure common brimſtone,

The metal freed from the ſulphur naturally blended with it, and afterwards fuſed with common brimſtone, reſumes the apearance and qualities of crude antimony.

The antimonial metal is a medicine of the greateſt power of any known ſubſtance; a quantity too minute to be ſenſible in the tendereſt balance, is capable of producing violent effects, if taken diſſolved or in a ſoluble ſtate. If given in ſuch a form as to be immediately miſcible with the animal fluids, it proves violently emetic; if ſo managed as to be more ſlowly acted on, cathartic; and in either caſe, if the doſe be extremely ſmall, diaphoretic. Thus, though vegetable acids extract ſo little from this metal, that the remainder ſeems to have loſt nothing of its weight, the tinctures prove in lage doſes ſtrongly emetic, and in ſmaller ones powerfully diaphoretic. The regulus has been caſt into the form of pills, which acted as violent cathartics, though without ſuffering any ſenſible diminution of weight in their paſſage through the body; and this repeatedly for a great number of times.

This metal, diveſted of the inflammable principle which it has in common with other metallic bodies that are reducible to a calx, becomes indiſſoluble and inactive. The calx nevertheleſs, urged with a ſtrong fire, melts into a glaſs, which is as eaſy of ſolution, and as violent in operation, as the regulus itſelf: the glaſs, thoroughly mixed with ſuch ſubſtances as prevent its ſolubility, as wax, reſin, and the like, is again rendered mild.

VEGETABLE acids, as has already been obſerved, diſſolve but an extremely minute portion of this metal: the ſolution nevertheleſs is powerfully emetic and cathartic. The nitrous and vitriolic acids only corrode it into a powder, to which they adhere ſo ſlightly as to be ſeparable in a conſiderable degree by water, and totally by fire, leaving the regulus in form of a calx ſimilar to that prepared by fire alone. The marine acid has a very different effect; this reduces the regulus into a violent corroſive; and though it difficultly unites, yet it adheres ſo very cloſely as not to be ſeparable by any ablution, nor by fire, the regulus ariſing along with it. The nitrous or vitriolic acids expel the marine, and thus reduce the corroſive into a calx ſimilar to the foregoing.

Sulphur remarkably abates the power of this metal: and hence crude antimony, in which the regulus appears to be combined with ſulphur, from one-fourth to one-half its weight, proves altogether mild.

If a part of the ſulphur be taken away by ſuch operations as do not deſtroy or calcine the metal, the remaining maſs becomes proportionally more active.

The ſulphur of antimony may be expelled by deflagration with nitre: the larger the quantity of nitre, to a certain point, the more of the ſulphur will be diſſipated, and the preparation will be the more active. If the quantity of nitre be more than ſufficient to conſume the ſulphur, the reſt of it, deflagrating with the inflammable principle of the regulus itſelf, renders it again mild.

The ſulphur of antimony is likewiſe abſorbed in fuſion by certain metals and by alkaline ſalts. Theſe laſt, when united with ſulphur, prove a menſtruum for all the metals (zinc excepted); and hence, if the fuſion be long continued, the regulus is taken up, and rendered ſoluble in water.

From theſe particulars with reſpect to antimony, it may naturally be concluded, that it not only furniſhes us with an uſeful and active medicine, but that it may alſo be exhibited for medical purpoſes under a great variety of different forms, and that the effects of theſe will be conſiderably diverſified. And this has in reality been the caſe. For further information reſpecting antimony, and its uſes in medicine, we refer our readers to the articles ANTIMONY; MATERIA MEDICA, p. 653, &c.; and CHEMISTRY-*Index*. But although there is perhaps no preparation there mentioned, which is not fitted to ſerve ſome uſeful purpoſe; yet the colleges both of London and Edinburgh have now reſtricted the number of preparations in their pharmacopœias to a few only. And it is highly probable, that from the proper employment of them, every uſeful purpoſe to be anſwered by antimony may be accompliſhed.

Calcined antimony. L.

255 Take of antimony, powdered, eight ounces; nitre, powdered, two pounds. Mix them, and caſt the mixture by degrees into a red hot crucible. Burn the white matter about half an hour; and, when cold, powder it; after which waſh it with diſtilled water.

In the laſt edition of the London Pharmacopœia this preparation had the name of *calx of antimony*; and it may be conſidered as at leaſt very nearly approaching to ſome other antimonials of the old pharmacopœias, particularly to the nitrated diaphoretic antimony, waſhed ditto, and ſtibiated nitre; none of which are now received as ſeparate formulas of the Edinburgh pharmacopœia, and indeed even the calx of antimony itſelf, at leaſt as thus prepared, has now no place in that pharmacopœia.

The calx of antimony, when freed by waſhing from the ſaline matter, is extremely mild, if not altogether inactive. Hoffman, Lemery, and others, aſſures us, that they have never experienced from it any ſuch effects as its uſual title imports: Boerhaave declares, that it is a mere metallic earth, entirely deſtitute of all medicinal virtue: and the committee of the London college admit that it has no ſenſible operation. The common doſe is from five grains to a ſcruple, or half a dram; though Wilſon relates, that he has known it given by half ounces, and repeated two or three times a day, for ſeveral days together.

Some report that this calx, by keeping for a length of time, contracts an emetic quality: From whence it has been concluded, that the powers of the reguline part are not entirely deſtroyed; that the preparation has the virtues of other antimonials which are given as alteratives; that is, in ſuch ſmall doſes as not to ſtimulate the primæ viæ; and that therefore diaphoretic antimony, or calcined antimony, as it is now more properly ſtyled, is certainly among the mildeſt preparations of that mineral, and may be uſed for children, and ſimilar delicate conſtitutions where the ſtomach and inteſtines are eaſily affected. The obſervations, however, from which theſe concluſions are drawn, does not appear to be well founded: Ludovici relates, that after keeping the powder for four years, it proved as mild as at firſt: and the Straſburgh pharmacopœia, with good reaſon, ſuſpects, that where the calx has proved emetic, it had either been given in ſuch caſes as would of themſelves have been attended with this ſymptom (for the great alexipharmac virtues attributed to it have occaſioned it to be exhibited even in the more dangerous malignant fevers, and other diſorders which are frequently accompanied with vomiting); or that it had not been ſufficiently calcined, or perfectly freed from ſuch part of the regulus as might remain uncalcined. The uncalcined part being groſſer than the true calx, the ſeparation is effected by often waſhing with water, in the ſame manner as directed for ſeparating earthy powders from their groſſer parts.

It has been obſerved, that when diaphoretic antimony is prepared with nitre abounding with ſea-ſalt, of which all the common nitre contains ſome portion, the medicine has proved violently emetic. This effect is not owing to any particular quality, of the ſea-ſalt, but to its quantity, by which the proportion of the nitre to the antimony is rendered leſs.

The *nitrum ſtibiatum*, as it was called, produced by the deflagration of the ſulphur of the antimony with the nitre in the ſame manner as the *ſal polychreſt*, from which it differs no otherwiſe than in retaining ſome portion of the antimonial calx.

Notwithſtanding the doubts entertained by ſome reſpecting the activity of the antimonium calcinatum, yet the London college have in our opinion done right in retaining it. For while it is on all hands allowed that it is the mildeſt of our antimonials, there are ſome accurate obſervers who conſider it by no means inefficacious. Thus Dr Healde tells us, that he has been in the habit of employing it for upwards of 40 years, and is much deceived, if, when genuine, it be not productive of good effects.

Nitrated calx of antimony. E.

Take of antimony calcined for making the glaſs of antimony, and nitre, equal weights. Having mixed, and put them into a crucible, let them be heated, ſo that the matter ſhall be of a red colour for an hour: then let it be taken out of the crucible, and, after beating it, waſh it repeatedly with warm water till it be inſipid. 256

Although this preparation agrees nearly in name with the preceding, and has been conſidered as being nearly a complete calx of antimony, yet there can be no doubt that it is a medicine of a much more active nature than the former; and in place of being one of the mildeſt of the antimonials, it often operates with great violence when given in doſes of a few grains only.

But as the effects of every preparation of antimony, not already conjoined with an acid, muſt depend on the quantity and condition of the acid in the ſtomach; ſo the ablution of the baſe of the nitre in this proceſs gives full power to the acid of the ſtomach to act as far as poſſible on the calx; whereas, when the unwaſhed calx is employed, a great quantity of the acid in the ſtomach is neutralized by the alkaline baſe of the nitre adhering to the calx. The nitrated calx of antimony is ſuppoſed to be nearly the ſame with the article which has been ſo much celebrated, and has had ſuch an extenſive ſale under the title of *Dr James's fever-powder*. And it was as an article which might be employed in the place of James's powder, that the Edinburgh college introduced this into their pharmacopœia. There is, however, reaſon to believe, that the preparation of James's powder is ſomewhat different from that here directed; but their effects, as far as our obſervation goes, appear to be very nearly the ſame.

The nitrated calx of antimony has been thought by ſome preferable to emetic tartar, where the permanent effects of a long continued nauſea are required, and where we wiſh our antimonials to paſs the pylorus and produce purging. But, like every other preparation where the reguline part is only rendered active by the acid in the ſtomach, the nitrated calx of antimony is in all caſes of uncertain operation: ſometimes proving perfectly inert, and at other times very violent in its effects. The doſe is generally 10 or 12 grains, and this is often given all at once; an inconvenience not attending the emetic tartar; the quantity and effects of which we can generally meaſure with ſurpriſing minuteneſs.

There is, however reaſon to believe, that by means of James's powder, and the nitrated calx, an artificial termination of fever is ſometimes accompliſhed, and that too more frequently than by emetic tartar. This perhaps may ſometimes be the conſequence of the violence with which they operate. At the ſame time it muſt be admitted, that even the moſt violent operation by no means enſures an immediate recovery, but that on the contrary it is ſometimes manifeſtly attended with bad effects.

Crocus of antimony.

257 Take of antimony, powdered; nitre, powdered, of each one pound; ſea-ſalt, one ounce. Mix, and put them by degrees into a red hot crucible, and melt them with an augmented heat. Pour out the melted matter; and, when cold, ſeparate it from the ſcoriæ. *L.*

Equal parts of antimony and nitre are to be injected by degrees into a red-hot crucible; when the detonation is over, ſeparate the reddiſh metallic matter from the whitiſh cruſt; beat it into a powder, and edulcorate it by repeated waſhings with hot water, till the water comes off inſipid. *E.*

Here the antimonial ſulphur is almoſt totally conſumed, and the metallic part left diveſted of its corrector. Theſe preparations, given from two to ſix grains, generally act as violent emetics, greatly diſordering the conſtitution. But the operation, like that of every preparation of antimony whoſe reguline part is not joined with an acid, muſt be liable to variations, according to the quantity and condition of the acid in the ſtomach. Their principal uſe is in maniacal caſes, as the baſis of ſome other preparations; and among the farriers, who frequently give to horſes an ounce or two a day, divided into different doſes as an alterative: in theſe, and other quadrupeds, this medicine acts chiefly as a diaphoretic.

The chemiſts have been accuſtomed to make the crocus with a leſs proportion of nitre than what is directed above; and without any farther melting than what enſues from the heat which the matter acquires by deflagration, which, when the quantity is large, is very conſiderable: a little common ſalt is added to promote the fuſion. The mixture is put by degrees into an iron pot or mortar, ſomewhat heated, and placed under a chimney: when the firſt ladleful is in, a piece of lighted charcoal is thrown to it, which ſets the matter on fire; the reſt of the mixture is then added by little and little: the deflagration is ſoon over, and the whole appears in perfect fuſion: when cold, a conſiderable quantity of ſcoriæ is found on the ſurface; which ſcoriæ are eaſily knocked off with a hammer. The crocus prepared after this manner is of a redder colour than that of the former editions of the London pharmacopœia. And indeed the method now directed by the London college may be conſidered as founded on this: It differs principally from that of the Edinburgh college in the employment of the ſea ſalt, by which the proceſs is much facilitated.

Muriated antimony. L.

258 Take of the crocus of antimony, powdered; vitriolic acid, each one pound; dry ſea-ſalt, two pounds. Pour the vitriolic acid into a retort, adding by degrees the ſea-ſalt and crocus of antimony, previouſly mixed; then diſtil in a ſand-bath. Let the diſtilled matter be expoſed to the air ſeveral days, and then let the fluid part be poured of from the dregs.

Butter of antimony. E.

259 Take of crude antimony, one part; corroſive ſublimate of mercury, two parts. Grind them firſt ſeparately; then thoroughly mix them together, taking the utmoſt care to avoid the vapours. Put the mixture into a coated glaſs retort (having a ſhort wide neck), ſo as to fill one half of it: the retort being placed in a ſand-furnace, and receiver adapted to it, give firſt a gentle heat, that only a dewy vapour may ariſe: the fire being then increaſed, an oily liquor will aſcend and congeal in the neck of the retort, appearing like ice, which is to be melted down by a live coal cautiouſly applied. This oily matter is to be rectified in a glaſs retort into a pellucid liquor.

The proceſs here directed by the Edinburgh college, and which is nearly the ſame with what ſtood in the former edition of the London pharmacopœia, is extremely dangerous, inſomuch that even the life of the operator, though tolerably verſed in common pharmacy, may be much endangered for want of due care. Boerhaave relates, that one who from the title he gives him is not to be ſuppoſed inexpert in chemical operations, or unacquainted with the danger attending this, was ſuffocated for want of proper care to prevent the burſting of the retort. The fumes which ariſe, even upon mixing the antimony with the ſublimate, are highly noxious, and ſometimes iſſue ſo copiouſly and ſuddenly, as very difficultly to be avoided. The utmoſt circumſpection therefore is neceſſary.

The cauſtic, or butter as it is called, appears to be a ſolution of the metallic part of the antimony in the marine acid of the ſublimate: the ſulphur of the antimony and the mercury of the ſublimate, remain at the bottom of the retort united into an æthiops. This ſolution does not ſucceed with ſpirit of ſalt in its liquid ſtate, and cannot be effected, unleſs (as in the caſe of making ſublimate) either the acid be highly concentrated, and both the ingredients ſtrongly heated; or when the antimony is expoſed to the vapours of the acid diſtilled from the black calx of manganeſe. By this laſt proceſs a perfect ſolution of the regulus of antimony in the muriatic acid is effected. Of this more ſimple, more ſafe, and leſs expenſive method of preparing muriated antimony, an account is given by Mr Ruſſel in the Tranſactions of the Royal Society of Edinburgh.

If regulus of antimony were added in the diſtillation of ſpirit of ſea-ſalt without water, a ſolution would alſo be made.

The method however, now directed by the London college, in which vitriolic acid and ſea-ſalt are employed to give a double elective attraction, is perhaps to be conſidered as preferable to any of the others. In this they have followed very nearly the directions given in the pharmacopœia Suecica, which are taken from the proceſs of Mr Scheele.

When the congealed matter that ariſes into the neck of the retort is liquefied by the moiſture of the air, it proves leſs corroſive than when melted down and rectified by heat; though it ſeems, in either caſe, to be ſufficiently ſtrong for the purpoſes of conſuming fungous fleſh and the callous lips of ulcers. It is remarkable, that though this ſaline concrete readily and almoſt entirely diſſolves by the humidity of the air, only a ſmall quantity of white powder ſeparating, it nevertheleſs will not diſſolve on putting water to it directly; even when previouſly liquefied by the air; the addition of water will precipitate the ſolution. And accordingly, by the addition of water is formed that one celebrated article known by the title of *mercurius vitæ*, or *Algeroth's powder*. This preparation, though never uſed by itſelf, is employed both by the Edinburgh and by ſome of the foreign colleges, in the formation of emetic tartar, the moſt uſeful of all the antimonials. And although chemiſts are not altogether agreed with regard to the beſt mode of making the tartarized antimony, yet we ſhall afterwards have occaſion to obſerve, when treating of that article, that the preparation of it from the muriated antimony, or rather from its precipitate (Algeroth's powder), is perhaps the beſt mode which has yet been practiſed. And were it even with no other intention than this; a ſafe, eaſy, and cheap method of forming a muriated antimony, may be conſidered as an important improvement in our pharmacopœias.

Antimonial powder. L.

260 Take of antimony, coarſely powdered, hartſhorn ſhavings, each two pounds; mix, and put them into a wide red-hot iron pot, ſtirring conſtantly till the maſs acquires a grey colour. Powder the matter when cold, and put it into a coated crucible. Lute to it another crucible inverted, which has a ſmall hole in its bottom: augment the fire by degrees to a red heat, and keep it ſo for two hours. Laſtly, reduce the mater, when cold, to a very fine powder.

In this preparation the metallic part of the antimony in a ſtate of calx will be united with that part of the hartſhorn which is indeſtructible by the action of fire, viz. its abſorbent earth. If this powder be properly prepared, it is of a white colour. It is a mild antimonial preparation, and is given as an alterative from three to ſix grains for a doſe. In this quantity, however, it ſometimes creates nauſea, and even vomits. In larger doſes it proves emetic, and operates by ſtool.

Precipitated ſulphur of antimony. L.

261 Take of antimony, powdered, two pounds; water of pure kali, four pints; diſtilled water, three pints; Mix, and boil them with a ſlow fire for three hours, conſtantly ſtirring, and adding the diſtilled water as it ſhall be wanted; ſtrain the hot ley through a double linen cloth, and into the liquor, whilſt yet hot, drop by degrees as much diluted vitriolic acid as is ſufficient to precipitate the ſulphur. Waſh off, with warm water, the vitriolated kali.

Golden ſulphur of antimony. E.

262 Boil, in an iron pot, four pounds of cauſtic ley diluted with three pints of water, and throw in by degrees two pounds of powdered antimony; keeping them continually ſtirring with an iron ſpatula for three hours, over a gentle fire, and occaſionally ſupplying more water. The liquor loaded with the ſulphur of antimony being then ſtrained through a woolen cloth, drop into it gradually, while it continues hot, ſo much ſpirit of nitre, diluted with an equal quantity of water, as ſhall be ſufficient to precipitate the ſulphur which is afterwards to be carefully waſhed with hot water.

The foregoing preparations are not ſtrictly ſulphurs; they contain a conſiderable quantity of the metallic part of the antimony, which is reducible from them by proper fluxes. Theſe medicines muſt needs be liable to great variation in point of ſtrength; and in this reſpect they are, perhaps the moſt precarious, though ſome have affirmed that they are the moſt certain, of the antimonial medicines.

They prove emetic when taken on an empty ſtomach, in a doſe of four, five, or ſix grains; but at preſent they are ſcarcely preſcribed with this intention; being chiefly uſed as alterative deobſtruents, particularly in cutaneous diſorders. Their emetic quality is eaſily blunted, by making them up into pills with reſins

ſins or extracts, and giving them on a full ſtomach: with theſe cautions they have been taken in the quantity of 16 grains a-day, and continued for a conſiderable time, without occaſioning any diſturbance upwards or downwards. As their ſtrength is precarious, they ſhould be taken at firſt in very ſmall doſes, and increaſed by degrees according to their effect.

A compoſition of the golden ſulphur, with ſweet mercury, has been found a powerful, yet ſafe alterative, in cutaneous diſorders; and has completed a cure after ſalivation had failed. In venereal caſes, likewiſe, this medicine has produced excellent effects. A mixture of equal parts of the ſulphur and calomel (well triturated together, and made into pills with extracts, &c.) may be taken from four to eight or ten grains, morning and night; the patient keeping moderately warm, and drinking after each doſe a draught of a decoction of the woods, or other ſimilar liquor. This medicine generally promotes perſpiration, ſcarcely occaſioning any tendency to vomit or purge, or affecting the mouth.

Tartarized antimony. L.

263 Take of crocus of antimony, powdered, one pound and an half; cryſtals of tartar, two pounds; diſtilled water two gallons: boil in a glaſs veſſel about a quarter of an hour; filter through paper, and ſet aſide the ſtrained liquor to cryſtallize.

Emetic tartar. E.

264 Take of the butter of antimony what quantity you chooſe; pour it into warm water, in which ſo much of the purified vegetable fixed alkali has been previouſly diſſolved, that the antimonial powder may be precipitated, which, after being well waſhed, is to be dried. Then to five pounds of water add of this powder nine drams, of cryſtals of tartar, beat into a very fine powder, two ounces and a half, boil for a little till the powders be diſſolved. Let the ſtrained ſolution be ſlowly evaporated in a glaſs veſſel to a pellicle, ſo that cryſtals may be formed.

We have here two modes of making the moſt common, and perhaps we may add the moſt uſeful, of all the antimonial preparations, long known in the ſhops under the name of *emetic tartar*. Theſe modes differ conſiderably from each other; but in both, the reguline part of the antimony is united with the acid of the tartar. It is perhaps difficult to ſay to which mode of preparation the preference is to be given: for on this ſubject the beſt chemiſts are ſtill divided in their opinion. The mode directed by the London college is nearly the ſame with that in the former editions of their pharmacopœia, while that now adopted by the Edinburgh college in which they have nearly followed the Pharmacopœia Roſſica, is of later date. That in both ways a good emetic tartar may be formed, is very certain: but in our opinion, when it is formed of the precipitate from the muriatic acid, or the *poudre d'Algerotti*, as it has been called, there is the leaſt chance of its being uncertain in its operation: and this method comes recommended to us on the authority of Bergman, Scheele, and ſome other of the firſt names in chemiſtry. Bergman adviſes, that the calx be precipitated, by ſimple water, as being leaſt liable to variation; and this is the direction followed in the Pharmacopœia Roſſica. But when the calx is precipitated by an alkaline ley, as is directed by the Edinburgh college, it is more certainly freed from the muriatic acid, and will of courſe be milder.

In the after part of the proceſs, whether precipitate or crocus have been uſed, the quantity of the antimonial ought always to be ſome drams more than is abſolutely neceſſary for ſaturating the acid of tartar, ſo that no cryſtals may ſhoot which are not impregnated with the active metallic part of the antimony. And in order to ſecure an uniform ſtrength, ſome attention is neceſſary in collecting the cryſtals, as ſome may contain more metal than others. After they are all ſeparated from the liquor, they ought to be beat together in a glaſs mortar into a fine powder, that the medicine may be of uniform ſtrength.

Emetic tartar is, of all the preparations of antimony, the moſt certain in its operation.

It will be ſufficient, in conſidering the medicinal effects of antimonials, that we ſhould obſerve, once for all, that their emetic property depends on two different conditions of the reguline part: the firſt is where the reguline part is only active, by being rendered ſo from meeting with an acid in the ſtomach: the ſecond is where the reguline part is already joined with an acid, rendering it active. It is obvious, that thoſe preparations, reducible to the firſt head, muſt always be of uncertain operation. Such then is the equal uncertainty in the chemical condition and medicinal effects of the croci, the hepata, and the calces; all of which proceſſes are different ſteps or degrees of freeing the reguline part from ſulphur and phlogiſton. It is equally plain, that the preparations coming under the ſecond head muſt be always conſtant and certain in their operation. Such a one is emetic tartar, the doſe and effects of which we can meaſure with great exactneſs.

The title of this medicine expreſſes its principal operation. It is one of the beſt of the antimonial emetics, acting more powerfully than the quantity of crocus contained in it would do by itſelf, though it does not ſo much ruffle the conſtitution. And indeed antimonials in general, when thus rendered ſoluble by vegetable acids, are more ſafe and certain in their effects than the violent preparations of that mineral exhibited by themſelves; the former never varying in their action from a difference in the food taken during their uſe, or other ſimilar circumſtances; which occaſioning more or leſs of the others to be diſſolved, make them operate with different degrees of force. Thus, crude antimony, where acid food has been liberally taken, has ſometimes proved violently emetic; whilſt in other had circumſtances it has had no ſuch effect.

The doſe of emetic tartar, when deſigned to produce the full effect of an emetic, is from two to four grains. It may likewiſe be advantageouſly given in much ſmaller doſes as a nauſeating and ſudorific medicine.

Vitrified antimony. L.

Take of powdered antimony, four ounces. Calcine in a broad earthen veſſel, with a fire gradually raiſed, ſtirring with an iron rod till it no longer emits a ſulphureous ſmoke. Put this powder into a crucible, ſo as to fill two thirds of it. A cover being fitted 265 on, make a fire under it, at firſt moderate, afterwards ſtronger, until the matter be melted. Pour out the melted glaſs.

Glaſs of antimony. E.

266 Strew antimony, beat into a coarſe powder like ſand, upon a ſhallow unglazed earthen veſſel, and apply a gentle heat underneath, that the antimony may be heated ſlowly; keeping it at the ſame time continually ſtirring to prevent it from running into lumps. White vapours of a ſulphureous ſmell will ariſe from it. If they ceaſe to exhale with the degree of heat firſt applied, increaſe the fire a little, ſo that vapours may again ariſe: go on in this manner, till the powder, when brought to a red heat, exhales no more vapours. Melt the calx in a crucible with an intenſe heat, till it aſſumes the appearance of melted glaſs; then pour it out on a heated braſs plate or diſh.

The calcination of antimony, in order to procure tranſparent glaſs, ſucceeds very ſlowly, unleſs the operator be wary and circumſpect in the management of it. The moſt convenient veſſel is a broad ſhallow diſh, or a ſmooth flat tile, placed under a chimney. The antimony ſhould be the purer ſort, ſuch as is uſually found at the apex of the cones; this, groſsly powdered, is to be evenly ſpread over the bottom of the pan, ſo as not to lie above a quarter of an inch thick on any part. The fire ſhould be at firſt no greater than is juſt ſufficient to raiſe a fume from the antimony, which is to be now and then ſtirred: when the fumes begins to decay, increaſe the heat, taking care not to raiſe it ſo high as to melt the antimony, or run the powder into lumps; after ſome time the veſſel may be made red-hot, and kept in this ſtate until the matter will not, upon being ſtirred, any longer fume. If this part of the proceſs be duly conducted, the antimony will appear in an uniform powder, without any lumps, and of a grey colour.

With this powder fill two-thirds of a crucible, which is to be covered with a tile, and placed in a wind-furnace. Gradually increaſe the fire till the calx be in perfect fuſion, when it is to be now and then examined by dipping a clean iron wire into it. If the matter which adheres to the end of the wire appears ſmooth and equally tranſparent, the vitrification is completed, and the glaſs may be poured out upon a hot ſmooth ſtone or copperplate, and ſuffered to cool ſlowly to prevent its cracking and flying in pieces. It is of a tranſparent yellowiſh red colour.

The glaſs of antimony uſually met with in the ſhops, is ſaid to be prepared with certain additions; which may, perhaps, render it not ſo fit for the purpoſe here deſigned. By the method above directed, it may be eaſily made of the requiſite perfection without any addition.

As antimony may be rendered nearly or altogether inactive by calcination, it might be expected that the calx and glaſs of the preſent proceſs would be likewiſe inert. But here the calcination is far leſs perfect than in the other caſe, where the inflammable principle of the regulus is totally burnt out by deflagration with nitre; there the calx is of perfect whiteneſs, and a glaſs made from that calx (with the addition of any ſaline flux, for of itſelf it will not vitrify) has little colour: but here ſo much of the inflammable principle is left, that the calx is grey, and the glaſs of a high colour. The calcined antimony is ſaid by Boerhaave to be violently emetic. Experience has ſhown that the glaſs is ſo, inſomuch as to be unſafe for internal uſe. At preſent it is chiefly employed in forming ſome other antimonial preparations, particularly the cerated glaſs of antimony, the next article to be mentioned; and the wine of antimony, afterwards to be treated of under the head of wines. It is alſo not unfrequently employed in the formation of emetic tartar; and it was directed for that purpoſe in the laſt edition of the Edinburgh pharmacopœia, being perhaps even ſuperior to the crocus of antimony.

Cerated glaſs of antimony. E.

267 Take of yellow wax, a dram; glaſs of antimony, reduced into powder, an ounce. Melt the wax in an iron veſſel, and throw into it the powdered glaſs: keep the mixture over a gentle fire for half an hour, continually ſtirring it: then pour it out on paper, and when cold grind it into powder.

The glaſs melts in the wax with a very gentle heat: after it has been about twenty minutes on the fire, it begins to change its colour, and in ten more comes near to that of Scotch ſnuff; which is a mark of its being ſufficiently prepared; the quantity ſet down above loſes about one dram of its weight in the proceſs.

This medicine was for ſome time much eſteemed in dyſenteries: ſeveral inſtances of its good effects in thoſe caſes may be ſeen in the fifth volume of the Edinburgh Eſſays, from which the above remarks on the preparations are taken. The doſe is from two or three grains to twenty, according to the age and ſtrength of the patient. In its operation, it makes ſome perſons ſick and vomit; it purges almoſt every one: though it has ſometimes effected a cure without occaſioning any evacuation or ſickneſs. It is now, however, much leſs uſed than formerly.

Mr Geoffroy gives two pretty ſingular preparations of glaſs of antimony, which ſeem to have ſome affinity with this. One is made by digeſting the glaſs, very finely levigated, with a ſolution of maſtich made in ſpirit of wine, for three or four days, now and then ſhaking the mixture; and at laſt evaporating the ſpirit ſo as to leave the maſtich and glaſs perfectly mixed. Glaſs of antimony thus prepared, is ſaid not to prove emetic, but to act merely as a cathartic, and that not of the violent kind. A preparation like this was firſt publiſhed by Hartman, under the name of *Chyliſta*.

The other preparation is made by burning ſpirit of wine on the glaſs three or four times, the powder being every time exquiſitely rubbed upon a marble. The doſe of this medicine is from ten grains to 20 or 30: it is ſaid to operate mildly both upwards and downwards and ſometimes to prove ſudorific.

Ceruſe of antimony. Brun.

268 Take of regulus of antimony, one part; nitre, three parts. Deflagrate them together in the manner directed for the calcined antimony.

The reſult of this proceſs and that formerly directed for the calcined antimony are nearly the ſame.

It is not neceſſary to uſe ſo much nitre here as when antimony itſelf is employed: for the ſulphur which the crude mineral contains, and which requires for its diſſipation nearly an equal weight of nitre to the antimony, is here already ſeparated. Two parts of nitre to one of the regulus are ſufficient. It is better, however, to have an over, than an under, proportion of nitre, leſt ſome parts of the regulus ſhould eſcape being ſufficiently calcined.

It may be proper to obſerve, that though crude antimony and the regulus yield the ſame calces, yet the ſalts ſeparated in waſhing the calces are very different. As crude antimony contains common ſulphur, the acid of the ſulphur unites with the alkaline baſis of the nitre, and the reſult is a neutral ſalt. As the regulus contains the phlogiſtic, or inflammable principle, but no ſulphur, the nitre is alkaliſed, as it would be by charcoal or ſuch like inflammable bodies, and is at the ſame time rendered more acrimonious than the common alkaline ſalts; probably owing to the calx abſorbing the air of the alkali. If only equal parts of the regulus and nitre be employed, and the fire kept up ſtrong for an hour or more, the ſalt will prove more cauſtic than even the potential cauſtic of the ſhops. But the cauſticity of the ſalt will ſtill be far greater, if, inſtead of the ſimple regulus of antimony, the martial regulus be uſed.

Kermes mineral. Suec.

269 Take of crude antimony, powdered, half a pound; fixed vegetable alkali, two pounds; boiling water, eight pounds. Boil them together in an iron pot for a quarter of an hour, continually ſtirring the mixture with an iron ſpatula, and filter as ſpeedily as poſſible while it is hot. The filtered liquor, ſet in cool places, will ſoon depoſite a powder, which muſt be repeatedly waſhed, firſt with cold and afterwards with warm water, until it be perfectly inſipid.

This medicine has of late been greatly eſteemed in France, eſpecially under the names of *Kermes mineral*, *pulvis Carthuſianus*, *poudre des Chartreaux*, &c. It was originally a preparation of Glauber, and for ſome time kept a great ſecret, till at length the French king purchaſed the preparation from M. de la Ligerie, for a conſiderable ſum, and communicated it to the public in the year 1720. In virtue, it is not different from the ſulphurs abovementioned; all of them owe their efficacy to a part of the regulus of the antimony, which the alkaline ſalt, by the mediation of the ſulphur, renders ſoluble in water.

Chemiſts are, however, divided in their opinions, with reſpect to the preciſe chemical condition of the reguline part in the preparations called *hepata of antimony*. Some have alleged that they contain not a particle of alkaline ſalt: it is at any rate certain, that the quantity and condition of the reguline part muſt vary according to the different proportions of the ingredients, the time of the precipitation, the greater or leſs degree of cauſticity of the alkali employed, and ſeveral other circumſtances. At beſt the whole of them are liable to the ſame uncertainty in their operation as the calces of antimony.

Panacea of antimony.

270 Take of antimony, ſix ounces; nitre, two ounces; common ſalt, an ounce and a half; charcoal, an ounce. Reduce them into a fine powder, and put the mixture into a red-hot crucible, by half a ſpoonful at a time, continuing the fire a quarter of an hour after the laſt injection: then either pour the matter into a cone, or let it cool in the crucible; which when cold muſt be broken to get it out. In the bottom will be found a quantity of regulus; above this a compact liver-coloured ſubſtance; and on the top a more ſpongy maſs: this laſt is to be reduced into powder, edulcorated with water, and dried, when it appears of a fine golden colour.

This preparation is ſuppoſed to have been the baſis of Lockyer's pills, which were formerly a celebrated purge. Ten grains of the powder, mixed with an ounce of white ſugar candy, and made up into a maſs with mucilage of gum tragacanth, may be divided into an hundred ſmall pills; of which one, two or three, taken at a time, are ſaid to work gently by ſtool and vomit. The compact liver-coloured ſubſtance, which lies immediately above the regulus, operates more ſeverely. This laſt appears to be nearly of the ſame nature with the crocus of antimony, and the former with the golden ſulphur.

CHAP. XI. *Preparations of ſilver.*

Nitrated ſilver. L.

Take of ſilver, one ounce; diluted nitrous acid, four ounces. Diſſolve the ſilver in the nitrous acid, in a glaſs veſſel, over a ſand-heat; then evaporate with an heat gently raiſed: afterwards melt the reſiduum in a crucible, that it may be poured into proper forms, carefully avoiding too great a heat. 271

Salt of ſilver, commonly called *lunar cauſtic.* E.

Take of pureſt ſilver, beat into plates, and cut in pieces, four ounces; weak nitrous acid, eight ounces; pureſt water, four ounces. Diſſolve the ſilver in a phial with a gentle heat, and evaporate the ſolution to dryneſs. Then put the maſs into a large crucible, and apply the heat, at firſt gently, but augment it by degrees till the maſs flows like oil; then pour it into iron moulds, previouſly heated, and greaſed with tallow. 272

Theſe proceſſes do not differ in any material particular. But the name of *nitrated ſilver* is preferable to the more indefinite one of *ſalt of ſilver*.

Strong ſpirit of nitre will diſſolve ſomewhat more than half its weight of pure ſilver; and the weaker of the aquæfortes formerly deſcribed, proportionally leſs, according to their quantity of pure nitrous acid. Sometimes this ſpirit contains a portion of the vitriolic or marine acids; which, however minute, renders it unfit for diſſolving this metal, and ſhould therefore be carefully ſeparated before the ſolution be attempted. The method which the refiners employ for examining the purity of their aquafortis, and purifying it if neceſſary, is to let fall into it a few drops of a perfect ſolution of ſilver already made: if the liquor remain clear, and grow not in the leaſt turbid or whitiſh, it is fit for uſe; otherwiſe they add a ſmall quantity more of the ſolution, which immediately turns the whole of a milky white colour; the mixture being then ſuffered to reſt for ſome time, depoſites a white ſediment; from which it is warily decanted, examined afreſh, and, if need be, farther purified by a freſh addition of the ſolution.

The ſilver beat into thin plates, as directed in the ſecond of the above proceſſes, needs not be cut in pieces: the ſolution will go on the more ſpeedily if they are only turned round into ſpiral circumvolutions, ſo as to be conveniently got into the glaſs, with care that the ſeveral ſurfaces do not touch each other. By this management, a greater extent of the ſurface is expoſed to the action of the menſtruum, than when the plates are cut in pieces and laid above each other. Good aquafortis will diſſolve about half its weight of ſilver; and it is not adviſeable to uſe a greater quantity of the menſtruum than is ſufficient for effecting the ſolution, for all the ſurplus muſt be evaporated in the ſubſequent fuſion.

It is neceſſary to employ very pure water: for if hard water were uſed in this proceſs, the nitrous acid would forſake a part of the ſilver to join with the calcareous earth of the imperfect nitrous ſelenite; but a part of the ſilver would be precipitated.

The crucible ought to be large enough to hold five or ſix times the quantity of the dry matter; for it bubbles and ſwells up greatly, and is conſequently apt to run over. During this time, alſo, little drops are now and then ſpurted up, whoſe cauſticity is increaſed by their heat, againſt which the operator ought therefore to be on his guard. The fire muſt be kept moderate till this ebullition ceaſes, and till the matter becomes conſiſtent in the heat that made it boil before; then quickly increaſe the fire till the matter flows thin at the bottom like oil, when it is to be immediately poured into the mould, without waiting till the fumes ceaſe to appear; for when this happens, the preparation proves not only too thick to run freely into the mould, but likewiſe leſs corroſive than it is expected to be.

For want of a proper iron mould, one may be formed of tempered tobacco-pipe clay, not too moiſt, by making in a lump of it, with a ſmooth ſtick firſt greaſed, as many holes as there is occaſion for: pour the liquid matter into theſe cavities, and when congealed, take it out by breaking the mould. Each piece is to be wiped clean from the greaſe, and wrapt up in ſoft dry paper, not only to keep the air from acting on them, but likewiſe to prevent their corroding or diſcolouring the fingers in handling.

This preparation is a ſtrong cauſtic; and is frequently employed as ſuch for conſuming warts and other fleſhy excreſcences, keeping down fungous fleſh in wounds or ulcers, and other ſimilar uſes. It is rarely applied where a deep eſchar is required, as in the laying open of impoſthumations and tumours; for the quantity neceſſary for theſe purpoſes, liquefying by the moiſture of the ſkin, ſpreads beyond the limits, within which it is intended to operate.

The lunar pills.

273 Diſſolve pure ſilver in aquafortis, as in the foregoing proceſs; and after due evaporation, ſet the liquor aſide to cryſtallize. Let the cryſtals be again diſſolved in common water, and mixed with a ſolution of equal their weight of nitre. Evaporate this mixture to dryneſs, and continue the exſiccation with a gentle heat, keeping the matter conſtantly ſtirring till no more fumes ariſe.

Here it is neceſſary to continue the fire till the fumes entirely ceaſe, as more of the acid is required to be diſſipated than in the preceding proceſs. The preparation is, nevertheleſs, in taſte very ſharp, intenſely bitter and nauſeous: applied to ulcers, it acts as a cauſtic, but it is much milder than the foregoing. Boerhaave, Boyle, and others, commend it highly in hydropic caſes. The former aſſures us, that two grains of it made into a pill with crumb of bread and a little ſugar, and taken on an empty ſtomach (ſome warm water, ſweetened with honey, being drank immediately after), purge gently without griping, and bring away a large quantity of water, almoſt without the patient's perceiving it: that it kills worms, and cures many inveterate ulcerous diſorders. He nevertheleſs cautions againſt uſing it too freely, or in too large a doſe; and obſerves, that it always proves corroſive and weakening, eſpecially to the ſtomach

CHAP. XII. *Preparations of iron.*

Ammoniacal iron. L.

Take of iron filings, one pound; ſal ammoniac, two pounds. Mix, and ſublime. What remains at the bottom of the veſſel mix by rubbing together with the ſublimed matter, and again ſublime. 274

Martial flowers, commonly called *Ens Veneris*. E.

Take of colcothar of martial vitriol, waſhed and well dried; ſal ammoniac, equal weights. Having mixed them well, ſublime. 275

Though the mode of preparation directed by the two colleges is here different, yet the preparation is fundamentally the ſame; and it is perhaps difficult to ſay which mode of preparation is to be preferred as the eaſieſt and beſt.

The name of *ens veneris* has by ſome been very improperly applied to this preparation, as it contains not a particle of copper. The proper *ens veneris* is prepared from the blue vitriol; but, as we ſhall ſoon ſee, is often not materially different from the *martial flowers*.

The ſucceſs of this proceſs depends principally on the fire being haſtily raiſed, that the ſal ammoniac may not ſublime before the heat be ſufficient to enable it to carry up a ſufficient quantity of the iron. Hence glaſs veſſels are not ſo proper as earthen or iron ones: for when the former are uſed, the fire cannot be raiſed quickly enough, without endangering the breaking of them. The moſt convenient veſſel is an iron pot: to which may be luted an inverted earthen jar, having a ſmall hole in its bottom to ſuffer the elaſtic vapours, which ariſe during the operation, to eſcape. It is of advantage to thoroughly mix the ingredients together, moiſten them with a little water, and then gently dry them; and to repeat the pulverization, humectation, and exſiccation, two or three times, or oftener. If this method be followed, the ſal ammoniac may be increaſed to two or three times the quantity of the iron, or farther; and a ſingle ſublimation will often be ſufficient to raiſe flowers of a very deep orange colour.

This preparation is ſuppoſed to be highly aperient and attenuating; though no otherwiſe ſo than the reſt of the chalybeates, or at moſt only by virtue of the ſaline matter joined to the iron. It has been found of ſervice in hyſterical and hypochondriacal caſes, and in diſtempers proceeding from a laxity and weakneſs of the ſolids, as the rickets. It may be conveniently taken in the form of a bolus, from two or three grains to ten; it is nauſeous in a liquid form (unleſs in ſpirituous tincture); and occaſions pills to ſwell and crumble, except ſuch as are made of the gums.

Ruſt of iron L.

276 Take of iron-filings, one pound; expoſe them to the air, often moiſtening them with water, until they be corroded into ruſt; then powder them in an iron mortar, and waſh off with diſtilled water the very fine powder. But the remainder, which cannot by moderate rubbing be reduced into a powder capable of being eaſily waſhed off, muſt be moiſtened, expoſed to the air for a longer time, and again powdered and waſhed as before. Let the waſhed powder be dried.

Ruſt of iron, commonly called *prepared iron fillings*. E.

Set purified filings of iron in a moiſt place, that they may turn to ruſt, which is to be ground into an impalpable powder.

The cleanſing of iron filings by means of a magnet is very tedious, and does not anſwer ſo well as might be expected: for if they be ruſty, they will not be attracted by it, or not ſufficiently; nor will they by this means be entirely freed from braſs, copper, or other metallic ſubſtances which may adhere to them. It appears from the experiments of Henckel, that of iron be mixed by fuſion with even its own weight if any of the other metals, regulus of antimony alone excepted, the compound will be vigorouſly attracted by the loadſtone. The ruſt of iron is to be procured at a moderate rate from the dealers in iron, free from any impurities, except ſuch as may be waſhed off by water.

The ruſt of iron is preferable as a medicine to the calces or croci, made by a ſtrong fire. Hoffman relates that he has frequently given it with remarkable ſucceſs in obſtinate chlorotic caſes accompanied with exceſſive headachs and other violent ſymptoms; and that he uſually joined with it pimpinella, arum root, and ſalt of tartar, with a little cinnamon and ſugar. The doſe is from four or five grains to twenty or thirty. Some have gone as far as a dram: but all the preparations of this metal anſwer beſt in ſmall doſes, which ſhould rather be often repeated than enlarged.

Tartarized iron. L.

277 Take of filings of iron, one pound, powdered cryſtals of tartar, two pounds. Mix them with diſtilled water into a thick paſte. Expoſe it to the air in an open earthen veſſel for eight days; then grind the matter, dried in a bath of ſand, to a very fine powder.

This is an uſeful preparation of iron in which that metal is chiefly brought to a ſaline ſtate by means of the cream of tartar. It has now for the firſt time a place in the London pharmacopœia; but it had before been introduced into ſome of the foreign ones, particularly the pharmacopœia Genevenſis under the title of *mars tartariſatus*; and indeed it is almoſt preciſely the ſame with the *mars ſolubilis* of the old editions of the Edinburgh pharmacopœia.

Vitriolated iron. L.

Take of filings of iron, vitriolic acid, each eight ounces; diſtilled water, three pints. Mix them in a glaſs veſſel, and when the efferveſcence has ceaſed, place the mixture for ſome time upon hot ſand; then pour off the liquor, ſtraining it through paper: and after due exhalation ſet it aſide to cryſtallize. 278

Vitriol of iron, or *ſalt of ſteel*. E.

Take of purified filings of iron, ſix ounces; vitriolic acid, eight ounces; water, two pounds and a half. Mix them; and when the efferveſcence ceaſes, let the mixture ſtand for ſome time upon warm ſand; then ſtrain the liquor through paper, and after due evaporation ſet it aſide to cryſtallize. 279

During the diſſolution of the iron an elaſtic vapour riſes, which on the approach of flame catches fire and explodes, ſo as ſometimes to burſt the veſſel. To this particular therefore the operator ought to have due regard.

This vapour is alſo noxious to animal life. It is the inflammable air of Dr Prieſtley.

The chemiſts are ſeldom at the trouble of preparing this ſalt according to the directions above given; but in its ſtead ſubſtitute common green vitriol, purified by ſolution in water, filtration, and cryſtallization, The only difference between the two is, that the common vitriol contains ſomewhat more metal in proportion to the acid; and hence in keeping, its green colour is much ſooner debaſed by a ruſty browniſh caſt. The ſuperfluous quantity of metal may be eaſily ſeparated by ſuffering the ſolution of the vitriol to ſtand for ſome time in a cold place, when a browniſh yellow ochery ſediment will fall to the bottom; or it may be perfectly diſſolved, and kept ſuſpended by a ſuitable addition of oil of vitriol. If the vitriol be ſuſpected to contain any cupreous matter, which the common Engliſh vitriol ſeldom does, though almoſt all the foreign vitriols do, the addition of ſome bright iron wire to the ſolution will both diſcover, and effectually ſeparate, that metal: for the acid quits the copper to diſſolve a proportionable quantity of the iron; and the copper, in its ſeparation from the acid, adheres to the undiſſolved iron, and forms a ſkin of a true copper colour on its ſurface. Even a vitriol of pure copper may on this principle, be converted into a ſmall vitriol of iron.

But though the vitriolic acid appears in this operation to have ſo much ſtronger a diſpoſition to unite with iron than with copper, that it totally rejects the latter when the former is preſented to it; the operator may nevertheleſs give a dangerous impregnation of copper to the pureſt and moſt ſaturated ſolution of iron in the vitriolic acid, by the uſe of copper veſſels. If the martial ſolution be boiled in a copper veſſel, it never fails to diſſolve a part of the copper, diſtinguiſhable by its giving a cupreous ſtain to a piece of bright iron immerſed in it. By the addition of the iron, the copper is ſeparated; by boiling it again without iron, more of the copper is diſſolved; and this may in like manner be ſeparated by adding more iron.

The ſalt of ſteel is one of the moſt efficacious preparations of this metal; and not unfrequently made uſe of in cachectic and chlorotic caſes for exciting the uterine purgations, ſtrengthening the tone of the viſcera, and deſtroying worms. It may be conveniently taken in a liquid form, largely diluted with water: Boerhaave directs it to be diſſolved in an hundred times its weight of water, and the ſolution to be taken in the doſe of twelve ounces on an empty ſtomach, walking gently after it. Thus managed, he ſays, it opens the body, proves diuretic, kills and expels worms, tinges the excrements black, or forms them into a matter like clay, ſtrengthens the fibres, and thus cures many different diſtempers. The quantity of vitriol in the above doſe of the ſolution is fifty-ſeven grains and a half; but in common practice, ſuch large doſes of this ſtrong chalybeate are never ventured on. Four or five grains, and in many caſes half a grain, are ſufficient for the intention in which chalybeate medicines are given. Very dilute ſolutions, as that of a grain of the ſalt in a pint of water, may be uſed as ſuccedanea to the natural chalybeate waters, and will in many caſes produce ſimilar effects.

Colcothar of vitriol. E.

280 Let calcined vitriol be urged with a violent fire till it becomes of a very red colour.

In this preparation, the iron which had been brought to a ſaline ſtate by means of the acid of vitriol, is again deprived of that acid by the action of fire. It may be conſidered therefore as differing in nothing from the reſiduum which remains in the retort, when vitriolic acid is diſtilled from martial vitriol. The colcothar is very early employed by itſelf for medical purpoſes; but it is uſed in the preparation of ſome other chalybeates, particularly the martial flowers, when prepared according to the method directed by the Edinburgh college.

Martial æthiops. Gen.

281 Take of the ruſt of iron, as much as you pleaſe: olive oil, a ſufficient quantity to make it into a paſte. Let this be diſtilled in a retort by a ſtrong fire to dryneſs. Keep the reſiduum reduced to a fine powder in a cloſe veſſel.

An article under this name had formerly a place in ſome of the old pharmacopœias, and is deſcribed by Lemery in the Memoirs of the French Academy; but it was formed by a tedious proceſs, continued for ſeveral months by the aid of water. Here the proceſs is much ſhorter, and is ſuppoſed to give nearly the ſame product. Some have recommended it, on the ſuppoſition that the iron has here obtained in a very ſubtile ſtate; but it is not in general ſuppoſed to have any advantage over the other more common chalybeates.

Open and aſtringent crocus of iron.

282 Theſe are prepared by mixing iron filings with twice their weight of powdered ſulphur, deflagrating in a red-hot crucible; and in the one caſe keeping the preparation over the fire till it aſſumes a red colour: in the other, by reverberating it for a long time in the moſt extreme degree of heat.

Preparations under theſe names ſtill retain a place in ſome of the foreign pharmacopœias, but they are variouſly prepared. They may, however, be conſidered as poſſeſſing the ſame medical powers: and although the preparations mentioned above probably differ from each other in their virtues, yet that difference is not of ſuch a nature as is imported by the titles by which they are uſually diſtinguiſhed. For all the preparations of iron probably act by an aſtringent quality; and that which is above denominated the *aſtringent crocus* has probably leaſt effect in that way. At one period, theſe preparations were not unfrequently in uſe; and they were given in the form of bolus, electuary, or pill, from a few grains to a ſcruple; but among us they are at preſent ſo little in uſe as to have no place in our pharmacopœias.

CHAP. XIII. *Preparations of Mercury.*

WE have already treated of mercury in various parts of our work as we found occaſion, and what we have already diſcuſſed it is unneceſſary to repeat. See MERCURY, CHEMISTRY-*Index*, MATERIA MEDICA, p. 653. METALLURGY, and QUICKSILVER. On the whole, it appears evident that there is no article which has been employed for medical purpoſes in a greater variety of forms. The colleges of London and Edinburgh have admitted into their pharmacopœias only a few of theſe; but from the ſelection they have made, there is reaſon to believe that every uſeful purpoſe for which mercury has been employed may be anſwered; and theſe purpoſes are both numerous and conſiderable. For it is at leaſt very generally allowed among intelligent practitioners, that there are few articles kept in the ſhops of our apothecaries which can be conſidered as ſo extenſively uſeful. 283

Mercury or quickſilver, in its crude ſtate, is a ponderous metallic fluid, totally volatile in a ſtrong fire, and calcinable by a weaker one (though very difficultly) into a red powdery ſubſtance. It diſſolves in the nitrous acid, is corroded by the vitriolic, but not acted on by the marine in its liquid ſtate: it nevertheleſs may be combined with this laſt ſkillfully applied in the form of fume. Quickſilver unites by trituration with earthy, unctuous, reſinous, and other ſimilar ſubſtances, ſo as to loſe its fluidity: triturated with ſulphur, it forms a black maſs, which by ſublimation changes into a beautiful red one.

For the general virtues of the mercurial preparations, ſee ſome of the articles above referred to, and MEDICINE. Here we ſhall only obſerve, that while in certain circumſtances they act as ſtimulants, and even as corroſives, to the parts to which they are applied; under a different management, when introduced into the habit, they ſeem to forward circulation through even the ſmalleſt and moſt remote veſſels of the body; and may be ſo managed as to promote all the excretions. But while they thus operate as a powerful ſtimulus to the ſanguiferous, and probably alſo to the lymphatic ſyſtem, they ſeem to exert but little influence on the nervous ſyſtem. By this means they prove eminently ſerviceable in ſome inveterate chronical diſorders, proceeding from obſtinate obſtructions of the glands. Crude mercury has no effect this way. Reſolved into fume, or divided into minute particles, and prevented from reuniting by the interpoſition of other ſubſtances, it operates very powerfully, unleſs the dividing body be ſulphur, which reſtrains its action. Combined with a ſmall quantity of the mineral acids, it acts effectually, though in general mildly; with a larger it proves violently corroſive.

Purified quickſilver. L.

284 Take of quickſilver, filings of iron, each four pounds. Rub them together, and diſtil from an iron veſſel.

As in the diſtillation of quickſilver glaſs retorts are very liable to be broken, an iron one is here with propriety directed: and by the addition of the filings of iron, matters which might otherwiſe ariſe with the quickſilver will be more apt to be detained in the retor. But ſtill this happens ſo readily, even merely with that degree of heat which is neceſſary to elevate the mercury, that it is very doubtful whether much advantage be obtained from this proceſs; and accordingly it has now no place in the pharmacopœia of the Edinburgh college.

Acetated quickſilver. L.

285 Take of purified quickſilver, one pound; diluted nitrous acid, two pounds; water of kali, as much as is ſufficient. Mix the quickſilver with the acid in a glaſs veſſel, and diſſolve it in a ſand-bath; then drop in by degrees the water of kali, that the calx of quickſilver may be precipitated; waſh this calx with plenty of diſtilled water, and dry it with a gentle heat. Theſe things being done, take of the calx of quickſilver, above deſcribed, one pound; acetous acid, as much as is neceſſary to diſſolve the calx. Mix them in a glaſs veſſel; and the ſolution being completed, ſtrain it through paper; then evaporate it till a pellicle appears; and ſet it aſide to cryſtallize. Keep theſe cryſtals in a veſſel cloſe ſtopped.

Of all the ſaline preparations of mercury, it has long been the opinion of the beſt chemiſts, that thoſe in which it was brought to a ſaline form, by means of acetous acid, would be the mildeſt; and ſuch a preparation was conjectured to be the baſis of a celebrated pill, prepared and ſold by Mr Keyſer. It was, however, found to be a very difficult matter to imitate his pill, or to abtain a combination of mercury with the acetous acid: but not long ſince, the proceſs for preparing theſe pills was publiſhed by authority at Paris after being purchaſed by the French king. The proceſs here deſcribed though in ſome particulars much leſs operoſe than that of Mr Keyſer, yet nearly approaches to it, and furniſhes us with the mildeſt of the ſaline mercurials.

Calcined quickſilver. L.

286 Take of purified quickſilver, one pound; expoſe the quickſilver in a flat-bottomed glaſs cucurbit, to an heat of about 600 degrees in a ſand-bath, till it becomes a red powder.

This preparation may now be made in a ſhorter time than by the proceſs formerly directed in the London pharmacopœia, which in general required ſeveral months; for the acceſs of air, without which calcination cannot be performed, was then very much excluded. Still, however, the proceſs is a tedious one, and might perhaps be improved. A veſſel might be ſo contrived, as to occaſion a continual flux of air over the ſurface of the mercury.

This preparation is highly eſteemed in venereal caſes, and ſuppoſed to be the moſt efficacious and certain of all the mercurials. It may be advantageouſly given in conjunction with opiates: a bolus or pill, containing from half a grain to two grains of this calx, and a quarter or half a grain or more of opium, with the addition of ſome warm aromatic ingredient, may be taken every night. Thus managed it acts mildly, though powerfully, as an alterative and diaphoretic: given by itſelf in larger doſes, as four or five grains, it proves a rough emetic and cathartic.

Aſh-coloured powder of mercury. E.

287 Take of quickſilver, weak nitrous acid, equal weights. Mix them ſo as to diſſolve the quickſilver; dilute the ſolution with pure water, and and ſpirit of ſal ammoniac as much as is ſufficient to ſeparate the mercury perfectly from the acid; then waſh the powder in pure water, and dry it.

In this proceſs the mercurial nitre is decompoſed; the precipitate, therefore, is a calx of mercury, and the clear liquor a ſolution of nitrous ammoniac. From the great attraction which the nitrous acid has for phlogiſton, or from its ready diſpoſition to part with pure air, the precipitates of mercury from its ſolution in this acid are more completely in the ſtate of a calx than thoſe from any other menſtruum. There are, however, ſeveral niceties to be obſerved in conducting this proceſs. If we employ too ſmall a proportion of acid, and aſſiſt the ſolution by heat, the ſolution will contain an exceſs of calx capable of being ſeparated by the water; and the whole precipitate from ſuch a ſolution would be of a white colour. If, on the other hand, we employ too large a proportion of acid, the mercury is then ſo far calcined as to be capable of being diſſolved by the volatile alkali; and this might happen in proportion as the quantity ſhould be ſuperabundant to the neutralization of the acid. The uſe of the water is to diſſolve the nitrous ammoniac as faſt as it is formed, and thereby prevent it from falling down and mixing with the precipitate. It is neceſſary to employ the pureſt water. If ſuch be uſed as contains a nitrous ſelenite, not only a part of the mercury may be precipitated by the baſe of the ſelenite, but this laſt might alſo be depoſited by the ſucceeding addition of the alkali.

The aſh-coloured powder of mercury has of late years been much celebrated for the cure of venereal affections. It was firſt propoſed by Dr Saunders to be made by precipitating the mercury from calomel, as the beſt ſubſtitute for the tedious and expenſive proceſs of the precipitate *per ſe*, and of the grey powder produced by triture with gum arabic. From the teſtimony of Dr Home, and ſeveral other practitioners, we have no doubt of its being a very valuable preparation of mercury. It may be given in a bolus or wafer, in the quantity of from one ſix or ſeven grains: the doſe being gradually increaſed according to its effects upon the perſon.

Quickſilver with chalk. L.

288 Take of purified quickſilver, three ounces; powdered chalk, five ounces. Rub them together until the globules diſappear.

In this preparation, as well as the two former, we have alſo the mercury in a ſtate of calx; but in place of being brought to that ſtate by the aid of fire or of acids, what may here be conſidered as calcination is effected by triture.

This preparation, had no place in the former editions of the London pharmacopœia. A preparation nearly ſimilar indeed, under the title of *mercurius alkaliſatus*, in which crabs eyes were employed inſtead of chalk, had a place in the old editions of the Edinburgh pharmacopœia, but was rejected from the edition of 1744, and has never again been reſtored. One reaſon for rejecting it was its being liable to groſs abuſe in the preparation, by the addition of ſome intermedium, facilitating the union of mercury with the abſorbent earth, but diminiſhing or altering its power. The preſent preparation is liable to the ſame objection. Some, however, are of opinion, that when duly prepared, it is an uſeful alterative. But there can be little doubt, that the abſorbent earth, by deſtroying acid in the alimentary canal, will diminiſh the activity of the mercurial calx.

Muriated quickſilver. L.

289 Take of purified quickſilver, vitriolic acid, each two pounds; dried ſea-ſalt, three pounds and an half. Mix the quickſilver with the acid in a glaſs veſſel, and boil in a ſand heat until the matter be dried. Mix it, when cold, with the ſea-ſalt, in a glaſs veſſel; then ſublime in a glaſs cucurbit, with a heat gradually raiſed. Laſtly, let the ſublimed matter be ſeparated from the ſcoriæ.

Sublimate corroſive mercury. E.

290 Take of quickſilver, weak nitrous acid, each four ounces; calcined ſea-ſalt, calcined vitriol, of each five ounces. Diſſolve the quickſilver in the nitrous acid, and evaporate the ſolution to a white and thoroughly dry maſs; then add the ſea ſalt and vitriol. Having ground and mixed them well together, put the whole into a phial, one half of which they ought to fill; then ſublime in ſand, firſt with a gentle, but afterwards with an increaſed heat.

The ſublimate prepared by either of theſe methods is the ſame, they both conſiſt only of mercury and the acid of the ſea-ſalt united together. In the proceſs directed by the Edinburgh college, the materials being mixed and expoſed to the fire, firſt the vitriol parts with its acid, which, diſlodging thoſe of the nitre and marine ſalt, takes their place. The marine acid, reſolved into fume and aſſiſted by the nitrous, diſſolves the mercury, now alſo ſtrongly heated. This acid, though it very difficultly acts on mercury, yet when thus once united with it, is more ſtrongly retained thereby than any other acid. The nitrous ſpirit therefore, having nothing to retain it (for its own baſis, and that of the ſea-ſalt are both occupied by the vitriolic, and that which the vitriolic forſook to unite with theſe, is now ſcarcely combinable with it), ariſes; leaving the mercury and marine acid to ſublime together when the heat ſhall be ſtrong enough to elevate them. Some ſmall portion of the marine ſpirit ariſes along with the nitrous: and hence this compound acid has been uſually employed inſtead of the *compound aquafortis*, to which it is ſimilar, for making the red corroſive.

It appears therefore that the vitriol, and the baſes of the nitre and ſea-ſalt, are of no farther uſe in this proceſs, than as convenient intermediums for facilitating the union of the mercury with the marine acids. They likewiſe ſerve to afford a ſupport for the ſublimate to reſt upon, which thus aſſumes the form of a placenta or cake.

This proceſs, however, now adopted by the London college, is a better and more ſimple one. There the mercury corroded by the vitriolic acid into a white maſs, is mixed with about an equal quantity of ſea-ſalt, and ſet to ſublime; the vitriolic acid quits the mercury to unite with the baſis of the ſea ſalt; and the acid of the ſea-ſalt, now ſet at liberty, unites with the mercury, and ſublimes with it into the compound required. The diſcovery of this method is generally attributed to Boulduc; though it is found alſo in Kunckel's *Laboratorium Chymicum*. When the proceſs is conducted in this way, the reſiduous matter is a pure Glauber's ſalt, and the ſublimate is alſo free of ferruginous matter; a greater or leſs quantity of which is very generally carried up along with the mercury when vitriol of iron is employed. Boulduc's method has therefore the advantage in this, that the proportion of mercury in a given quantity of ſublimate muſt be leſs liable to variation.

If the mercury be corroded by the nitrous acid inſtead of the vitriolic, the event will be the ſame; that acid equally quitting the mercury, and ſetting looſe the marine; and the ſublimate made by this method is the ſame with the foregoing; but as the quantity of fixed matter is ſmaller, it more difficultly aſſumes the form of a cake. It requires indeed ſome ſkill in the operator to give it this appearance when either proceſs is followed. When large quantities are made, this form may be eaſily obtained, by placing the matraſs no deeper in the ſand than the ſurface of the matter contained in it; and removing a little of the ſand from the ſides of the glaſs, as ſoon as the flowers begin to appear in the neck; when the heat ſhould likewiſe be ſomewhat lowered, and not at all raiſed during the whole proceſs. The ſublimation is known to be completed by the edges of the cryſtalline cake which will form on the ſurface of the caput mortuum, appearing ſmooth and even, and a little removed from it.

Our apothecaries rarely, and few even of the chemiſts, attempt the making of this preparation themſelves; greateſt part of what is uſed among us comes from Venice and Holland. This foreign ſublimate has been reported to be adulterated with arſenic. Some affirm, that this dangerous fraud may be diſcovered by the ſublimate turning black on being moiſtened with alkaline ley; which by others is denied. As this point ſeemed of ſome importance to be determined, ſundry experiments have been made with this view, which prove the inſufficiency of alkalis for diſcovering arſenic. Alkaline ley, poured into a ſolution of pure arſenic, and into a mixture of the two ſolutions in different proportions, produced no blackneſs in any: and though the pure ſublimate, and the mixtures of it with arſenic, exhibited ſome differences in theſe trials, yet theſe differences were neither ſo conſtant nor ſo ſtrongly marked as to be laid down univerſally for criteria of the preſence or abſence of arſenic; different ſpecimens of ſublimate, known to be pure, have been found to differ conſiderably in this reſpect; probably from their holding a little more or leſs mercury in proportion to the acid, or from their retaining ſome ſmall portion of thoſe acids which were employed in the preparation as intermedia.

Some chemiſts deny the practicability of this adulteration. There is a proceſs common in books of chemiſtry, wherein ſublimate and arſenic being mixed together, and ſet to ſublime, do not ariſe in one maſs, or yield any thing ſimilar to the preparation here intended: the arſenic abſorbs the acid of the ſublimate, and is reduced thereby into a liquid or butyraceous conſiſtence; while the mercury thus freed from the acid diſtils in its fluid form: if the quantity of arſenic be inſufficient to decompound the whole of the ſublimate, the remainder of the ſublimate concretes diſtinct from the arſenical butter. From whence they conclude, that arſenic and ſublimate cannot be united together into a cryſtalline cake, the form in which this preparation is brought to us.

The above experiment is not altogether deciſive; for though arſenic and ſulphur do not aſſume the required form by the common proceſs, it is poſſible they may by ſome other management. It will therefore be proper to point out means for the ſatisfaction of thoſe who may be deſirous of convincing themſelves of the genuineneſs of this important preparation. Let ſome of the ſublimate, powdered in a glaſs mortar, be well mixed with twice its weight of black flux, and a little filing or ſhavings of iron; put the mixture into a crucible capable of holding four or five times as much; give a gradual fire till the ebullition ceaſes, and then haſtily increaſe it to a white heat. If no fumes of a garlic ſmell can be perceived during the proceſs, and if the particles of iron retain their form without any of them being melted, we may be ſure that the mixture contained no arſenic.

Sublimate is a moſt violent corroſive, ſoon corrupting and deſtroying all the parts of the body it touches. A ſolution of it in water, in the proportion of about a dram to a quart, is uſed for keeping down proud fleſh, and cleanſing foul ulcers; and a more diluted ſolution as a coſmetic, and for deſtroying cutaneous inſects. But a great deal of caution is requiſite even in theſe external uſes of it.

Some have neverthleſs ventured to give it internally, in the doſe of one-tenth or one-eighth of a grain. Boerhaave relates, that if a grain of it be diſſolved in an ounce or more of water, and a dram of this ſolution, ſweetened with ſyrup of violets, be taken twice or thrice a day, it will prove efficacious in many diſtempers though incurable; but he particularly cautions us not to venture upon it, unleſs the method of managing it be well known.

Sublimate diſſolved in vinous ſpirit has of late been given internally in larger doſes; from a quarter of a grain to half a grain. This method of uſing it was brought into repute by Baron Van Swieten at Vienna, eſpecially for venereal maladies; and ſeveral trials of it have alſo been made in this kingdom with ſucceſs. Eight grains of the ſublimate are diſſolved in ſixteen ounces of rectified ſpirit of wine or proof-ſpirit; the rectified ſpirit diſſolves it more perfectly, and ſeems to make the medicine milder in its operation than the proof-ſpirit of the original preſcription of Van Swieten. Of this ſolution from one to two ſpoonfuls, that is, from half an ounce to an ounce, are given twice a-day, and continued till all the ſymptoms are removed; obſerving to uſe a low diet, with plentiful dilution, otherwiſe the ſublimate is apt to purge, and gripe ſeverely. It generally purges more or leſs at the beginning, but afterwards ſeems to operate chiefly by urine and perſpiration.

Sublimate conſiſts of mercury united with a large quantity of marine acid. There are two general methods of deſtroying its corroſive quality, and rendering it mild: the one is, combining with it as much freſh mercury as the acid is capable of taking up; and the other by ſeparating a part of the acid by means of alkaline ſalts and earths. On the firſt principle ſweet mercury is formed; on the latter, white precipitate. But before entering on theſe, it is proper to give the following formula.

Solution of corroſive ſublimate mercury. E.

Take of corroſive ſublimate mercury, ſix grains; ſal ammoniac, twelve grains. Diſſolve in a pound of diſtilled water. If hard water be uſed for this purpoſe, the ſolution ſuffers a kind of decompoſition from the nitrous ſelenite of the water. 291

The ſolution of corroſive ſublimate in water is very much aſſiſted by ſal ammoniac. There was a practice ſome years ago, of mixing up this ſolution with wheat flour into the conſiſtence of pills for internal uſe: and the quantity of ſublimate in each pill was eaſily aſcertained.

This ſolution may alſo be uſed for waſhing venereal and other ſores; but in many inſtances it will be found too acrid for that purpoſe, and will require to be weakened by the addition of a portion of water.

Calomel. L.

Take of muriated quickſilver, one pound; purified quickſilver, nine ounces. Rub them together till the globules diſappear, and then ſublime the maſs. In the ſame manner repeat the ſublimation four times. Afterwards rub the matter into a very fine powder, and waſh it by pouring on boiling diſtilled water. 292

Sweet mercury. E.

Take of corroſive mercury ſublimate reduced to a powder in a glaſs mortar, four ounces; pure quickſilver, three ounces and a half. Mix them well together, by long trituration in a glaſs or marble mortar until the quickſilver ceaſes to appear. Put the powder into an oblong phial, of ſuch a ſize that only one-third of it may be filled; and ſet the glaſs in ſand, that the maſs may ſublime. After the ſublimation, break the glaſs; and the red powder which is found in its bottom, with the whitiſh one that ſticks about the neck, being thrown away, let the white mercury be ſublimed again three or four times, and reduce it to a very fine powder. 393

The trituration of corroſive ſublimate with quickſilver is a very noxious operation: for it is almoſt impoſſible, by any care, to prevent the lighter particles of the former from riſing ſo as to affect the operator's eyes and mouth. It is nevertheleſs of the utmoſt conſequence, that the ingredients be perfectly united before the ſublimation is begun. It is neceſſary to pulverize the ſublimate before the mercury is added to it: but this may be ſafely performed with a little caution; eſpecially if during the pulverization the matter be now and then ſprinkled with a little ſpirit of wine: this addition does not at all impede the union of the ingredients, or prejudice the ſublimation: it will be convenient not to cloſe the top of the ſubliming veſſel with a cap of paper at firſt (as is uſually practiſed), but to defer this till the mixture begins to ſublime, that the ſpirit may eſcape.

The rationale of this proceſs deſerves particular attention; and the more ſo, as a miſtaken theory herein has been productive of ſeveral errors with regard to the operation of mercurials in general. It is ſuppoſed, that the *dulcification*, as it is called, of the corroſive mercury is owing to the ſpiculæ or ſharp points, on which its corroſiveneſs depends, being broken and worn off by the frequent ſublimations. If this opinion were juſt, the corroſive would become mild, without any addition, barely by repeating the ſublimation; but this is contrary to all experience. The abatement of the corroſive quality of the ſublimate is entirely owing to the combination of as much freſh mercury as is capable of being united with it; and by whatever means this combination be effected, the preparation will be ſufficiently dulcified. Triture and digeſtion promote the union of the two, while ſublimation tends rather to diſunite them. The prudent operator, therefore, will not be ſolicitous about ſeparating ſuch mercurial globules as appear diſtinct after the firſt ſublimation: he will endeavour rather to combine them with the reſt, by repeating the triture and digeſtion.

The college of Wirtemberg require their ſweet mercury to be only twice ſublimed, and the Auguſtan but once; and Neumann propoſes making it directly by a ſingle ſublimation from the ingredients of the corroſive ſublimate, by only taking the quickſilver in a larger proportion.

Mr Selle of Berlin has lately propoſed a method of making ſweet mercury nearly ſimilar to that of Neumann. He directs, that to four ounces of pure quickſilver there ſhould be added as much ſtrong vitriolic acid. Theſe are to be mixed over a ſtrong fire till they become a ſolid hard maſs. This maſs is to be triturated in a ſtone mortar with two ounces and an half of quickſilver and four ounces and an half of dried common ſalt. And by a ſingle, or at moſt two, ſublimations, he aſſures us an excellent ſweet mercury is obtained.

If the medicine made after either of theſe methods ſhould prove in any degree acrid, water boiled on it for ſome time will diſſolve and ſeparate that part in which its acrimony conſiſts. The marks of the preparation being ſufficiently dulcified are, its being perfectly inſipid to the taſte, and indiſſoluble by long boiling in water. Whether the water in which it has been boiled has taken up any part of it may be known by dropping into the liquor a ley of any fixed alkaline ſalt, or any volatile alkaline ſpirit. If the decoction has any mercurial impregnation, it will grow turbid on this addition; if otherwiſe, it will continue limpid. But here care muſt be taken not to be deceived by any extraneous ſaline matter in the water itſelf. Moſt of the common ſpring waters turn milky on the addition of alkalis; and therefore, for experiments of this kind, diſtilled water or rain water ought to be uſed.

This name of *calomel*, though for a conſiderable time baniſhed from our beſt pharmacopœias, is again reſtored by the London college. But we cannot help thinking, that they might eaſily have invented a name better expreſſing the conſtituent parts and nature of the preparation.

Calomel, or ſweet mercury, may be conſidered as one of the moſt uſeful of the mercurial preparations; and it may be eſtimated as holding an intermediate place between the acetated quickſilver, one of the mildeſt of the ſaline preparations, and the muriated quickſilver, or corroſive ſublimate, one of the moſt acrid of them.

Mild muriated quickſilver. L.

Take purified quickſilver, diluted nitrous acid, of each half a pound. Mix in a glaſs veſſel, and ſet it aſide until the quickſilver be diſſolved. Let them boil, that the ſalt may be diſſolved. Pour out the boiling liquor into a glaſs veſſel into which another boiling liquor has been put before, conſiſting of ſea ſalt, four ounces; diſtilled water, eight pints. After a white powder has ſubſided to the bottom of the veſſel, let the liquor ſwimming at the top be poured off, and the remaining powder be waſhed till it becomes inſipid with frequent affuſions of hot water; then dried on blotting paper with a gentle heat. 294

This preparation had a place in former editions of the London and Edinburgh pharmacopœias under the name of *mercurius dulcis præcipitatus*. But the proceſs as now given is ſomewhat altered, being that of Mr Scheele of Sweden, who has recommended this as an eaſy and expeditious method of preparing ſweet mercury or calomel.

It appears from ſeveral teſts that this precipitate is equal in every reſpect to that prepared by the preceding proceſſes. It is leſs troubleſome and expenſive, and the operator is not expoſed to the noxious duſt ariſing from the triture of the quickſilver with the corroſive ſublimate, which neceſſarily happens by the common method. The powder is alſo finer than can be made from the common ſublimed ſweet mercury by any trituration whatever. The clear liquor ſtanding over the precipitate is a ſolution of cubic or rhomboidal nitre.

Sweet mercury, which may be conſidered as preciſely the ſame with the calomel and mild muriated quickſilver, appears to be one of the beſt and ſafeſt preparations of this mineral, when intended to act as a quick and general ſtimulant. Many of the more elaborate proceſſes are no other than attempts to produce from mercury ſuch a medicine as this really is. The doſe recommended by ſome for raiſing a ſalivation, is ten or fifteen grains taken in the form of a bolus or pill, every night or oftener, till the ptyaliſm begins. As an alterant and diaphoretic, it has been given in doſes of five or ſix grains; a purgative being occaſionally interpoſed, to prevent its affecting the mouth. It anſwers, however, much better when given in ſmaller quantities, as one, two, or three grains every morning and evening, in conjunction with ſuch ſubſtances as determine its action to the ſkin, as the extract of reſin of guaiacum; the patient at the ſame time keeping warm, and drinking liberally of warm diluent liquors. By this method of managing it, obſtinate cutaneous and venereal diſtempers have been ſucceſsfully cured without any remarkable increaſe of the ſenſible evacuations. It is ſometimes, however, difficult to meaſure its effects in this way; and it is ſo very apt to run off by the inteſtines, that we can ſeldom adminiſter it in ſuch a manner as to produce thoſe permanent effects which are often required, and which we are able to do by other preparations. It has been lately propoſed to rub the gums and inſide of the mouth with this preparation, as a ready and effectual method of producing ſalivation. This practice has been particularly recommended in the internal hydrocephalus, where it is exceedingly difficult to excite a ſalivation, by other means. The advantages of this practice are not fully confirmed by experience: and when mercury is attended with advantage in hydrocephalus, this is not probably the conſequence of any diſcharge under the form of ſalivation, but merely of the mercury being introduced into the ſyſtem in an active ſtate, and thus promoting abſorption. And ſalivation when it ariſes from the internal uſe of mercury, may be conſidered as the ſtrongeſt teſt of this; but this is by no means the caſe when ſalivation ariſes from a topical action on the excretories of ſaliva.

Red nitrated quickſilver. L.

295 Take of purified quickſilver, nitrous acid, each one pound; muriatic acid, one dram. Mix in a glaſs veſſel, and diſſolve the quickſilver in a ſand bath; then raiſe the fire until the matter be formed into red cryſtals.

Red corroſive commonly called *red precipitated mercury.* E.

296 Take of quickſilver, weak nitrous acid, each one pound. Let the quickſilver be diſſolved in the acid, and then let the ſolution be evaporated to a white dry maſs. This being beat into a powder, muſt be put into a glaſs retort, and ſubjected to a fire gradually increaſed, till a ſmall quantity of it, taken out in a glaſs ſpoon, and allowed to cool, aſſumes the form of ſhining red ſquamæ. Let the veſſel be then removed from the fire. During the proceſs the matter muſt be carefully agitated by a glaſs rod, that it may be equally heated.

The marine acid in the menſtruum ordered in the firſt proceſs diſpoſes the mercurial calx to aſſume the bright ſparkling look admired in it; which, though perhaps no advantage to it as a medicine, ought nevertheleſs to be inſiſted on by the buyer as a mark of its goodneſs and ſtrength. As ſoon as the matter has gained this appearance, it ſhould be immediately removed from the fire; otherwiſe it will ſoon loſe it again. The preparation of this red precipitate, as it is called, in perfection, is ſuppoſed by ſome to be a ſecret not known to our chemiſts, inſomuch that we are under the neceſſity of importing it from abroad. This reflection ſeems to be founded on miſinformation. We ſometimes indeed receive conſiderable quantities of it from Holland: but this depends on the ingredients being commonly cheaper there than with us, and not on any ſecret in the manner of the preparation.

This precipitate is, as its title imports, an eſcharotic; and with this intention is frequently employed by the ſurgeons with baſilicum and other dreſſings, for conſuming fungous fleſh in ulcers and the like purpoſes. It is ſubject to great uncertainty in point of ſtrength, more or leſs of the acid exhaling according to the degree and continuance of the fire. The beſt criterion of its ſtrength, as already obſerved, is its brilliant appearance: which is alſo the mark of its genuineneſs: if mixed with minium, which it is ſometimes ſaid to be, the duller hue will diſcover the abuſe. This admixture may be more certainly detected by means of fire: the mercurial part will totally evaporate, leaving the minium behind.

Some have ventured to give this medicine internally in venereal, ſcrophulous, and other obſtinate chronic diſorders, in doſes of two or three grains or more. But certainly the milder mercurials, properly managed, are capable of anſwering all that can be expected from this; without occaſioning violent anxieties, tormina of the bowels, and ſimilar ill conſequences, which the beſt management can ſcarcely prevent this corroſive preparation from ſometimes inducing. The chemiſts have contrived ſundry methods of correcting and rendering it milder, by diveſting it of a portion of the acid: but to no very good purpoſe, as they either leave the medicine ſtill too corroſive, or render it ſimilar to others which are procurable at an eaſier rate.

White calx of quickſilver. L.

297 Take of muriated quickſilver, ſal ammoniac, water of kali, each half a pound. Diſſolve firſt the ſal ammoniac, afterwards the muriatic quickſilver in diſtilled water, and add the water of kali. Waſh the precipitated powder until it becomes inſipid.

White precipitate of mercury. E.

298 Diſſolve corroſive ſublimate mercury in a ſufficient quantity of hot water, and gradually drop into the ſolution ſome ſpirit of ſal ammoniac as long as any precipitation enſues. Waſh the precipitated powder with ſeveral freſh quantities of warm water.

Theſe preparations are uſed chiefly in ointments, with which intention their fine white colour is no ſmall recommendation to them. For internal purpoſes they are rarely employed, nor is it at all wanted; they are nearly ſimilar to ſweet mercury, but leſs certain in their effects.

Though the proceſſes directed by the London and Edinburgh colleges be here ſomewhat different, yet the preparations are ultimately the ſame. The proc deſcribed by the Edinburgh college is the moſt ſimple but is liable to ſome objections.

Corroſive ſublimate, as we have already ſeen, conſiſts of mercury united with a large portion of acid. It is there dulcified by adding as much freſh mercury as is ſufficient to ſaturate all the acid; here, by ſeparating all the acid that is not ſaturated. This laſt way ſeems an unfrugal one, on account not only of the loſs of the acid, but of the volatile ſpirit neceſſary for abſorbing it. The operator may, however, if it ſhould be thought worth while, recover the volatile ſalt from the liquour, by adding to it, after the precipitate has been ſeparated, a proper quantity of potaſh, and diſtilling with a gentle heat, in the ſame manner as for the ſpirit of volatile ſalt of ſal ammoniac; for a true ſal ammoniac is regenerated, in the precipitation, from the union of the volatile ſpirit with the marine acid of the ſublimate. It is by no means adviſable to uſe the liquor itſelf as a ſolution of ſal ammmoniac, or to ſeparate the ſal ammoniac from it by evaporation and cryſtallization, as a part of the mercury might be retained, and communicate dangerous qualities: but the volatile ſalt ſeparated by diſtillation may be uſed without fear of its containing any mercury; none of which will ariſe with the heat by which the volatile ſalts are diſtilled.

Fixed alkalis anſwer as effectually for precipitating ſolutions of ſublimate as the volatile; but the precipitate obtained by means of the former, inſtead of being white, as with the latter, is generally of a reddiſh yellow or orange colour. If ſal ammoniac be diſſolved along with the ſublimate, the addition of fixed alkalis will, by extricating the volatile alkali of the ſal ammoniac, occaſion as white a precipitation as if the volatile ſalt had been previouſly ſeparated and employed in its pure ſtate; and this compendium is now allowed by the London college in the proceſs which they have adopted.

There the ſal ammoniac, beſides its uſe in the capital intention, to make a white precipitation, promotes the ſolution of the ſublimate; which of itſelf is difficultly, and ſcarcely at all totally, ſoluble by repeated boiling in water: for however ſkilfully it be prepared, ſome part of it will have an under proportion of acid, and conſequently approach to the ſtate of ſweet mercury. A good deal of care is requiſite in the precipitation; for if too large a quantity of the fixed alkaline ſolution be imprudently added, the precipitate will loſe the elegant white colour for which it is valued.

Quickſilver with ſulphur. L.

299 Take of purified quickſilver, flowers of ſulphur, each one pound. Rub them together until the globules diſappear.

Æthiops mineral. E.

300 Take of quickſilver, flowers of ſulphur, each equal weights. Grind them together in a glaſs or ſtone mortar, with a glaſs peſtle, till the mercurial globules totally diſappear.

An æthiops is made alſo with a double quantity of mercury.

We need hardly remark, that theſe preparations, though now differing in name, are in reality the ſame. Nor need we add, that the direction given by the Edinburgh college, of uſing a glaſs or ſtone mortar and peſtle, is neceſſary and proper.

The union of the mercury and ſulphur might be much facilitated by the aſſiſtance of a little warmth. Some are accuſtomed to make this preparation in a very expeditious manner, by melting the ſulphur in an iron ladle, then adding the quickſilver, and ſtirring them together till the mixture be completed. The ſmall degree of heat here ſufficient cannot reaſonably be ſuppoſed to do any injury to ſubſtances which have already undergone much greater fires, not only in the extraction from their ores, but likewiſe in the purifications of them directed in the pharmacopœia. In the following proceſs they are expoſed in conjunction to a ſtrong fire, without ſuſpicion of the compound receiving any ill quality from it. This much is certain, that the ingredients are more perfectly united by heat than by the degree of triture uſually beſtowed on them. From the æthiops prepared by triture, part of the mercury is apt to be ſqueezed out on making it into an electuary or pills; from that made by fire no ſeparation is obſerved to happen.

Æthiops mineral is one of the moſt inactive of the mercurial preparations. Some practitioners, however, have repreſented it as poſſeſſing extraordinary virtues; and moſt people imagine it a medicine of ſome efficacy. But what benefit is to be expected from it in the common doſes of eight or ten grains, or a ſcruple, may be judged from hence, that it has been taken in doſes of ſeveral drams, and continued for a conſiderable time, without producing any remarkable effect. Sulphur eminently abates the power of all the more active minerals, and ſeems to be at the ſame time reſtrained by them from operating in the body itſelf. Boerhave, who is in general ſufficiently liberal in the commendation of medicines, diſapproves of the æthiops in very ſtrong terms. "It cannot enter the abſorbent veſſels, the lacteals, or lymphatics, but paſſes directly through the inteſtinal tube, where it may happen to deſtroy worms, if it operates luckily. They are deceived who expect any other effects from it; at leaſt I myſelf could never find them. I am afraid it is unwarily given, in ſuch large quantities, to children, and perſons of tender conſtitutions, as being a foreign maſs, unconquerable by the body; the more to be ſuſpected as it there continues long ſluggiſh and inactive. It does not raiſe a ſalivation, becauſe it cannot come into the blood. Who knows the effects of a ſubſtance, which, ſo long at it remains compounded, ſeems no more active than any ponderous inſipid earth?" The æthiops, with a double proportion of mercury, now received into our pharmacopœias, has a greater chance for operating as a mercurial; and probably the quantity of mercury might be ſtill further increaſed to advantage.

Red ſulphurated quickſilver. L.

Take of quickſilver, purified, forty ounces; ſulphur, eight ounces. Mix the quickſilver with the melted ſulphur; and if the mixture takes fire, extinguiſh it by covering the veſſel; afterwards reduce the maſs to powder, and ſublime it. 301

It has been cuſtomary to order a larger quantity of ſulphur than here directed; but ſmaller proportions anſwer better, for the leſs ſulphur the finer coloured is the cinnabar.

As ſoon as the mercury and ſulphur begin to unite, a conſiderable exploſion frequently happens, and the mixture is very apt to take fire, eſpecially if the proceſs be ſomewhat haſtily conducted. This accident the operator will have previous notice of, from the matter ſwelling up, and growing ſuddenly conſiſtent: as ſoon as this happens, the veſſel muſt be immediately cloſe covered.

During the ſublimation, care muſt be had that the matter riſe not in to the neck of the veſſel, ſo as to block up and burſt the glaſs. To prevent this, a wide-necked bolt head, or rather an oval earthen jar, coated, ſhould be choſen for the ſubliming veſſel. If the former be employed, it will be convenient to introduce at times an iron wire, ſomewhat heated, in order to be the better aſſured that the paſſage is not blocking up; the danger of which may be prevented by cautiouſly raiſing the veſſel higher from the fire.

If the ingredients were pure, no feces will remain: in ſuch caſes, the ſublimation may be known to be over by introducing a wire as before, and feeling therewith the bottom of the veſſel, which will then be perfectly ſmooth: if any roughneſs or inequalities are perceived, either the mixture was impure, or the ſublimation is not completed: if the latter be the caſe, the wire will ſoon be covered over with the riſing cinnabar.

The preparers of cinnabar in large quantity employ earthen jars, which in ſhape pretty much reſemble an egg. Theſe are of different ſizes, according to the quantity intended to be made at one ſublimation, which ſometimes amounts to two hundred weight. The jar is uſually coated from the ſmall end almoſt to the middle, to prevent its breaking by the vehemence or irregularity of the fire. The greater part, which is placed uppermoſt, not being received within the furnace, has no occaſion for this defence The whole ſecret with regard to this proceſs, is the management of the fire, which ſhould be ſo ſtrong as to keep the matter continually ſubliming to the upper part of the jar, without coming out at its mouth, which is covered with an iron plate; care ſhould alſo be taken to put into the ſubliming veſſel only ſmall quantities of the mixture at a time.

The principal uſe of cinnabar is as a pigment. It was formerly held in great eſteem as a medicine in cutaneous foulneſſes, gouty and rheumatic pains, epileptic caſes, &c. but of late it has loſt much of its reputation It appears, to be nearly ſimilar to the æthiops already ſpoken of. Cartheuſer relates, that having given cinnabar in large quantities to a dog, it produced no ſenſible effect, but was partly voided along with the feces unaltered, and partly found entire in the ſtomach and inteſtines on opening the animal. The celebrated Frederic Hoffman, after beſtowing high encomiums on this preparation, as having in many inſtances within his own knowledge perfectly cured epilepſies and vertigoes from contuſions of the head (where it is probable, however, that the cure did not ſo much depend on the cinnabar as on the ſpontaneous recovery of the parts from the external injury), obſerves, that the large repeated doſes, neceſſary for having any effect, can be borne only where the firſt paſſages are ſtrong; and that if the fibres of the ſtomach and inteſtines are lax and flaccid, the cinnabar accumulated and concreting with the mucous matter of the parts, occaſions great oppreſſion; which ſeems to be an acknowlegement that the cinnabar is not ſubdued by the powers of digeſtion, and has no proper medicinal activity. There are indeed ſome inſtances of the daily uſe of cinnabar having brought on a ſalivation; perhaps from the cinnabar, uſed in thoſe caſes, having contained a leſs proportion of ſulphur than the ſorts commonly met with. The regulus of antimony, and even white arſenic when combined with a certain quantity of common ſulphur, ſeem to have their deleterious power deſtroyed: on ſeparating more and more of the ſulphur, they exert more and more of their proper virulence. It does not ſeem unreaſonable to preſume, that mercury may have its activity varied in the ſame manner; that when perfectly ſatiated with ſulphur, it may be inert: and that when the quantity of ſulphur is more and more leſſened, the compound may have greater and greater degrees of the proper efficacy of mercurials.

Cinnabar is ſometimes uſed in fumigations againſt venereal ulcers in the noſe, mouth, and throat. Half a dram of it burnt, the fume being imbibed with the breath, has occaſioned a violent ſalivation. This effect is by no means owing to the medicine as cinnabar: when ſet on fire, it is no longer a mixture of mercury and ſulphur, but mercury reſolved into fume, and blended in part with the volatile vitriolic acids; in either of which circumſtances this mineral as we have already obſerved, has very powerful effects.

Vitriolated quickſilver. L.

Take of quickſilver, purified, vitriolic acid, each one pound. Mix in a glaſs veſſel, and heat them by degrees until they unite into a white maſs, which is to be perfectly dried with a ſtrong fire. This matter, on the affuſion of a large quantity of hot diſtilled water, immediately becomes yellow, and falls to powder. Rub the powder carefully with this water in a glaſs mortar. After the powder has ſubſided, pour off the water; and, adding more diſtilled water ſeveral times, waſh the matter till it become inſipid. 302

Yellow mercury commonly called *Turbith mineral.* E.

Take of quickſilver, four ounces; vitriolic acid, eight ounces. Cautiouſly mix them together and diſtil in a retort, placed in a ſand furnace, to dryneſs: the white calx, which is left at the bottom, being ground to powder, muſt be thrown into warm water. It immediately aſſumes a yellow colour, but muſt afterwards be purified by repeated ablutions. 303

The quantity of oil of vitriol, formerly directed, was double to that now employed by the Edinburgh college. The reduction made in this article greatly facilitates the proceſs; and the proportions of the London college are perhaps preferable.

Boerhaave directs this preparation to be made in an open glaſs, ſlowly heated, and then placed immediately on burning coals; care being taken to avoid the fumes, which are extremely noxious. This method will ſucceed very well with a little addreſs when the ingredients are in ſmall quantity; but where the mixture is large, it is better to uſe a retort, placed in a ſand furnace, with a recipient, containing a ſmall quantity of water, luted to it. Great care ſhould be taken, when the oil of vitriol begins to bubble, that the heat be ſteadily kept up, without at all increaſing it, till the ebullition ceaſes, when the fire ſhould be augmented to the utmoſt degree, that as much as poſſible of the redundant acid may be expelled.

If the matter be but barely exſiccated, it proves a cauſtic ſalt, which in the ablution with water will almoſt all diſſolve, leaving only a little quantity of turbith the more of the acid that has been diſſipated, the leſs of the remaining mercury will diſſolve, and conſequently the yield of turbith will be greater; fire expelling only ſuch part of the acid as is not completely ſatiated with mercury, while water takes up always, along with the acid, a proportional quantity of the mercury itſelf. Even when the matter has been ſtrongly calcined, a part will ſtill be ſoluble; this evidently appears on pouring into the waſhings a little ſolution of fixed alkaline ſalt, which will throw down a conſiderable quantity of yellow precipitate, greatly reſembling the turbith, except, that it is leſs violent in operation.

From this experiment it appears, that the beſt method of edulcorating this powder is, by impregnating the water, intended to be uſed in its ablution, with a determined proportion of fixed alkaline ſalt; for by this means, the waſhed turbith will not only turn out greater in quantity, but, what is of more conſequence, will have an equal degree of ſtrength; a circumſtance, which deſerves particularly to be conſidered, eſpecially in making ſuch preparations as, from an error in the proceſs, may prove too violently corroſive to be uſed with any tolerable degree of ſafety. It is neceſſary to employ warm water if we are anxious for a fine colour. If cold water be uſed, the precipitate will be white.

It is obſervable, that though the ſuperfluous acid be here abſorbed from the mercury by the alkaline ſalt; yet in ſome circumſtances this acid forſakes that ſalt to unite with mercury. If vitriolated tartar, or *vitriolated kali*, as it is now called, which is a combination of vitriolic acid with fixed alkali, be diſſolved in water, and the ſolution added to a ſolution of mercury in aquafortis, the vitriolic acid will unite with the mercury, and form with it a turbith, which falls to the bottom; leaving only the alkali diſſolved in the aquafortis, and united with its acid into a regenerated nitre. On this principle depends the preparation deſcribed by Wilſon under the title of *an excellent precipitate of mercury*; which is no other than a true turbith, though not generally known to be ſuch. It is made by diſſolving four ounces of vitriolated kali in ſixteen ounces of ſpirit of nitre; diſſolving in this compound liquor four ounces of mercury; abſtracting the menſtruum by a ſand heat; and edulcorating with water the gold coloured maſs which remains.

Turbith mineral is a ſtrong emetic, and with this intention operates the moſt powerfully of all the mercurials that can be ſafely given internally. Its action, however, is not confined to the primæ viæ; it will ſometimes excite a ſalivation, if a purgative be not taken ſoon after it. This medicine is uſed chiefly in virulent gonorrhœas, and other venereal caſes, where there is a great flux of humours to the parts. Its chief uſe at preſent is in ſwellings of the teſticle from a venereal affection; and it ſeems not only to act as a mercurial, but alſo, by the ſevere vomiting it occaſions, to perform the office of a diſcutient, by accelerating the motion of the blood in the parts affected. It is ſaid likewiſe to have been employed with ſucceſs, in robuſt conſtitutions, againſt leprous diſorders and obſtinate glandular obſtructions: the doſe is from two grains to ſix or eight. It may be given in doſes of a grain or two as an alterative and diaphoretic, in the ſame manner as the calcined mercury already ſpoken of. Dr Hope has found that the turbith mineral is the moſt convenient errhine he has had occaſion to employ.

This medicine was lately recommended as the moſt effectual preſervative againſt the hydrophobia. It has been alledged there are ſeveral examples of its preventing madneſs in dogs which had been bitten: and ſome of its performing a cure after the madneſs was begun: from ſix or ſeven grains to a ſcruple may be given every day, or every ſecond day, for a little time, and repeated at the two or three ſucceeding fulls and changes of the moon. Some few trials have likewiſe been made on human ſubjects bitten by mad dogs; and in theſe alſo the turbith, uſed either as an emetic or alterative, ſeemed to have good effects.

The waſhings of turbith mineral are uſed by ſome externally for the cure of the itch and other cutaneous foulneſſes. In ſome caſes mercurial lotions may be proper, but they are always to be uſed with great caution: this is by no means an eligible one, as being extremely unequal in point of ſtrength, more or leſs of the mercury being diſſolved, as has been obſerved above, according to the degree of calcination. The pharmacopœia of Paris directs a mercurial waſh free from this inconvenience, under the title of *Aqua mercurialis*, or *Mercurius liquidus*. It is compoſed of one ounce of mercury, diſſolved in a ſufficient quantity of ſpirit of nitre, and diluted with 30 ounces of diſtilled water. In want of diſtilled water, rain water may be uſed: but of ſpring waters there are very few which will mix with the mercurial ſolution without growing turbid and precipitating a part of the mercury.

Simple mercurial ſolution. **Joſ. Jac. Plenck.**

Take of pureſt quickſilver, one dram; gum arabic, two drams. Beat them in a ſtone mortar, adding by little and little diſtilled water of fumitory till the mercury thoroughly diſappear in the mucilage. Having beat and mixed them thoroughly, add by degrees, and at the ſame time rubbing the whole together, ſyrup of kermes, half an ounce, diſtilled water of fumitory, eight ounces. 304

This mixture was much celebrated by its author as an effectual preparation of mercury, unattended with the inconvenience of producing a ſalivation; and he imagined that this depended on a peculiar affinity exiſting between mercury and mucilage. Hence ſuch a conjunction, the gummy quickſilver, as it has been ſtyled, has been the foundation of mixtures, pills, ſyrups, and ſeveral other formulæ, which it is unneceſſary to dwell upon in this place.

By a long continued triture, mercury ſeems to undergo a degree of calcination; at leaſt its globular appearance is not to be diſcerned by the beſt microſcope; its colour is converted into that of a greyiſh powder; and from the inactive ſubſtance in its globular form, it its now become one of the moſt powerful preparations of this metallic body. The uſe of the gum ſeems to be nothing more than to afford the interpoſition of a viſcid ſubſtance to keep the particles at a diſtance from each other, till the triture requiſite to produce this change be performed. Dr Saunders has clearly proved, that no real ſolution takes place in this proceſs, and that though a quantity of mercurial particles are ſtill retained in the mixture after the globular parts have been depoſited by dilution with water, yet that this ſuſpended mercurial matter is only diffuſed in the liquor, and capable of being perfectly ſeparated by filtration. That long triture is capable of effecting the above change on mercury, is fully evinced from the well known experiment of Dr Boerhaave, in producing a kind of calcined mercury by expoſing quickſilver incloſed in a phial to the agitation produced by keeping the phial tied to a windmill for 14 years. By incloſing a pound of quickſilver in an iron box, with a quantity of iron nails and a ſmall quantity of water, by the addition of which a greater degree of inteſtine motion is given to the particles of the mercury, and fixing the box to the wheel of a carriage, Dr Saunders obtained, during a journey of 400 miles, two ounces of a greyiſh powder, or calx of mercury.

On the above accounts we are not to aſcribe the effects of Plenck's ſolution to an intimate diviſion of the globules of mercury, nor to any affinity, nor elective attraction, between gum-arabic and mercury; which laſt Mr Plenck has very unphiloſophically ſuppoſed. The ſame thing can be done by means of gum-tragacanth, by honey, and by ſundry balſams. It is evidently owing to the converſion of the quickſilver to a calciform nature; but as this will be accompliſhed more or leſs completely according to the different circumſtances during the triture, it is certainly preferable, inſtead of Plenck's ſolution, to diffuſe in mucilage, or other viſcid matters, a determinate quantity of the aſh-coloured powder, or other calx of mercury.

It is proper to take notice, that there is in many inſtances a real advantage in employing mucilaginous matters along with mercurials, theſe being found to prevent diarrhœa and ſalivation to a remarkable degree. So far, then, Mr Plenck's ſolution is a good preparation of mercury, though his chemical rationale is perhaps erroneous. The diſtilled water and ſyrup are of no conſequence to the preparation, either as facilitating the proceſs or for medicinal uſe.

It is always moſt expeditious to triturate the mercury with the gum in the ſtate of mucilage. Dr Saunders found that the addition of honey was an excellent auxillary; and the mucilage of gum-tragacanth ſeems better ſuited for this purpoſe than gum-arabic.

CHAP. XIV. *Preparations of Lead.*

305 LEAD readily melts in the fire, and calcines into a duſky powder; which, if the flame is reverberated on it, becomes at firſt yellow, then red, and at length melts in a vitreous maſs. This metal diſſolves eaſily in the nitrous acid, difficultly in the vitriolic, and in ſmall quantity in the vegetable acids; it is alſo ſoluble in expreſſed oil, eſpecially when calcined.

Lead and its calces, while undiſſolved, have no conſiderable effects as medicines. Diſſolved in oils, they are ſuppoſed to be (when externally applied) anti-inflammatory and deſiccative. Combined with vegetable acids, they are remarkably ſo; and taken internally prove a powerful though dangerous ſtyptic.

There are two preparations of lead, *red* and *white lead*, as they are commonly called, which are much more extenſively employed in other arts than in medicine, and of courſe they are prepared in large quantities. Theſe formerly ſtood among the preparations in our pharmacopœias; but they are now referred to the materia medica. We ſhall not, therefore, on the preſent occaſion, make any farther obſervations with reſpect to them, but ſhall here inſert from the old editions of the Edinburgh pharmacopœia the directions there given for preparing them.

Red lead.

306 Let any quantity of lead be melted in an unglazed earthen veſſel, and kept ſtirring with an iron ſpatula till it falls into powder, at firſt blackiſh, afterwards yellow, and at length of a deep red colour, in which laſt ſtate it is called *minium;* taking care not to raiſe the fire ſo high as to run the calx into a vitreous maſs.

The preparation of red lead is ſo troubleſome and tedious, as ſcarce ever to be attempted by the apothecary or chemiſt; nor indeed is this commodity expected to be made by them, the preparation of it being a diſtinct branch of buſineſs. The makers melt large quantities of lead at once, upon the bottom of a reverberatory furnace built for this purpoſe, and ſo contrived that the flame acts on a large ſurface of the metal, which is continually changed by means of iron rakes drawn backwards and forwards, till the fluidity of the lead is deſtroyed; after which, the calx is only now and then turned. By barely ſtirring the calx, as above directed, in a veſſel over the fire, it acquires no redneſs; the reverberation of flame on the ſurface being abſolutely neceſſary for this effect. It is ſaid, that 20 pounds of lead gain, in the proceſs, five pounds; and that the calx, being reduced into lead again, is found one pound leſs than the original weight of the metal.

Theſe calces are employed in external applications, for abating inflammations, cleanſing and healing ulcers, and the like. Their effects, however, are not very conſiderable; nor are they perhaps of much farther real uſe, than as they give conſiſtence to the plaſter, unguent, &c.

Ceruſe or white lead.

307 Put ſome vinegar into the bottom of an earthen veſſel, and ſuſpend over the vinegar very thin plates of lead, in ſuch a manner that the vapour which ariſes from the acid may circulate about the plates. Set the containing veſſel in the heat of horſe-dung for three weeks; if at the end of this time the plates be not totally calcined, ſcrape off the white powder, and expoſe them again to the ſteam of vinegar, till all the lead be thus corroded into powder.

The making of white lead is alſo become a trade by itſelf, and confined to a few perſons, who have large conveniences for this purpoſe. The general method which they follow is nearly the ſame with that above deſcribed. See the Philoſophical Tranſactions, nº 137.

In this preparation, the lead is ſo far opened by the acid, as to diſcover, when taken internally, the malignant quality of the metal; and to prove externally, when ſprinkled on running ſores, or ulcers moderately cooling, drying, and aſtrictive.

Acetated ceruſe. L.

308 Take of ceruſe, one pound; diſtilled vinegar, one gallon and an half. Boil the ceruſe with the vinegar until the vinegar is ſaturated; then filter thro' paper; and, after proper evaporation, ſet it aſide to cryſtallize.

Salt, commonly called *ſugar of lead.* E.

309 Put any quantity of ceruſe, into a cucurbit, and pour upon it ten times its quantity of diſtilled vinegar. Let the mixture ſtand upon warm ſand till the vinegar becomes ſweet; when it is to be poured off, and freſh vinegar added as often as it comes off ſweet. Then let all the vinegar be evaporated in a glaſs veſſel to the conſiſtence of pretty thin honey, and ſet it aſide in a cold place, that cryſtals may be formed, which are to be afterwards dried in the ſhade. The remaining liquor is again to be evaporated, that new cryſtals may be formed; the evaporation of the reſiduous liquor is to be repeated till no more cryſtals concrete.

Ceruſe (eſpecially that ſort called *flake lead*, which is not, like the others, ſubject to adulteration) is much preferable either to minium or litharge, for making the ſugar of lead: for the corroſion which it has undergone from the ſteam of the vinegar diſpoſes it to diſſolve more readily. It ſhould be finely powdered before the vinegar be put to it; and during the digeſtion, or boiling, every now and then ſtirred up with a wooden ſpatula, to promote its diſſolution, and prevent its concreting into a hard maſs at the bottom. The ſtrong acid obtained from the *caput mortuum* of vinegar may be employed for this purpoſe to better advantage than the weaker, though purer acid, above directed. If a ſmall quantity of rectified ſpirit of wine be prudently added to the ſolution as ſoon as it is duly exhaled, and the mixture ſuffered to grow cold by ſlow degrees, the ſugar will concrete into very large and tranſparent cryſtals, which are ſcarcely to be obtained by any other method.

If the cryſtals be dried in ſunſhine, they acquire a blackiſh or livid colour. This ſeems to happen from the abſorption of light and its converſion into phlogiſton. If it be owing to the eſcape of pure air, why are the rays of the ſun neceſſary to this diſcharge? On whatever principles we account for it the fact is the ſame; that the cryſtals ſoon loſe their ſaline condition and the lead gradually reaſſumes its metallic form. From this property of lead readily abſorbing phlogiſton, or parting with pure air, a ſolution of the ſugar of lead becomes a very convenient ſympathetic ink; on the ſame grounds it is alſo uſed for a more important purpoſe. As lead communicates a ſweetneſs and aſtringency very ſimilar to the product of the vinous fermentation, a practice formerly prevailed among fraudulent dealers, of correcting the too great ſharpneſs of acid wines by adulterating them with this metal. The abuſe may be detected in two different ways: a piece of paper may be moiſtened with the liquor to be examined, and then expoſed to the vapours of liver of ſulphur; the moiſtened paper will become of a livid colour, and this will happen though 200 or 300 leaves of a book were interpoſed between the paper and the vapours; by this method, then, we make a kind of ſympathetic ink. But the beſt way of making the teſt is, to drop a ſmall quantity of a ſolution of the liver of ſulphur into the ſuſpected liquor: if there be any lead preſent, this addition will inſtantly occaſion the precipitation of a livid or dark coloured cloud.

The ſugar of lead is much more efficacious than the foregoing preparations, in anſwering the ſeveral intentions to which they are applied. Some have ventured upon it internally, in doſes of a few grains, as a ſtyptic in hæmorrhagies, profuſe coliquative ſweats, ſeminal fluxes, the fluor albus, &c. nor has it failed their expectations. It very powerfully reſtrains the diſcharge; but almoſt as certainly as it does this, it occaſions ſymptoms of another kind, often more dangerous than thoſe removed by it, and ſometimes fatal. Violent pains in the bowels or through the whole body, and obſtinate conſtipations, ſometimes immediately follow, eſpecially if the doſe has been conſiderable: cramps, tremors, and weakneſs of the nerves, generally ſooner or later enſue.

Boerhaave is of opinion, that this preparation proves malignant only as far as its acid happens to be *abſorbed* in the body: for in ſuch a caſe, he ſays, "it returns again into ceruſe, which is violently poiſonous."

On this principle it would follow, that in habits where acidities abound, the ſugar of lead would be innocent. But this is far from being the caſe. Lead and its preparations act in the body only when they are *combined* with acid: ceruſe poſſeſſes the qualities of the ſaccharum only in a low degree; and either of them freed from the acid has little, if any, effect at all. For the ſame reaſons, the ſalt of lead is preferable to the pompous *extract* and *vegeto-mineral water* of Goulard, in which the lead is much leſs perfectly combined in a ſaline ſtate. It is ſometimes convenient to aſſiſt the ſolution of the ſugar of lead in water, by adding a portion of vinegar. The effects of the external application of lead ſeems to differ from the ſtrength of the ſolution: thus a very weak ſolution ſeems to diminiſh directly the action of the veſſels, and is therefore more peculiarly proper in active inflammations, as of the eyes; whereas a ſtrong ſolution operates as a direct ſtimulant, and is therefore more ſucceſsful in paſſive ophthalmia.

Water of acetated litharge. L.

Take of litharge, two pounds and four ounces; diſtiled vinegar, one gallon. Mix, and boil to ſix pints, conſtantly ſtirring; then ſet it aſide. After the feces have ſubſided, ſtrain. 310

This preparation may be conſidered as nearly the ſame with the extract and vegeto-mineral water of Mr Goulard. And it is probably from the circumſtances of his preparations having come into a common uſe, that the London college have given this article a place in their pharmacopœia. It may, however, be a matter of doubt whether it be really intitled to a place. For, as we have alread obſerved, every purpoſe to be anſwered by it may be better obtained from the employment of a ſolution of the acetated ceruſe in ſimple water. The acetated water of litharge is intended for external uſe only.

Chap. XV. *Preparations of tin.*

311 Tin eaſily melts in the fire, and calcines into a duſky powder; which, by a farther continuance of the heat, becomes white. A maſs of tin heated till it be juſt ready to melt proves extremely brittle, ſo as to to fall in pieces from a blow; and by dexterous agitation, into powder. Its proper menſtruum is aqua-regia; though the other mineral acids may alſo be made to diſſolve it, and the vegetable ones in ſmall quantity. It cryſtallizes with the vegetable and vitriolic acids; but with the others, deliquates.

The virtues of this metal are little known. It has been recommended as an antihyſteric, antihectic, &c. At preſent it is chiefly uſed as an anthelmintic.

Powdered tin. L.

312 Take of tin, ſix pounds. Melt it in an iron veſſel, and ſtir it with an iron rod until a powder floats on the ſurface. Take off the powder, and, when cold, paſs it through a ſieve.

This preparation may be conſidered as nearly the ſame with the calx Jovis, which had a place in the former editions of the Edinburgh pharmacopœia: but from the late editions the calx has been expunged, and the filings or powder of tin, has a place only in their liſt of the materia medica. But although ſeldom prepared by the apothecary himſelf, it is not unfrequently employed as a remedy againſt worms, particularly the flat kinds, which too often elude the force of other medicines. The general doſe is from a ſcruple to a dram; ſome confine it to a few grains. But Dr Alſton aſſures us in the Edinburgh Eſſays, that its ſucceſs chiefly depends on its being given in much larger quantities; he directs an ounce of the powder on an empty ſtomach, mixed with four ounces of molaſſes; next day, half an ounce; and the day following, half an ounce more; after which a cathartic is adminiſtered: he ſays the worms are uſually voided during the operation of the purge, but that pains in the ſtomach occaſioned by them are removed almoſt immediately upon taking the firſt doſe of the tin.

This practice is ſometimes ſucceſsful in the expulſion of tænia, but by no means ſo frequently as Dr Alſton's obſervations would lead us to hope.

Amalgama of tin. Dan.

313 Take of ſhavings of pure tin, two ounces; pure quick ſilver, three drams. Let them be rubbed to a powder in a ſtone mortar.

Some have imagined that tin thus acted on by mercury is in a more active condition then when exhibited in a ſtate of powder; and accordingly it has been given in worm caſes. But as both are equally inſoluble in the animal fluids, this is not to be expected; and to obtain any peculiar properties which tin may poſſeſs to their full extent, it will probably be neceſſary to exhibit it in ſome ſaline ſtate.

Chap. XVI. *Preparations of zinc and copper.*

Calcined zinc. L.

314 Take of zinc, broken into ſmall pieces, eight ounces. Caſt the pieces of zinc, at ſeveral times, into an ignited, large, and deep crucible, placed leaning, or half-upright, putting on it another crucible in ſuch a manner that the air may have free acceſs to the burning zinc. Take out the calx as ſoon as it appears, and ſeparates its white and lighter part by a fine ſieve.

Flowers of zinc. E.

315 Let a large crucible be placed in a furnace, in an inclined ſituation, only half-upright; when the bottom of the veſſel is moderately red, put a ſmall piece of zinc, about the weight of two drams, into it. The zinc ſoon flames, and is at the ſame time converted into a ſpongy calx, which is to be raked from the ſurface of the metal with an iron ſpatula, that the combuſtion may proceed the more ſpeedily: when the zinc ceaſes to flame, take the calx out of the crucible. Having put in another piece of zinc, the operation may be repeated as often as you pleaſe. Laſtly, the calx is to be prepared like antimony.

Theſe flowers, as uſed externally, are preferable for medicinal purpoſes to tutty, and the more impure ſublimates of zinc, which are obtained in the braſs works; and likewiſe to calamine, the natural ore of this metal, which contains a large quantity of earth, and frequently a portion of heterogeneous metallic matter. But beſides being applied externally, they have alſo of late been uſed internally. The flowers of zinc, in doſes from one to ſeven or eight grains, have been much celebrated of late years in the cure of epilepſy and ſeveral ſpaſmodic affections; and there are ſufficient teſtimonies of their good effects, where tonic remedies in thoſe affections are proper.

White vitriol. E.

316 Take of zinc, cut into ſmall pieces, three ounceſs; vitriolic acid, five ounces; water, twenty ounces; having mixed the acid and water, add the zinc, and when the ebullition is finiſhed ſtrain the liquor: then after proper evaporation ſet it apart in a cold place, that that it may ſhoot into cryſtals.

This ſalt is an elegant white vitriol. It differs from the common white vitriol, and the ſalt of vitriol of the ſhops, only in being purer, and perfectly free from any admixture of copper, or ſuch other foreign metallic bodies as the others generally contain.

Purified vitriolated zinc. L.

317 Take of white vitriol, one pound; vitriolic acid, one dram; boiling diſtilled water, three pints. Mix, and filter through paper. After a proper evaporation, ſet it aſide in a cold place to cryſtallize.

Although the Edinburgh college have given a formula for the preparations of white vitriol, yet their direction is very rarely followed by any of the apothecaries or chemiſts, who in general purchaſe it as obtained from the Goſlar mines. When, however, it is got in this way, it is often a very impure ſalt, and requires

quires that purification which is here directed, and which is by no means neceſſary for the white vitriol artificially prepared, in the manner above directed. But by this proceſs, the ordinary white vitriol, in its common ſtate of impurity, will be freed from thoſe impregnations of earthy and other matters which it often contains. And in this purified ſtate it anſwers many uſeful purpoſes, not only externally but internally; and particularly in doſes from ten grains to half a dram, it operates almoſt inſtantly as an emetic, and is at the ſame time perfectly ſafe. By employing it internally in ſmaller doſes, we may obtain, and perhaps even more effectually, all the tonic power of the zinc; and ſome think it in every caſe preferable to the calx of zinc.

Ammoniacal copper. E.

318 Take of blue vitriol, two parts: volatile ſal ammoniac, three parts; rub them together in a glaſs mortar, until they unite, after the efferveſcence ceaſes, into a uniform violet-coloured maſs, which muſt be firſt dried on blotting paper, and afterwards by a gentle heat. The product muſt be kept in a glaſs phial, well cloſed with a glaſs ſtopper.

This preparation has been thought ſerviceable in epilepſies; but from its frequent want of ſucceſs, and the diſagreeable conſequences with which its uſe is ſometimes attended, it has not lately been much preſcribed. It is employed by beginning with doſes of half a grain, twice a day, and increaſing them gradually to as much as the ſtomach will bear. Dr Cullen ſometimes increaſed the doſe to five grains.

CHAP. XVII. *Simple diſtilled waters.* L. E.

319 THE effluvia which exhale into the air from many vegetables, particularly from thoſe of the odorous kind, conſiſt apparently of principles of great ſubtilty and activity, capable of ſtrongly and ſuddenly affecting the brain and nervous ſyſtem, eſpecially in thoſe whoſe nerves are of great ſenſibility; and likewiſe of operating in a ſlower manner on the ſyſtem of the groſſer veſſels. Thus Boerhaave obſerves, that in hyſterical and hypochondriacal perſons, the fragrant odour of the Indian hyacinth excites ſpaſms, which the ſtrong ſcent of rue relieves; that the effluvia of the walnut-tree occaſions headachs, and makes the body coſtive; that thoſe of poppies procure ſleep; and that the ſmell of bean-bloſſoms, long continued, diſorders the ſenſes. Lemery relates, from his own knowledge, that ſeveral perſons were purged by ſtaying long in a room where damaſk roſes were drying.

Some of the chemiſts have indulged themſelves in the pleaſing ſurvey of theſe preſiding ſpirits, as they are called, of vegetables; their peculiar nature in the different ſpecies of plants; their exhalation into the atmoſphere by the ſun's heat, and diſperſion by winds; their rendering the air of particular places medicinal, or otherwiſe, according to the nature of the plants that abound. They have contrived alſo different means for collecting theſe fugitive emanations, and concentrating and condenſing them into a liquid form, employing either the native moiſture of the ſubject, or an addition of water, as a vehicle or matrix for retaining them.

The proceſs which has been judged moſt analogous to that of nature, is the following. The ſubject freſh gathered at the ſeaſon of its greateſt vigour, with the morning dew on it, is laid lightly and unbruiſed in a ſhallow veſſel, to which is adapted a low head with a recipient; under the veſſel a live coal is placed, and occaſionally renewed, ſo as to keep up an uniform heat, no greater than that which obtains in the atmoſphere in ſummer, viz. about 85 degrees of Fahrenheit's thermometer. In this degree of heat there ariſes exceeding ſlowly an inviſible vapour, which condenſes in the head into dewy drops, and falls down into the receiver; and which has been ſuppoſed to be the very ſubſtance that the plant would have ſpontaneouſly emitted in the open air.

But on ſubmitting many kinds of odoriferous vegetables to this proceſs, the liquors obtained by it have been found to be very different from the natural effluvia of the reſpective ſubjects: they have had very little ſmell, and no remarkable taſte. It appeared that a heat, equal to that of the atmoſphere, is incapable of raiſing in cloſe veſſels thoſe parts of vegetables which they emit in the open air. It may therefore be preſumed that in this laſt caſe ſome other cauſe concurs to the effect: that it is not the ſun's heat alone which raiſes and impregnates the air with the odorous principles of vegetables, but that the air itſelf, or the watery humidity with which it abounds, acting as a true ſolvent, extracts and imbibes them; ſo that the natural effluvia of a plant may be conſidered as an infuſion of the plant made in air. The purgative virtue of the damaſk roſe, and the aſtringency of the walnut-tree, which, as above obſerved, are in ſome degree communicated to the air, may be totally extracted by infuſion both in watery and ſpirituous menſtrua, but never riſe in diſtillation with any degree of heat: and the volatile odours of aromatic herbs, which are diffuſed through the atmoſphere in the loweſt warmth, cannot be made to diſtil without a heat much greater than is ever found to obtain in a ſhaded air.

We apprehend, that the effluvia ariſing from growing vegetables are chiefly exhaled by the living energy of the plant: the odorous matter is a real ſecretion, which cannot be performed independent of active veſſels; and it is as reaſonable to allow the ſame powers for the exhalation of theſe effluvia, as for the tranſpiration of their watery parts.

The above proceſs, therefore, and the theory on which it is built, appear to be faulty in two points: 1. In ſuppoſing that all theſe principles, which naturally exhale from vegetables, may be collected by diſtillation; whereas there are many which the air extracts in virtue of its ſolvent power; ſome are alſo incapable of being collected in a viſible and inelaſtic form; and ſome are artificially ſeparable by ſolvents only: 2. In employing a degree of heat inſufficient for ſeparating even thoſe parts which are truly exhalable by heat.

The foregoing method of diſtillation is commonly called *diſtillation by the cold ſtill*; but thoſe who have practiſed it have generally employed a conſiderable heat. A ſhallow leaden veſſel is filled with the freſh herbs, flowers, &c. which are heaped above it; ſo that when the head is fitted on, this alſo may be filled a conſiderable way. A little fire is made under the veſſel,

ſel, ſufficient to make the bottom much hotter than the hand can bear, care being only taken not to heat it ſo far as to endanger ſcorching any part of the ſubject. If the bottom of the veſſel be not made ſo hot as to have this effect on the part contiguous to it, it is not to be feared that the heat communicated to the reſt of the included matter will be ſo great as to do it any injury. By this management, the volatile parts of ſeveral odorous plants, as mint, are effectually forced over; and if the proceſs has been ſkilfully managed, the diſtilled liquor proves richly impregnated with the native odour and flavour of the ſubject, without having received any kind of diſagreeable impreſſion from the heat uſed.

This proceſs has been chiefly practiſed in private families; the ſlowneſs of the diſtillation, and the attendance and care neceſſary for preventing the ſcorching of ſome part of the plant, ſo as to communicate an ungrateful burnt flavour to the liquor, rendering it inconſiſtent with the diſpatch requiſite in the larger way of buſineſs.

Another method has therefore been had recourſe to, viz. by the common ſtill, called, in diſtinction from the foregoing, the *hot-ſtill*. Here a quantity of water is added to the plant to prevent its burning; and the liquor is kept nearly of a boiling heat, or made to boil fully, ſo that the vapour riſes plentifully into the head, and paſſing thence into a ſpiral pipe or worm placed in a veſſel of cold water, is there condenſed, and runs out in drops quickly ſucceeding each other, or in a continued ſtream. The additional water does not at all weaken the produce; for the moſt volatile parts of the ſubject riſe firſt, and impregnate the liquor that firſt diſtils; as ſoon as the plant has given over its virtue ſufficiently, which is known by examining from time to time the liquor that runs from the noſe of the worm, the diſtillation is to be ſtopped.

This is the method of diſtillation commonly practiſed for the officinal waters. It is accompanied with one imperfection, affecting chiefly thoſe waters whoſe principal value conſiſts in the delicacy of their flavour; this being not a little injured by the boiling heat uſually employed, and by the agitation of the odorous particles of the ſubject with the water. Sometimes alſo a part of the plant ſticks to the ſides of the ſtill, and is ſo far ſcorched as to give an ungrateful taint to the liquor.

There is another method of managing this operation, which has been recommended for the diſtillation of the more volatile eſſential oils, and which is equally applicable to that of the waters. In this way the advantages of the foregoing methods are united, and their inconveniences obviated. A quantity of water being poured into the ſtill, and the herbs or flowers placed in a baſket over it, there can be no poſſibility of burning; the water may be made to boil, but ſo as not to riſe up into the baſket, which would defeat the intention of this contrivance. The hot vapour of the water paſſing lightly through all the interſtices of the ſubject matter, imbibes and carries over the volatile parts unaltered in their native flavour. By this means the diſtilled waters of all thoſe ſubſtances whoſe oils are of the moſt volatile kind, are obtained in the utmoſt perfection, and with ſufficient diſpatch; for which laſt intention the ſtill may be filled quite up to the head.

In the diſtillation of eſſential oils, the water, as was obſerved in the foregoing ſection, imbibes always a part of the oil. The diſtilled liquors here treated of are no other than water thus impregnated with the eſſential oil of the ſubject; whatever ſmell, taſte, or virtue is here communicated to the water, or obtained in the form of a watery liquor, being found in a concentrated ſtate in the oil. The eſſential oil, or ſome part of it, more attenuated and ſubtilized than the reſt, is the direct principle on which the title of *ſpiritus rector*, or preſiding ſpirit has been beſtowed.

All thoſe vegetables therefore which contain an eſſential oil, will give over ſome virtue to water by diſtillation: but the degree of the impregnation of the water which a plant is capable of ſaturating with its virtue, are by no means in proportion to the quantity of its oil. The oil ſaturates only the water that comes over at the ſame time with it: if there be more oil than is ſufficient for this ſaturation, the ſurplus ſeparates, and concretes in its proper form, not miſcible with the water that ariſes afterwards. Some odoriferous flowers, whoſe oil is, in ſo ſmall quantity, that ſcarcely any viſible mark of it appears, unleſs fifty or an hundred pounds or more are diſtilled at once, give neverthelеſs as ſtrong an impregnation to water as thoſe plants which abound moſt with oil.

Many have been of opinion, that diſtilled waters may be more and more impregnated with the virtues of the ſubject, and their ſtrength increaſed to any aſſigned degree, by *cohobation*, that is, by rediſtilling them a number of times from freſh parcels of the plant. Experience, however, ſhows the contrary; a water ſkilfully drawn in the firſt diſtillation, proves on every repeated one not ſtronger but more diſagreeable. Aqueous liquors are not capable of imbibing above a certain quantity of the volatile oil of vegetables; and this they may be made to take up by one as well as by any number of diſtillations: the oftener the proceſs is repeated, the ungrateful impreſſion which they generally receive from the fire, even at the firſt time, becomes greater and greater. Thoſe plants, which do not yield at firſt waters ſufficiently ſtrong, are not proper ſubjects for this proceſs, ſince their virtue may be obtained much more advantageouſly by others.

General rules for the DISTILLATION *of the* OFFICINAL SIMPLE WATERS.

1. Where they are directed freſh, ſuch only muſt be employed: but ſome are allowed to be uſed dry, as being eaſily procurable in this ſtate at all times of the year, though rather more elegant waters might be obtained from them while green. 320

When freſh and juicy herbs are to be diſtilled, thrice their weight of water will be fully ſufficient; but dry ones require a much larger quantity. In general, there ſhould be ſo much water, that after all intended to be diſtilled has come over, there may be liquor enough left to prevent the matter from burning to the ſtill.

Plants differ ſo much, according to the ſoil and ſeaſon of which they are the produce, and likewiſe according to their own age, that it is impoſſible to fix the quantity of water to be drawn from a certain weight of them to any invariable ſtandard. The diſtillation may always be continued as long as the liquor runs well flavoured off the ſubject, and no longer.

2. The diſtillation may be performed in an alembic with a refrigeratory, the junctures being luted.
3. If the herbs are of prime goodneſs, they muſt be taken in the weights preſcribed: but when freſh ones are ſubſtituted for dry, or when the plants themſelves are the produce of unfavourable ſeaſons, and weaker than ordinary, the quantities are to be varied according to the diſcretion of the artiſt.

After the odorous water, alone intended for uſe, has come over, an acidulous liquor ariſes, which has ſometimes extracted ſo much from the copper head of the ſtill as to prove emetic. To this are owing the anthelmintic virtues attributed to certain diſtilled waters.

4. In a preceeding edition of the Edinburgh pharmacopœia, ſome vegetables were ordered to be ſlightly fermented with the addition of yeſt previouſly to the diſtillation.

The principle on which this management is founded, is certainly juſt; for the fermentation ſomewhat opens and unlocks their texture, ſo as to make them part with more in the ſubſequent diſtillation than could be drawn over from them without ſome aſſiſtance of this kind. Thoſe plants, however, which require this treatment, are not proper ſubjects for ſimple waters to be drawn from, their virtues being obtainable to better advantage by other proceſſes.

5. If any drops of oil ſwim on the ſurface of the water, they are to be carefully taken off.
6. That the waters may keep the better, about a 20th part their weight of proof-ſpirit may be added to each after they are diſtilled.

A great number of diſtilled waters were formerly kept in the ſhops, and are ſtill retained in foreign pharmacopœias. The faculty of Paris direct, in the laſt edition of their *Codex Medicamentarius*, no leſs than 125 different waters, and 130 different ingredients in one ſingle water. Nearly one half of theſe preparations have ſcarcely any virtue or flavour from the ſubject, and many of the others are inſignificant.

The colleges of London and Edinburgh have rejected theſe oſtentatious ſuperfluities, and given an elegant and compendious ſet of waters, ſufficient for anſwering ſuch purpoſes as theſe kinds of preparations are applied to in practice. Diſtilled waters are employed chiefly as grateful diluents, as ſuitable vehicles for medicines of greater efficacy, or for rendering diſguſtful ones more acceptable to the palate and ſtomach; few are depended on, without any intention of conſequence, by themſelves.

Diſtilled water. L.

321 Take of ſpring-water, 10 gallons. Draw off by diſtillation, firſt, four pints; which being thrown away, draw off four gallons. This water is to be kept in a glaſs or earthen bottle with a glaſs ſtopper.

Diſtilled water. E.

Let well or river water be diſtilled in very clean veſſels till about two thirds are drawn off.

Native water is ſeldom or never found pure, and generally contains earthy, ſaline, metallic, or other matters. Diſtillation is therefore employed as a means of freeixg it from theſe heterogeneous parts. For ſome pharmaceutical purpoſes diſtilled water is abſolutely neceſſary: thus, if we employ hard undiſtilled water for diſſolving ſugar of lead, inſtead of a perfect ſolution, we produce a milky-like cloud, owing to a real decompoſition of parts.

Diſtilled water is now employed by the London college for a great variety of purpoſes; and there can be no doubt, that in many chemical and pharmaceutical proceſſes, the employment of a heterogeneous fluid, in place of the pure element, may produce an eſſential alteration of qualities, or fruſtrate the intention in view. While the London college have made more uſe of diſtilled water than any other, their directions for preparing it ſeem to be the beſt. For as ſome impregnations may be more volatile than pure water, the water may be freed from them by throwing away what comes firſt over; and by keeping it afterwards in a cloſe veſſel, abſorption from the air is prevented.

Dill-water L.

Take of dill-ſeed, bruiſed, one pound; water, ſufficient to prevent an empyreuma. Draw off one gallon. 322

Simple dill-ſeed water. E.

Take of dill-ſeeds, one pound; pour on as much water as when ten pounds have been drawn off by diſtillation there may remain as much as is ſufficient to prevent an empyreuma. After proper maceration, let ten pounds be drawn off.

Although the dill-water holds a place, not only in the London and Edinburh pharmacopœias, but alſo in moſt of the foreign ones; yet it is not much employed in practice. It obtains, indeed, a pretty ſtrong impregnation from the ſeeds, and is ſometimes employed as a carminative, particularly as the baſis of mixtures and juleps; but it is leſs powerful and leſs agreeable than that of peppermint, cinnamon, and ſome others.

Cinnamon water. L. E

Take of cinnamon, bruiſed one pound; water, ſufficient to prevent and empyreuma. Macerate for 24 hours, and draw off one gallon. 323

From one pound of cinnamon the Edinburgh college direct 10 pounds of water to be drawn off; and if the cinnamon employed be of good quality, it may yield that quantity with a ſtrong impregnation: but what comes over firſt is unqueſtionably the ſtrongeſt.

This is a very grateful and uſeful water, poſſeſſing in an eminent degree the fragrance and aromatic cordial virtues of the ſpice. Where real cinnamon water is wanted, care ſhould be had in the choice of the cinnamon. To avoid the too common impoſition of caſſia being ſubſtituted in its room. The two drugs may be eaſily diſtinguiſhed from each other by a variety of marks, which it is needleſs to introduce in this place. See CASSIA and CINNAMON. But the eſſential oils of the two approach ſo near, that after diſtillation it is perhaps impoſſible to diſtinguiſh the waters; and it is ſtill more doubtful how far the one is in any degree preferable to the other.

The oil of cinnamon is very ponderous, and ariſes more difficultly than that of any other of the vegetable matters from which ſimple waters are ordered to be drawn. This obſervation directs us, in the diſtillation of this water, to uſe a quick fire and a low veſſel. For the ſame reaſon, the water does not keep ſo well as might be wiſhed; the ponderous oil parting from it in time, and falling to the bottom, when the liquor loſes its milky hue, its fragrant ſmell, and aromatic taſte. Some recommend a ſmall proportion of ſugar to be added, in order to keep the oil united with the water.

Caſſia-water. E.

324 From a pound and a half of the caſſia bark, ten pounds of water are directed to be drawn off in the ſame manner as the dill-water.

This diſtilled water, as we have already obſerved, when properly prepared, approaches ſo near to that of cinnamon, that it is almoſt, if not altogether, impoſſible to diſtinguiſh the difference between the two. And though the London college has given it no place in their pharmacopœia, yet we may venture to aſſert, that it is no ſtranger in the ſhops of the apothecaries. Nay, ſo great is the difference of price, and the ſenſible qualities ſo nearly alike, that what is ſold under the name of cinnamon-water is almoſt entirely prepared from caſſia alone; and not even prepared from the caſſia bark, as directed by the Edinburgh college, but from the caſſia buds, which may be had at a ſtill cheaper rate, and which yield preciſely the ſame eſſential oil, although in leſs quantity. When caſſia-water is prepared preciſely according to the directions of the Edinburgh college, from containing a larger proportion of the ſubject, it has in general a ſtronger impregnation than their genuine cinnamon-water, and is probably in no degree inferior in its virtues.

Fennel-water. L.

325 Take of ſweet fennel ſeeds, bruiſed, one pound; water, ſufficient to prevent an empyreuma. Draw off one gallon.

The water of fennel ſeeds is not unpleaſant. A water has alſo been diſtilled from the leaves. When theſe are employed, they ſhould be taken before the plant has run into flower; for after this time they are much weaker and leſs agreeable. Some have obſerved, that the upper leaves and tops, before the flowers appear, yield a more elegant water, and a remarkably finer eſſential oil than the lower ones; and that the oil obtained from the one ſwims on the water, while that of the other ſinks. No part of the herb, however, is equal in flavour to the ſeeds.

Peppermint-water.

326 Take of herb of peppermint, dried, one pound and an half; water, ſufficient to prevent an empyreuma. Draw off one gallon. *L.*

From three pounds of the leaves of peppermint, ten pounds of water are to be drawn off. *E.*

This is a very elegant and uſeful water. It has a warm pungent taſte, exactly reſembling that of the peppermint itſelf. A ſpoonful or two taken at a time warm the ſtomach, and give great relief in cold flatulent colics. Some have ſubſtituted a plain infuſion of the dried leaves of the plant, which is not greatly different in virtue from the diſtilled water.

In the diſtillation of this water, a conſiderable quantity of eſſential oil generally comes over in its pure ſtate. And it is not uncommon to employ this for impregnating other water, with which it may be readily mixed by the aid of a little ſugar.

Spearmint-water. L.

327 Take of ſpearmint, dried, one pound and an half; water ſufficient to prevent an empyreuma. Draw off one gallon.

The Edinburgh college directs this water to be made in the ſame proportion as the preceding. But probably three pounds of the freſh herb will not give a ſtronger impregnation than a pound and a half of the dried: ſo that the water of the London college may be conſidered to be as ſtrongly impregnated as that of the Edinburgh college.

This water ſmells and taſtes very ſtrongly of the mint; and proves in many caſes an uſeful ſtomachic. Boerhaave commends it (cohobated) as a pleaſant and incomparable remedy for ſtrengthening a weak ſtomach, and curing vomiting proceeding from cold viſcous phlegm, and alſo in lienteries.

All-ſpice-water. L. E.

328 Take of all-ſpice, bruiſed, half a pound; water, ſufficient to prevent an empyreuma. Macerate for 24 hours, and draw off one gallon.

From half a pound of the pimento the Edinburgh college directs ten pounds of water to be drawn off; ſo that the impregnation is there ſomewhat weaker than the above.

This diſtilled water is a very elegant one, and has of late come pretty much into uſe; the hoſpitals employ it as a ſuccedaneum to the more coſtly ſpice-waters. It is, however, inferior in gratefulneſs to the ſpirituous water of the ſame ſpice hereafter directed.

Pennyroyal-water. L. E.

329 Take of dried herb pennyroyal, one pound and an half; water, ſufficient to prevent an empyreuma. Draw off one gallon.

The pennyroyal-water is directed to be prepared by the Edinburgh college in the ſame proportions as the mint and peppermint. Whether prepared from the recent or dried plant it poſſeſſes in a conſiderable degree the ſmell, taſte, and, virtues of the pennyroyal. It is not unfrequently employed in hyſterical caſes, and ſometimes with a good effect.

Roſe-water. L. E.

330 Take of freſh petals of the damaſk roſe, the white heels being cut off, ſix pounds; water ſufficient to prevent an empyreuma. Draw off one gallon.

From the ſame quantity the Edinburgh college direct ten pounds to be drawn off.

This water is principally valued on account of its fine flavour, which approaches to that generally admired in the roſe itſelf. The purgative virtue of the roſes remains entire in the liquor left in the ſtill, which has therefore been generally employed for making the ſolutive honey and ſyrup, inſtead of a decoction or infuſion of freſh roſes prepared on purpoſe; and this piece of frugality the college have now admitted. A diſtilled water of red roſes has been ſometimes called for in the ſhops, and ſupplied by that of damaſk roſes diluted with common water. This is a very venial ſubſtitution; for the water drawn from the red roſe has no quality which that of the damaſk does not poſſeſs in a far ſuperior degree; neither the purgative virtue of the one nor the aſtringency of the other ariſing in diſtillation.

Lemon-peel-water. E.

331 From two pounds of recent lemon-peel ten pounds of water are to be drawn off by diſtillation.

Orange-peel-water. E

332 From two pounds of orange-peel ten pounds of water are directed to be drawn off.

Neither of theſe diſtilled waters are now to be met with in the London pharmacopœia; and it is probable that no great loſs ariſes from the want of them, for both the one and the other contain only a very weak impregnation. They are chiefly employed as diluents in fevers and other diſorders where the ſtomach and palate are very apt to be diſguſted. And perhaps the only circumſtance for which they are valuable is the ſlightneſs of the impregnation; for in ſuch affections, any flavour, however agreeable at other times, often becomes highly diſguſtful to patients.

The diſtilled waters above noticed are the whole that have now a place in the pharmacopœias of the London and and Edinburgh colleges; and perhaps this ſelection is ſufficiently large for anſwering every uſeful purpoſe. But beſides theſe, a conſiderable number of others are ſtill even retained in the modern foreign pharmacopœias; ſome of which at leaſt it may not be improper to mention.

Alexiterial water. Brun.

333 Take of elder flowers, moderately dried, three pounds; angelica leaves, freſh gathered, two pounds; ſpring water, forty pounds. Draw off, by diſtillation, thirty pounds.

This water is ſufficiently elegant with regard to taſte and ſmell; though few expect from it ſuch virtues, as its title ſeems to imply. It is uſed occaſionally for vehicles of alexipharmac medicines, or in juleps to be drank after them, as coinciding in the intention; but in general is not ſuppoſed to be itſelf of any conſiderable efficacy.

Camphor-water. Brun.

334 Take of camphor, an ounce and an half. Let it be diſſolved in half an ounce of the ſpirit of roſemary, then pour on it two pounds of ſpring-water, and draw off by diſtillation a pound and an half.

This diſtilled water, which has no place in our pharmacopœias, is introduced into ſome of the foreign ones. And ſince camphor may be conſidered as a concrete eſſential oil, it naturally occurs as a form under which that medicine may be introduced with advantage in a diluted ſtate.

Caſtor-water. Brun.

335 Take of Ruſſia caſtor, one ounce; water, as much as will prevent burning. Draw off two pints.

Caſtor yields almoſt all its flavour in diſtillation to water, but treated in the ſame manner with ſpirit of wine gives over nothing. The ſpirit of caſtor formerly kept in the ſhops had none of the ſmell or virtues of the drug; while the water here directed proves, when freſh drawn, very ſtrong of it.

It is remarkable, that the virtues of this animal-ſubſtance reſide in a volatile oil, analogous to the eſſential oils of vegetables. Some are reported to have obtained, in diſtilling large quantities of this drug, a ſmall portion of oil, which ſmelt extremely ſtrong of the caſtor, and diffuſed its ungrateful ſcent to a great diſtance.

This water is uſed in hyſteric caſes, and ſome nervous complaints, though it has not been found to anſwer what many people expect from it. It loſes greatly of its flavour in keeping.

And it is probably from this circumſtance that it has no place either in our pharmacopœias or in the modern foreign ones; but at the ſame time, as poſſeſſing in a high degree the ſenſible qualities of the caſtor, it may be conſidered as juſtly deſerving future attention.

Chervil-water. Gen.

Take of freſh leaves of chervil, one pound; ſpring-water as much as is ſufficient for allowing eight pounds to be drawn off by diſtillation, at the ſame time avoiding empyreuma. 236

Although the chervil be but little employed in Britain, yet among ſome of the foreigners it is held in high eſteem; and the diſtilled water is perhaps one of the moſt elegant forms under which its active parts can be introduced. But there is reaſon to believe that thoſe diuretic powers, for which it has been chiefly celebrated, will be moſt certainly obtained from exhibiting it in ſubſtance, or under the form of the expreſſed juice of the recent plant.

Black-cherry-water. Suec.

Take of ripe black cherries bruiſed with the kernels, 20 pounds; pure water, as much as is ſufficient for avoiding empyreuma. Draw off 20 pounds by diſtillation. 237

This water, although now baniſhed from our pharmacopœias, has long maintained a place in the foreign ones, and even in Britain it is not unfrequently to be met with in the ſhops. It has often been employed by phyſicians as a vehicle, in preference to the other diſtilled waters; and among nurſes who have the care of young children has been the firſt remedy againſt the convulſive diſorders to which infants are ſo often ſubject.

This water has nevertheleſs of late been brought into diſrepute, and has been eſteemed poiſonous. They obſerve, that it receives its flavour principally from the cherry ſtones; and that theſe kernels like many others, bear a reſemblance in taſte to the leaves of the lauroceraſus, which have been diſcovered to yield, by infuſion or diſtillation, the moſt ſudden poiſon known. Some phyſicians in England have lately found, by trial purpoſely made, that a diſtilled water very ſtrongly impregnated with the flavour of the cherry kernels (no more than two pints being diſtilled from fourteen pounds of the cherry ſtones) proved in like manner poiſonous to brutes. The London college repeated the ſame experiment, and found the effects agreeable to thoſe gentlemens report.

It by no means follows from theſe trials, nor after ſuch long experience can it be imagined, that black-cherry-water, when no ſtronger than the ſhops have been accuſtomed to prepare it, is unſafe. Theſe kernels plainly reſemble opium, and ſome other things, which poiſon only when taken in too great a quantity. The water from the very laurel leaves is harmleſeſs when duly diluted; and even ſpirit of wine proves a poiſon of its kind not greatly different, if drank to a certain degree of exceſs. Nor can it be concluded, from the trials with the ſtrong black-cherry water on dogs, &c. that even this will have the ſame effects in the human body; the kernels of many ſorts of fruits being in ſubſtance poiſonous to brutes, though innocent to man.

It is poſſible, however, that this water in any degree of ſtrength may not be altogether ſafe to the tender age of infants, where the principles of life are but juſt beginning as it were to move. It is poſſible that it may there have had pernicious effects without being ſuſpected; the ſymptoms it will produce, if it ſhould prove hurtful, being ſuch as children are often thrown into from the diſeaſe which it is imagined to relieve. On theſe conſiderations, both the London and Edinburgh colleges have choſen to lay it aſide; more eſpecially as it has been too often counterfeited with a water diſtilled from bitter almonds, which are known to communicate a poiſonous quality. It is, however, one of thoſe active articles which may perhaps be conſidered as deſerving farther attention.

Camomile-flower water. Dan.

338 Take of camomile flowers, dried in the ſhade, eight pounds; water, 72 pounds. Draw off by gentle diſtillation 48 pounds.

Cammomile flowers were formerly ordered to be fermented previouſly to the diſtillation, a treatment which they do not need; for they give over, without any fermentation, as much as that proceſs is capable of enabling them to do. In either caſe the ſmell and peculiar flavour of the flowers ariſe without any of the bitterneſs, this remaining behind in the decoction; which, if duly depurated and inſpiſſated, yields an extract ſimilar to that prepared from the flowers in the common manner. The diſtilled water has been uſed in flatulent colics and the like, but is at preſent held in no great eſteem.

Strawberry water. Suec.

339 From 20 pounds of ſtrawberies 20 pounds of diſtilled water are drawn off, according to the ſame directions given for the preparation of the black cherry water.

Water thus impregnated with the eſſential oil of the ſtrawberries ſome people will think of a very agreeable flavour, but any conſiderable medical power is not to be expected from it.

Hyſſop water. Suec.

340 From four pounds of the freſh leaves of hyſſop ſix pounds of water are drawn off.

Hyſſop-water has been held by ſome in conſiderable eſteem as an uterine and pectoral medicine. It was directed in a former edition of the Edinburgh pharmacopœia for making up the black pectoral troches, but is now exchanged for common water. Few at preſent expect any ſingular virtues from it, nor is it often to be met with in our ſhops, being now expunged from our pharmacopœias. It holds a place, however, in moſt of the foreign ones, and among ourſelves there are ſtill ſome practitioners who frequently employ it. But there can be no doubt that thoſe medical properties which the hyſſop contains may be more readily and effectually extracted by ſimple infuſion.

White-lily water. Brun.
Lily-of the-valley-water. Brun.

341 To any quantity of theſe flowers four times their weight of water is to be added, and water drawn off by diſtillation in the proportion of two pounds to each pound of the flowers.

Theſe waters muſt obtain ſome impregnation of that elegant eſſential oil on which the odour of flowers in their growing ſtate depends. But they do not poſſeſs any remarkable medical proprieties.

Balm-water. Brun.

342 The green leaves of the balm are to be macerated with double their weight of water; and from each pound of the plant a pound and an half of water is to be drawn off.

This water contains a conſiderable impregnation from the balm, which yields its eſſential oil pretty freely on diſtillation. Though now baniſhed from our pharmacopœias, it has ſtill a place in moſt of the foreign ones. In the old editions of the Edinburgh pharmacopœia, this water was ordered to be cohobated or rediſtilled from freſh quantities of the herb. This management ſeems to have been taken from Boerhaave, who has a very high opinion of the water thus prepared: he ſays, he has experienced in himſelf extraordinary effects from it taken on an empty ſtomach: that it has ſcarce its equal in hypochondriacal and hyſterical caſes, the chloroſis, and palpitation of the heart, as often as thoſe diſeaſes proceed from a diſorder of the ſpirits rather than from any collection of morbific matter.

But whatever virtues are lodged in balm, they may be much more perfectly and advantageouſly extracted by cold infuſion in aqueous or ſpirituous menſtrua: in this laſt proceſs, the liquor ſuffers no injury from being returned on freſh parcels of the herb: a few repetitions will load it with the virtues of the ſubject, and render it very rich. The impregnation here is almoſt unlimited; but in diſtilled waters it is far otherwiſe.

Rue water. Roſſ.

343 From each pound of rue, with a ſufficient quantity of ſpring-water to prevent empyreuma, two pounds of diſtilled water are to be drawn.

Rue gives over in this proceſs the whole of its ſmell, and great part of its pungency. The diſtilled water ſtands recommended in epileptic caſes, the hyſteric paſſion, for promoting perſpiration, and other natural ſecretions. But though it is a good deal employed abroad, it is with us falling into diſpute.

Savin water.

This is diſtilled from the freſh leaves of ſavin, after the ſame manner as the other already mentioned.

344 This water is by ſome held in conſiderable eſteem for the ſame purpoſes as the diſtilled oil of ſavin. Boerhaave relates, that he has found it (when prepared by cohobation) to give an almoſt incredible motion to the whole nervous ſyſtem: and that, when properly uſed, it proves eminently ſerviceable for promoting the menſes and the hæmorrhoidal flux.

It has now, however, fallen ſo much into diſrepute as to have no place either in our pharmacopœias or in the beſt modern foreign ones: But at the ſame time, when we reflect how readily ſavin yields a large proportion of active eſſential oil on diſtillation, it may perhaps be conſidered as better entitled to attention than ſome other diſtilled waters which are ſtill retained.

Elder-flower-water. Brun.

345 This is diſtilled from freſh elder flowers, after the ſame manner as the white-lily water.

This water ſmells conſiderably of the flowers; but is rarely uſed among us.

Sage-water. Brun.

346 This is directed to be prepared from the green leaves of the ſage in the ſame manner as the balm-water.

Sage leaves contain a conſiderable proportion of eſſential oil, which they yield pretty freely on diſtillation. But their whole medical properties may with ſtill greater eaſe and advantage be extracted by ſimple infuſion.

To the ſimple diſtilled waters the London college have annexed the following remarks.

We have ordered the waters to be diſtilled from the dried herbs, becauſe freſh are not ready at all times of the year. Whenever the freſh are uſed, the weights are to be increaſed. But, whether the freſh or dried herbs be employed, the operator may vary the weight according to the ſeaſon in which they have been produced and collected.

Herbs and ſeeds kept beyond the ſpace of a year are leſs proper for the diſtillation of waters.

To every gallon of theſe waters add five ounces, by meaſure, of proof-ſpirit.

CHAP. XVIII. *Diſtilled Spirits.*

347 The flavours and virtues of diſtilled waters are owing, as was obſerved in the preceding chapter, to their being impregnated with a portion of the eſſential oil of the ſubject from which they are drawn. Spirit of wine, conſidered as a vehicle for theſe oils, has this advantage above water, that it is their proper menſtruum, and keeps all the oil that riſes with it perfectly diſſolved into an uniform limpid liquor.

Nevertheleſs, many ſubſtances, which, on being diſtilled with water, impart to it their virtues in great perfection; if treated in the ſame manner with ſpirit of wine, ſcarcely give it any ſmell or taſte. This difference proceeds from hence, that ſpirit is not ſuſceptible of ſo great a degree of heat as water. Liquids in general when made to boil, have received as great a heat as they are capable of ſuſtaining; now, if the extent of heat between freezing and boiling water, as meaſured by thermometers, be taken for a ſtandard, ſpirit of wine will be found to boil with leſs than four-fifths of that heat, or above one fifth-leſs than the heat of boiling water. It is obvious, therefore that ſubſtances may be volatile enough to riſe with the heat of boiling water, but not with that of boiling ſpirit.

Thus, if cinnamon, for inſtance, be committed to diſtillation with a mixture of ſpirit of wine and water, or with a pure proof-ſpirit, which is no other than a mixture of about equal parts of the two; the ſpirit will riſe firſt, clear, colourleſs, and tranſparent, and almoſt without any taſte of the ſpice; but as ſoon as the more ponderous watery fluid begins to riſe, the oil comes over freely with it, ſo as to render the liquor highly odorous, ſapid, and of a milky hue.

The proof-ſpirits uſually met with in the ſhops are accompanied with a degree of ill flavour: which, though concealed by means of certain additions, plainly diſcovers itſelf in diſtillation. This nauſeous reliſh does not begin to riſe till after the purer ſpirituous part has come over: which is the very time that the virtues of the ingredients begin alſo moſt plentifully to diſtil: and hence the liquor receives an ungrateful taint. To this cauſe principally is owing the general complaint, that the cordials of the apothecary are leſs agreeable than thoſe of the ſame kind prepared by the diſtiller: the latter being extremely curious in rectifying or purifying the ſpirits (when deſigned for what he calls fine goods) from all ill flavour.

Ardent ſpirit. L.

348 Take of rectified ſpirit of wine, one gallon; kali, made hot one pound and an half; pure kali, one ounce. Mix the ſpirit of wine with the pure kali, and afterwards add one pound of the hot kali, and ſhake them, and digeſt for twenty-four hours. Pour off the ſpirit, to which add the reſt of the kali, and diſtil in a water bath. It is to be kept in a veſſel well ſtopped. The ſpecific gravity of the alcohol is to that of diſtilled water as 815 to 1000.

We have already offered ſome obſervations on ſpirit of wine both in the ſtate of what is called *rectified* and *proof-ſpirit*. But in the preſent formula we have ardent ſpirit ſtill more freed from an admixture of water than even the former of theſe. And in this ſtate it is unqueſtionably beſt fitted for anſwering ſome purpoſes. It may therefore be juſtly conſidered as an ommiſſion in the preſent edition of the Edinburgh pharmacopœia, that they have no analogous form. In former editions of this work, alcohol was directed to be prepared from French brandy. But this is rather too dear an article in this country for diſtillation; nor is the ſpirit obtained from it anywiſe preferable to one procurable from cheaper liquors. The coarſer inflammable ſpirits may be rendered perfectly pure, and fit for the niceſt purpoſes, by the following method.

If the ſpirit be exceedingly foul, mix it with about an equal quantity of water, and diſtil with a ſlow fire; diſcontinuing the operation as ſoon as the liquor begins to run milky, and diſcovers by its nauſeous taſte that the impure and phlegmatic part is riſing. By this treatment, the ſprit leaves a conſiderable portion of its foul oily matter behind it in the water, which now appears milky and turbid, and proves highly diſagreeable to the taſte. If the ſpirit be not very foul at firſt, this ablution is not neceſſary; if extremely ſo, it will be needful to repeat it once, twice, or oftener.

As vinous ſpirits ariſe with a leſs degree of fire than watery liquors, we are hence directed to employ, in the diſtillation of them, a heat leſs than that in which water boils; and if due regard be had to this circumſtance, very weak ſpirits may, by one or two wary diſtillations, be tolerably well freed from their aqueous phlegm; eſpecially if the diſtilling veſſels are of ſuch a height, that the ſpirit, by the heat of a water-bath, may but juſt paſs over them: in this caſe, the phlegmatic vapours which riſe for a little way along with the ſpirit, will condenſe and fall back again before they can come to the head. Very pompous inſtruments have been contrived for this purpoſe, and carried in a ſpiral or ſerpentine form to an extraordinary heigh. The ſpirit aſcending through theſe, was to leave all the watery parts it contained in its paſſage, and come over perfectly pure and free from phlegm. But theſe inſtruments are built upon erroneous principles, their extravagant height defeating the end it was deſigned to anſwer; if the liquor be made to boil, a conſiderable quantity of mere phlegm will come over along with the ſpirit; and if the heat be not raiſed to this pitch, neither phlegm nor ſpirit will diſtil. The moſt convenient inſtrument is the common ſtill; between the body of which and its head an adopter or copper tube may be fixed.

The ſpirit being waſhed, as above directed, from its foul oil, and freed from the greateſt part of the phlegm by gentle diſtillation in a water-bath, add to every gallon of it a pound or two of pure dry fixed alkaline ſalt. Upon digeſting theſe together for a little time, the alkali, from its known property of attracting water and oils, will imbibe the remaining phlegm, and ſuch part of the diſagreeable unctuous matter as may ſtill be left in the ſpirit, and will ſink with them to the bottom of the veſſel. If the ſpirit be now again gently drawn over, it will riſe entirely free from its phlegm and nauſeous flavour; but ſome particles of the alkaline ſalt are apt to be carried up with it, and give what the workmen call an *urinous reliſh*: this may be prevented by adding, previous to the laſt diſtillation, a ſmall proportion of calcined vitriol, alum or bitter cathartic ſalt; the acids of theſe ſalts will unite with and neutralize the alkali, and effectually prevent it from riſing: while no more of the acid of the ſalt is extricated than what the kali abſorbs.

The ſpirit obtained by this means is extremely pure, limpid, perfectly flavourleſs, and fit for the fineſt purpoſes. It may be reduced to the ſtrength commonly underſtood by proof, by mixing twenty ounces of it with ſeventeen ounces of water. The diſtilled cordials made with theſe ſpirits prove much more elegant and agreeable, than when the common rectified or proof-ſpirits of the ſhops are uſed.

If the rectified ſpirit be diſtilled afreſh from dry alkaline ſalt with a quick fire, it brings over a conſiderable quantity of the ſalt; and in this ſtate it is ſuppoſed to be a more powerful menſtruum for certain ſubſtances than the pure ſpirit. This alkalized ſpirit is called *tartariſed ſpirit of wine*.

The proceſs here deſcribed, which was long ſince recommended by Dr Lewis, will ſufficiently explain the intention of the London college, in the directions they have now given for the preparation of alcohol. And there can be no doubt, that by their proceſs a very pure alcohol may be obtained. Of this we have a ſufficient teſt in the ſpecific gravity of the fluid which comes over, which is to that of diſtilled water only as 815 to 1000, while the ſpecific gravity of proper rectified ſpirit is as 835 to 1000.

Spirit of vitriolic æther. L.

Take of rectified ſpirit of wine, vitriolic acid, each one pound. Pour by a little at a time the acid on the ſpirit, and mix them by ſhaking; then from a retort through a tubulated receiver, to which another recipient is fitted, diſtil the ſpirit of vitriolic æther till ſulphureous vapours begin to riſe. 349

Vinous vitriolic acid, commonly called *dulcified ſpirit of vitriol.* E.

Take of vitriolic ethereal liquor, one part; rectified ſpirit of wine, two parts. Mix them.

The laſt of theſe proceſſes is a very ready and convenient method of preparing the dulcified ſpirit of vitriol, which only differs from æther by the acid being more predominant, and leſs intimately combined.

In the firſt proceſs, a good deal of caution is requiſite in mixing the two liquors. Some direct the ſpirit of wine to be put firſt into the retort. and the oil of vitriol to be poured upon it all at once; a method of procedure by no means adviſable, as a violent heat and ebullition always enſue, which not only diſſipate a part of the mixture, but hazard alſo the breaking of the veſſel, to the great danger of the operator. Others put the oil of vitriol into the retort firſt: then by means of a funnel, with a long pipe that may reach down juſt to the ſurface of the acid, pour in the ſpirit of wine: if this be done with ſufficient caution, the vinous ſpirit ſpreads itſelf on the ſurface of the oil of vitriol, and the two liquors appear diſtinct. On ſtanding for a week or two, the vinous ſpirit is gradually imbibed, without any commotion, and the veſſel may then be ſafely ſhaken to complete the mixture; but if the ſpirit be poured in too haſtily at firſt, or if the veſſel be moved before the two liquors have in ſome degree incorporated, the ſame effect enſues as in the foregoing caſe. The only ſecure way is, to add the oil of vitriol to the ſpirit of wine by a little quantity at a time, waiting till the firſt addition be incorporated before another quantity is put in; by this management the heat that enſues is inconſiderable, and the mixture is effected without any inconvenience.

The diſtillation ſhould be performed with an equable and very gentle heat, and not continued ſo long as till a black froth begins to appear: for before this time a liquor will ariſe of a very different nature from the ſpirits here intended. The ſeveral products are moſt commodiouſly kept apart by uſing a tubulated receiver, ſo placed that its pipe may convey the matter which ſhall come over into a vial ſet underneath. The juncture of the retort and recipient is to be luted with a paſte made of lintſeed meal, and further ſecured by a piece of wet bladder; the lower juncture may be cloſed only with ſome ſoft wax, that the vial may be occaſionally removed with eaſe.

The true dulcified ſpirit ariſes in thin ſubtile vapours, which condenſe on the ſides of the recipient in ſtraight ſtriæ. It is colourleſs as water, very volatile, inflammable, of an extremely fragrant ſmell, in taſte ſomewhat aromatic.

After the fire has been kept up for ſome time, white fumes ariſe; which either form irregular ſtriæ, or are collected into large round drops like oil: On the firſt appearance of theſe, the vial, or the receiver, if a common one is uſed, muſt be taken away. If another be ſubſtituted and the diſtillation continued, an acid liquor comes over, of an exceeding pungent ſmell, like the fumes of burning brimſtone. At length a black froth begins haſtily to ariſe, and prevents carrying the proceſs further.

On the ſurface of the ſulphureous ſpirit is found ſwimming a ſmall quantity of oil, of a light yellow colour, a ſtrong, penetrating, and very agreeable ſmell. This oil ſeems to be nearly of the ſame nature with the eſſential oils of vegetables. It readily and totally diſſolves in rectified ſpirit of wine, and communicates to a large quantity of that menſtruum the taſte and ſmell of the aromatic or dulcified ſpirit.

The matter remaining after the diſtillation is of a dark blackiſh colour, and ſtill highly acid. Treated with freſh ſpirit of wine, in the ſame manner as before, it yields the ſame production: till at length all the acid that remains unvolatiliſed being ſaturated with the inflammable oily matter of the ſpirit, the compound proves a bituminous ſulphureous maſs; which, expoſed to the fire in open veſſels, readily burns, leaving a conſiderable quantity of fixed aſhes; but in cloſe ones it explodes with violence; with fixed alkaline ſalts it forms a compound nearly ſimilar to one compoſed of alkalis and ſulphur.

The new names adopted by the London and Edinburgh colleges for this fluid, are expreſſive of its compoſition; the one employed the term of *ſpiritus ætheris vitriolici*, the other of *acidum vitriolicum vinoſum*; the old term of *ſpiritus vitrioli dulcis* is leſs properly fitted to diſtinguiſh it from other fluids, and to convey a juſt idea of its nature.

Dulcified ſpirit of vitriol has been for ſome time greatly eſteemed, both as a menſtruum and a medicine. It diſſolves ſome reſinous and bituminous ſubſtances more readily than ſpirit of wine alone, and extracts elegant tinctures from ſundry vegetables. As a medicine, it promotes perſpiration and the urinary ſecretion, expels flatulencies, and in many caſes abates ſpaſmodic ſtrictures, eaſes pains, and procures ſleep. The doſe is from ten to eighty or ninety drops in any convenient vehicle. It is not eſſentially different from the celebrated anodyne liquor of Hoffman; to which it is, by the author himſelf, not unfrequently directed as a ſuccedaneum.

Of this fluid however, or at leaſt of an article ſtill more nearly reſembling it, we ſhall afterwards have occaſion to ſpeak, when we treat of the vinous ſpirit of vitriolic æther.

Vitriolic æther. L.

Take of the ſpirit of vitriolic ether, two pounds; water of pure kali one ounce. Shake them together, and diſtil, with a gentle heat, fourteen ounces by meaſure.

Vitriolic ethereal liquor. E.

Take of rectified ſpirit of wine, vitriolic acid, each thirty-two ounces. Pour the ſpirit into a glaſs retort fit for ſuſtaining a ſudden heat, and add to it the acid in an uniform ſtream. Mix them by degrees frequently ſhaking them moderately; this done, inſtantly diſtil from ſand previouſly heated for that purpoſe, into a receiver kept cool with water or ſnow. But the heat is to be ſo managed, that the liquor ſhall boil at firſt, and continue to boil till 16 ounces are drawn off; then let the retort be raiſed out of the ſand.

To the diſtilled liquor add two drams of the common bitter cauſtic; then diſtil again in a very high retort with a very gentle heat, into a cool receiver, until ten ounces have been drawn off.

If ſixteen ounces of rectified ſpirit of wine be poured upon the acid remaining in the retort after the firſt diſtillation, an ethereal liquor may be obtained by repeating the diſtillation. This may be done pretty often.

The preparation of this ſingular fluid, now received into public pharmacopœias, was formerly confined to a few hands; for though ſeveral proceſſes have been publiſhed for obtaining it, the ſucceſs of moſt of them is precarious and ſome of them are accompanied alſo with danger to the operator. The principal difficulty conſiſts in the firſt part of the diſtillation.

It has been uſual to direct the heat to be kept up till a black froth begins to appear: but if it is managed in the manner here directed, the quantity of æther which the liquor can afford will be formed and drawn off before this ſulphureous froth appears. The uſe of the cauſtic alkali is to engage any uncombined vitriolic acid which may be preſent in the firſt diſtilled liquor. If a mild alkali were employed for this purpoſe, the ſeparation of its air by the acid might endanger the burſting of the veſſels. The laſt is indeed an inconvenience which attends the whole of this proceſs. It might in a great meaſure be obviated by employing a range of receivers ſuch as the adopter deſcribed in the firſt part of this work.

The æther, or etherial ſpirit, is the lighteſt, moſt volatile and inflammable of all known liquids. It is lighter than the moſt highly rectified ſpirit of wine, in the proportion of about 7 to 8: a drop, let fall on the hand, evaporates almoſt in an inſtant, ſcarcely rendering the part moiſt. It does not mix, or only in a ſmall quantity, with water, ſpirit of wine, alkaline lixivia, volatile alkaline ſpirits, or acids; but is a powerful diſſolvent for oils, balſams, reſins, and other analogous ſubſtances; it is the only known ſubſtance capable of diſſolving the elaſtic gum: it has a fragrant odour, which in conſequence of the volatility of the fluid, is diffuſed through a large ſpace. It has often been found to give eaſe in violent headachs, by being applied externally to the part; and to relieve the toothach, by being laid on the afflicted jaw. It has been given alſo internally, with benefit, in hooping coughs, hyſterical caſes, in aſthma, and indeed in almoſt every ſpaſmodic affection, from a few drops to the quantity of half an ounce, in a glaſs of wine or water; which ſhould be ſwallowed as quickly as poſſible, as the æther ſo ſpeedily exhales.

Spirit of nitrous æther. L.

351 Take of rectified ſpirit of wine, two pints; nitrous acid, half a pound. Mix them, by pouring in the acid on the ſpirit, and diſtil with a gentle heat one pound ten ounces.

Vinous acid of nitre, commonly called *dulcified ſpirit of nitre.* E.

Take of rectified ſpirit of wine, three pounds; nitrous acid one pound. Pour the ſpirit into a capacious phial, placed in a veſſel full of cold water, and add the acid by degrees, conſtantly agitating them. Let the phial be ſlightly covered, and laid by for ſeven days in a cool place; then diſtil the liquor with the heat of boiling water, into a receiver kept cool with water or ſnow, till no more ſpirit comes over.

By allowing the acid and rectified ſpirit to ſtand for ſome time, the union of the two is not only more complete, but the danger alſo of the veſſels giving way to the ebullition and heat conſequent on their being mixed, is in a great meaſure prevented. By fixing the degree of heat to the boiling point, the ſuperabundant acid matter is left in the retort, being too ponderous to be raiſed by that degree of heat.

Here the operator muſt take care not to invert the order of mixing the two liquors, by pouring the vinous ſpirit into the acid; for if he ſhould, a violent effervеſcence and heat would enſue, and the matter be diſperſed in highly noxious red fumes. The moſt convenient and ſafe method of performing the mixture ſeems to be to put the inflammable ſpirit into a large glaſs bottle with a narrow mouth, placed under a chimney, and to pour into it the acid, by means of a glaſs funnel, in very ſmall quantities at a time; ſhaking the veſſel as ſoon as the effervеſcence enſuing upon each addition ceaſes, before a freſh quantity is put in: by this means the glaſs will be heated equally, and be prevented from breaking. During the action of the two ſpirits upon each other, the veſſel ſhould be lightly covered: if cloſe ſtopped, it will burſt; and if left entirely open, ſome of the more valuable parts will exhale. Lemery directs the mixture to be made in an open veſſel; by which unſcientifical procedure, he uſually loſt, as he himſelf obſerves, half his liquor; and we may preſume, that the remainder was not the medicine here intended.

Several methods have been contrived for obviating the inconveniences ariſing from the elaſtic fluid and violent exploſions produced on the mixture of the nitrous acid and rectified ſpirit of wine: for preparing the nitrous æther they are abſolutely neceſſary, and might perhaps be conveniently uſed for making the dulcified ſpirit. The method we judge to be the beſt, is that employed by Dr Black. On two ounces of the ſtrong acid put into a phial, the doctor pours, ſlowly and gradually, about an equal quantity of water; which, by being made to trickle down the ſides of the phial, floats on the ſurface of the acid without mixing with it: he then adds, in the ſame cautious manner, three ounces of highly rectified ſpirit of wine, which in its turn floats on the ſurface of the water. By this means the three fluids are kept ſeparate on account of their different ſpecific gravities, and a ſtratum of water is interpoſed between the acid and ſpirit. The phial is now ſet in a cool place: the acid gradually aſcends and the ſpirit deſcends through the water, this laſt acting as a boundary to reſtrain their violent action on each other. By this method a quantity of nitrous æther is formed, without the danger of producing elaſtic vapours or exploſion.

For the preparation of the dulcified ſpirit, the liquors, when mixed together, ſhould be ſuffered to reſt for ſome time as above directed, that the fumes may entirely ſubſide, and the union be in ſome meaſure completed. The diſtillation ſhould be performed with a very ſlow and well regulated fire; otherwiſe the vapour will expand with ſo much force as to burſt the veſſels. Wilſon ſeems to have experienced the juſtneſs of this obſervation, and hence directs the juncture of the retort and receiver not to be luted, or but ſlightly: if a tubulated recipient, with a ſufficiently long pipe, be uſed, and the diſtillation performed with the heat of a water-bath, the veſſels may be luted without any danger: this method has likewiſe another advantage, as it aſcertains the time when the operation is finiſhed: examining the diſtilled ſpirit every now and then with alkaline ſalts, as directed above, is ſufficiently troubleſome; while in a water-bath we may ſafely draw over all that will riſe; for this heat will elevate no more of the acid than what is dulcified by the vinous ſpirit.

Dulcified ſpirit of nitre has been long held, and not undeſervedly, in great eſteem. It quenches thirſt, promotes the natural ſecretions, expels flatulencies, and moderately ſtrengthens the ſtomach; it may be given from 20 drops to a dram, in any convenient vehicle. Mixed with a ſmall quantity of ſpirit of hartſhorn, the volatile aromatic ſpirit, or any other alkaline ſpirit, it proves a mild, yet efficacious, diaphoretic, and often remarkably diuretic; eſpecially in ſome febrile caſes, where ſuch a ſalutary evacuation is wanted. A ſmall proportion of this ſpirit added to malt ſpirits, gives them a flavour approaching to that of French brandy.

Spirit of ammonia. L.

Take of proof-ſpirit, three pints; ſal ammoniac, four ounces; pot-aſh, ſix ounces. Mix and diſtil with a ſlow fire one pint and an half. 352

Vinous ſpirit of ſal ammoniac. E.

Take of quicklime, 10 ounces: ſal ammoniac, eight ounces; rectified ſpirit of wine, 32 ounces. Having ſlightly bruiſed and mixed the quicklime and ammoniacal ſalt, put them into a glaſs retort; then add the ſpirit, and diſtil in the manner directed for the volatile cauſtic alkali, till all the ſpirit has paſſed over.

This ſpirit has lately come much into eſteem, both as a medicine and a menſtruum. It is a ſolution of volatile ſalt in rectified ſpirit of wine; for though proof-ſpirit be uſed, its phlegmatic part does not riſe in the diſtillation, and ſerves only to facilitate the action of the pure ſpirit upon the amoniacal ſalt.

Rectified ſpirit of wine does not diſſolve volatile alkaline ſalts by ſimple mixture: on the contrary, it precipitates them, as has been already obſerved, when they are previouſly diſſolved in water: but by the preſent proceſs, a conſiderable proportion of the volatile alkali is combined with the ſpirit. It might perhaps, for ſome purpoſes, be more adviſable to uſe with this intention the volatile ſpirit made with quicklime; for this may be mixed at once with rectified ſpirit of wine, in any proportion, without the leaſt danger of any ſeparation of the volatile alkali.

The name here employed by the London college, particularly when put in contradiſtinction to the water of ammonia, conveys a clear idea of the article, and is, we think, preferable to that employed by the Edinburgh college.

As a menſtruum, the ſpirit of ammonia is employed to diſſolve eſſential oils, thus forming the volatile aromatic ſpirit, or *compound ſpirit of ammonia*, as it is now called by the London college, which again is employed in making the tinctures of guaiac, valerian, &c.

The chief medical virtues which the ſpirit of ammonia poſſeſſes, when exhibited by itſelf, are thoſe of the volatile alkali.

Fetid ſpirit of ammonia.

353 Take of proof-ſpirit, ſix pints; ſal ammoniac, one pound; aſafœtida, four ounces; pot-aſh, one pound and a half. Mix them, and draw off by diſtillation five pints, with a ſlow fire. *L.*

Take of vinous ſpirit of ſal ammoniac, eight ounces; aſafœtida, half an ounce. Digeſt in a cloſe veſſel 12 hours; then diſtil of with the heat of boiling water eight ounces. *E.*

This ſpirit, the laſt formula of which is in our opinion the beſt, as being moſt eaſily prepared without any riſk of being injured in the preparation, is deſigned as an antihyſteric, and is undoubtedly a very elegant one. Volatile ſpirits, impregnated for theſe purpoſes with different fetids, have been uſually kept in the ſhops; the ingredient here made choice of, is the beſt calculated of any for general uſe, and equivalent in virtue to them all. The ſpirit is pale when newly diſtilled, but acquires a conſiderable tinge in keeping.

Compound ſpirit of anniſeed. L.

354 Take aniſeed, angelica-ſeed, of each bruiſed, half a pound; proof-ſpirit, one gallon; water, ſufficient to prevent an empyreuma. Draw off one gallon by diſtillation.

This compound ſpirit is now directed to be prepared by the London college in the ſame manner as in their former edition. It has no place in the Edinburgh pharmacopœia: but it may juſtly be conſidered as a very elegant aniſeed water. The angelica ſeeds greatly improve the flavour of the aniſe. It is often employed with advantage, particularly in caſes of flatulent cholic; but it has been alleged to be ſometimes too frequently uſed with this intention as a domeſtic medicine, eſpecially by old ladies: for unleſs it be prudently and cautiouſly employed, it may ſoon be attended with all the pernicious conſequences of dram-drinking.

Spirit of caraway. L.

355 Take of carraway ſeeds, bruiſed, half a pound; proof-ſpirit, one gallon; water, ſufficient to prevent an empyreuma. Draw off one gallon.

Spirituous caraway-water. E.

Take of caraway-ſeeds, half a pound; proof-ſpirits nine pounds. Macerate two days in a cloſe veſſel; then pour on as much water as will prevent an empyreuma, and draw off by diſtillation nine pounds.

By this proceſs the ſpirit obtains in great perfection the flavour of the caraway-ſeeds; and with ſome it is a cordial not uncommonly in uſe.

Spirit of cinnamon. L.

356 Take of bruiſed cinnamon one pound; proof-ſpirit, one gallon; water, ſufficient to prevent an empyreuma. Draw off one gallon.

Spirituous cinnamon-water. E.

From one pound of cinnamon, nine pounds of ſpirit are to be drawn off, in the ſame manner as in the caraway-ſpirit.

This is a very agreeable and uſeful cordial, but not ſo ſtrong of the cinnamon as might be expected; for very little of the virtues of the ſpice ariſes till after the pure ſpirituous part has diſtilled. Hence, in the former editions of the London pharmacopœia, the diſtillation was ordered to be protracted till two pints more than here directed were come over. By this means, the whole virtue of the cinnamon was more frugally than judicially obtained: for the diſagreeable flavour of the feints of proof ſpirits, and the acidulous liquor ariſing from cinnamon as well as other vegetables when their diſtillation is long continued, give an ill reliſh to the whole; at the ſame time that the oil which was extracted from the ſpice was by this acid thrown down.

In the Pharmacopœia Reformata, it is propoſed to make this ſpirit by mixing the ſimple cinnamon water with ſomewhat leſs than an equal quantity of rectified ſpirit: on ſhaking them together, the liquor loſes its milky hue, ſoon becomes clear, and more elegant than the water diſtilled as above: it is equally ſtrong of the cinnamon, and free from the nauſeous taint with which the common proof-ſpirits are impregnated.

Compound ſpirit of juniper. L. 357

Take of juniper-berries, bruiſed, one pound; caraway ſeeds, bruiſed, ſweet-fennel ſeeds, of each one ounce and an half; proof-ſpirit, one gallon; water-ſufficient to prevent an empyreuma. Draw off one gallon.

Compound juniper water. E.

Take of juniper-berries, well bruiſed, one pound; ſeeds of caraway, ſweet-fennel, each one ounce and a half; proof-ſpirit, nine pounds; macerate two days: and having added as much water as will prevent an empyreuma, draw off by diſtillation nine pounds.

This water, mixed with about an equal quantity of the rob of juniper-berries, proves an uſeful medicine in catarrhs, debility of the ſtomach and inteſtines, and ſcarcity of urine. The water by itſelf is a good cordial and carminative: the ſervice which this and other ſpirituous waters do with theſe intentions is commonly known; though the ill conſequences that follow from their conſtant uſe are too little regarded.

Spirit of Lavender. L.

358 Take of freſh flowers of lavender, one pound and an half; proof-ſpirit, one gallon. Draw off by diſtillation in a water-bath, five pints.

Simple ſpirit of lavender. E.

Take of flowering ſpikes of lavender, freſh gathered, two pounds; rectified ſpirit of wine, eight pounds. Draw off by the heat of boiling water ſeven pounds.

This ſpirit, when made in perfection, is very grateful and fragrant; It is frequently rubbed on the temples, &c. under the notion of refreſhing and comforting the nerves; and it probably operates as a powerful ſtimulus to their ſenſible extremities: it is likewiſe taken internally, to the quantity of a teaſpoonful, as a warm cordial.

Spirit of peppermint. L.

359 Take of the herb peppermint, dried, one pound and an half: proof-ſpirit, one gallon; water, ſufficient to prevent an empyreuma. Draw off one gallon.

Spirituous peppermint water. E.

From a pound and a half of theſe leaves nine pounds of ſpirit are drawn off, as from the caraway-ſeeds.

This ſpirit receives a ſtrong impregnation from the peppermint. It is employed in flatulent colics and ſimilar diſorders; and in theſe it ſometimes gives immediate relief: but where it is indicated, there are few caſes in which the peppermint-water is not preferable.

Spirit of Spearmint. L.

360 Take of ſpearmint, dried, one pound and an half; proof-ſpirit, one gallon; water, ſufficient to prevent an empyreuma. Draw off one gallon.

This ſpirit has no place in the Edinburgh pharmacopœia. It, however, turns out a very elegant one, and preferable, in weakneſs of the ſtomach, retching to vomit, and the like, to many more elaborate preparations. Where the diſorder is not accompanied with heat or inflammation, half an ounce of this water may be given diluted with ſome agreeable aqueous liquor; but, as was already obſerved with regard to the preceding article, there are many caſes in which the prudent practitioner will be diſpoſed to give the preference to the ſimple diſtilled water.

Spirit of nutmeg. L.

361 Take of bruiſed nutmegs, two ounces; proof-ſpirit, one gallon; water, ſufficient to prevent an empyreuma. Draw off one gallon.

Spirituous nutmeg-water. E.

By two ounces of the nutmeg, well bruiſed, nine pounds of ſpirit are impregnated.

This is an agreeable ſpirituous liquor, highly impregnated with the nutmeg flavour. It was formerly celebrated in nephritic diſorders, and when combined with a few hawthorn flowers, it had even the title of *nephritic water*. At preſent it is employed only as a cordial liquor, and is not even very frequently in uſe.

Spirit of pimento, or *all-ſpice.* L.

Take of all-ſpice, bruiſed, two ounces; proof-ſpirit, one gallon; water, ſufficient to prevent an empyreuma. Draw off one gallon. 362

Spirituous Jamaica-pepper water. L.

By half a pound of pimento nine pounds of ſpirit are to be impregnated.

This water is far more agreeable than a ſimple water drawn from the ſame ſpice; and had long a place among the cordials of the diſtiller before it was received into any public pharmacopœia; but although now adopted both by the London and Edinburgh colleges, it is not very frequently ordered from the ſhops of the apothecary.

Spirit of penny-royal. L.

Take of the herb pennyroyal, dried, one pound and an half; proof-ſpirit one gallon; water ſufficient to prevent an empyreuma. Draw off one gallon. 363

This ſpirit has no place in the Edinburgh pharmacopœia. It poſſeſſes, however, a conſiderable ſhare of the flavour of the pennyroyal, and very frequently it is employed as a carminative and antihyſteric.

Compound ſpirit of horſe-radiſh. L.

Take of freſh horſe raddiſh root, dried outer rind of Seville oranges, each two pounds; freſh herb of garden ſcurvy-graſs, four pounds: bruiſed nutmegs, one ounce; proof-ſpirit, two gallons; water, ſufficient to prevent an empyreuma. Draw off two gallons. 364

This ſpirit has long been conſidered as an elegant one, and is perhaps as well adapted for the purpoſes of an antiſcorbutic as any thing, that can be contrived in this form. It has been alleged, that the horſe radiſh and ſcurvy-graſs join very well together, giving a ſimilar flavour, though not a little diſagreeable; that the nutmeg ſuppreſſes this flavour very ſucceſsfully, without ſuperadding any of its own; and that to this, orange-peel adds a flavour very agreeable. Arum root had formerly a place in this water, but is here deſervedly thrown out; for it gives nothing of its pungency over the helm, notwithſtanding what is aſſerted by ſome pharmaceutical writers to the contrary. Muſtard-ſeed, though not hitherto employed in theſe kinds of compoſitions, would ſeem to be an excellent ingredient; it gives over the whole of its pungency, and is likewiſe leſs periſhable than moſt of the other ſubſtances of this claſs: this ſeed wants no addition, excepting ſome aromatic material to furniſh an agreeable flavour.

But although this proceſs may furniſh an agreeable compound ſpirit, yet it is much to be doubted, whether it poſſeſs thoſe antiſcorbutic powers for which it was once celebrated. And with this intention the Edinburgh college place ſo little confidence in it, that they have now rejected it from their pharmacopœia.

Spirit of roſemary.

Take of freſh tops of roſemary, one pound and a half; proof-ſpirit, one gallon. Diſtil in a water-bath, five pints. *L.*

365 Take of flowering tops of roſemary, freſh gathered, two pounds: rectified ſpirit of wine, eight pounds Diſtil in the heat of boiling water till ſeven pounds come over. *E.*

A ſpirit ſimilar to this is generally brought to us from abroad, under the name of *Hungary water*.

This ſpirit is very fragrant, ſo as to be in common uſe as a perfume: that brought from abroad is ſuperior in fragrance to ſuch as is generally made among us. In order to prepare it in perfection, the vinous ſpirit ſhould be extremely pure; the roſemary tops gathered when the flowers are full blown upon them, and committed immediately to diſtillation, care being taken not to bruiſe or preſs them. The beſt method of managing the diſtillation, is that which was formerly recommended for the diſtillation of the more volatile eſſential oils and ſimple waters, viz. firſt to place the ſpirit in the ſtill, and then ſet in, above the liquor either an iron hoop, with a hair-cloth ſtretched over it, upon which the flowers are to be lightly ſpread, or rather a baſket, ſupported on three pins, reaching down to the bottom. A gentle heat being applied, juſt ſufficient to raiſe the ſpirit, its vapour rightly percolating through the flowers, will imbibe their finer parts, without making that diſagreeable alteration, which liquors appplied to ſuch tender ſubjects, in their groſſer form, generally do. Probably the ſuperiority of the French Hungary water, to that prepared among us, is owing to ſome ſkilful management of this kind, or to employing a perfectly pure ſpirit.

In the Wirtemberg pharmacopœia, ſome ſage and ginger are added, in the proportion of half a pound of the former, and two ounces of the latter, to four pounds of the roſemary.

But the peculiar agreeable flavour of this water in all probability depends on the roſemary alone.

Carmelite water, or compound balm-water. Dan.

366 Take of freſh gathered leaves of balm, a pound and a half; the recent yellow rind of lemons, four ounces; nutmeg, coriander, each two ounces; cloves cinnamon, each one ounce. The ingredients being ſliced and bruiſed, pour upon them rectified ſpirit of wine, ſix pounds; balm water, three pounds. Digeſt for three days, then draw off ſix pounds by diſtillation.

This ſpirit has been a good deal celebrated, particularly among the French, under the title of *Eua de Carmes*. Mr Beaumé, in his *Elemens de Pharmacie*, propoſes ſome improvements on the proceſs. After the ſpirit added to the ingredients has been drawn off in the heat of a water bath, he orders the diſtilled liquor to be rectified by a ſecond diſtillation, drawing off ſomewhat leſs than nine-tenths of it. He recommends, that all the aromatic ſpirits ſhould be prepared in the ſame manner. When the common ſpirits of this kind are rubbed on the hands, &c. they leave after the more volatile parts have exhaled, a diſagreeable empyreumatic ſmell; and when diluted with water, and taken medicinally, they leave, in like manner, a nauſeous flavour in the mouth. To remedy theſe imperfections, he made many experiments, which ſhowed, that in order to obtain theſe liquors of the deſirable qualities, the ſpirit muſt not only be perfectly pure at firſt, but that the liquor ought alſo to be rectified after it has been diſtilled from the ſubjects. In this rectification, only the more volatile, ſubtile, aromatic parts of the ingredients ariſe: there remains behind a white liquor, acrid, bitter, loaded only with the groſſer oil, and deprived of all the ſpecific flavour of the ſubjects. Indeed the very imperfection complained of naturally points out this ſecond diſtillation as the remedy; for it ſhows the ſpirit to contain a grateful and ungrateful matter; the firſt of which exhales, while the other is left behind. The author ſays that when the *aqua meliſſæ* is prepared as above directed, it has ſomething in it more perfect than any of the odoriferous ſpirits, whoſe excellence is cried up, and which have the reputation of being the beſt.

Aromatic ſpirituous liquors have in general leſs ſmell, when newly diſtilled, than after they have been kept about ſix months. M. Beaumé ſuſpects that the preparations of this kind which have been moſt in vogue, were ſuch as have been thus improved by keeping; and found that the good effects of age might be produced in a ſhort time by means of cold. He plunges quart bottles of the liquor into a mixture of pounded ice and ſea ſalt: the ſpirit, after having ſuffered, for ſix or eight hours, the cold thence reſulting, proves as grateful as that which has been kept for ſeveral years. Simple waters alſo, after being frozen, prove far more agreeable than they were before, though they are always leſs ſo than thoſe which have been drawn with ſpirit and expoſed to a like degree of cold. This melioration of diſtilled waters by froſt was taken notice of by Geoffroy.

Spirit of Scurvy-graſs. Suec.

Take of freſh ſcurvy graſs, bruiſed, 10 pounds; rectified ſpirit of wine, eight pints. With the heat of a water-bath, diſtil off four pints. 367

This ſpirit is very ſtrong of the ſcurvy-graſs; and has been given in thoſe caſes where the uſe of this herb is proper, from 20 to 100 drops. The virtues of ſcurvy graſs reſide in a very ſubtile, volatile oil, which ariſes in diſtillation both with water and pure ſpirit; and if the liquors are expoſed to the air, ſoon exhales from both. The ſpirit, newly diſtilled, is extremely pungent; but if long kept, even in cloſe veſſels, it becomes remarkably leſs ſo; but it is not probable, that with ſuch a pungent vehicle we can uſe a ſufficient quantity of the herb to produce any permanent or conſiderable effect; it has been much recommended as a diuretic in dropſies.

The makers of this ſpirit have frequently added to the ſcurvy-graſs a quantity of horſe-radiſh root, and ſometimes ſubſtituted for it one drawn entirely from the horſe radiſh: the flavour of theſe two ſimples being ſo much alike that their diſtilled ſpirits are ſcarceby diſtinguiſhable from each other. Here it may be obſerved, that though *arum* and *dracunculus* are uſually ranked in the ſame claſs with the two foregoing vegetables, and conſidered as ſimilar to them; this proceſs diſcovers a remarkable difference: while the former yield all their pungency in diſtillation both to water and ſpirit; the latter give over nothing to either, and yet their virtues are deſtroyed in the operation.

Orange-peel water. Suec.

268 Take of recent orange ſkins, one pound; proof-ſpirit, three pounds. Draw off two pounds by the heat of a water bath.

This ſpirit, which is now rejected from our pharmacopœias, had formerly a place in them under the title of *aqua corticum aurantiorum ſpirituoſa*. It is conſiderably ſtronger of the orange-peel than the ſimple water; and it is uſed as an uſeful cordial, ſtomachic, and carminative.

Aromatic ſpirit. Suec.

369 Take of the tops of roſemary, a pound and an half; tops of milfoil, thyme, each half a pound; proof ſpirit, 16 pounds; macerate for two days, and draw off by diſtillation eight pounds. If before diſtillation eight pounds of vinegar be added, it forms the acetated aromatic ſpirit.

Theſe preparations do not differ materially from the ſpirit of roſemary or Hungary water; for on the eſſential oil of the roſemary their medicinal properties may be conſidered as chiefly depending. They are often employed, particularly for external purpoſes, and for impregnating the air with their vapours, to deſtroy the influence of febrile contagions.

Antiicteric ſpirit. Gen.

370 Take of ſpirit of turpentine, an ounce and an half; rectified ſpirit of wine, half a pound. Diſtil with a gentle heat. Let the oil ſwimming above in the receiver be ſeparated from the ſaturated ſpirit, which is to be preſerved for uſe.

It has been imagined, that this combination of oil of turpentine with ardent ſpirit will furniſh an effectual ſolvent for biliary calculi. Hence the origin of the name here given it; but although it may have ſuch an effect when copiouſly applied to the calculi in a glaſs veſſel; yet this is not to be expected when it is taken into the ſtomach, and can only reach them in the courſe of circulation.

Chap. XIX. *Decoctions and infuſions.*

371 Water, the direct menſtruum of gums and ſalts, extracts readily the gummy and ſaline parts of vegetables. Its action, however, is not limited to theſe; the reſinous and oily principles being, in moſt vegetables, ſo intimately blended with the gummy and ſaline, as to be in part taken up along with them: ſome of the reſinous cathartics, and moſt of the aromatic herbs, as well as bitters and aſtringents, yield to water the greateſt part of their ſmell taſte, and medicinal virtue. Even of the pure eſſential oils, and odorous reſins of vegetables, ſeparated from the other principles, water imbibes a part of the flavour; and by the artificial admixture of gummy or ſaline matter, the whole ſubſtance of the oil or reſin is made ſoluble in water.

Of pure ſalts, water diſſolves only certain determinate quantities: by applying heat, it is generally enabled to take up more than it can do in the cold, and this in proportion to the degree of heat: but as the liquor cools, this additional quantity ſeparates, and the water retains no more than it would have diſſolved without heat. With gummy ſubſtances, on the other hand, it unites unlimitedly, diſſolving more and more of them till it looſes its fluidity. Heat expedites the action of the water, but cannot enable it to take up more than it would do by allowing it longer time in the cold. The active parts extracted from moſt vegetables by water, and oils and reſins made ſoluble in water by the artificial admixture of gum, partake of this property of pure gums, being ſoluble without ſaturation.

It has been imagined, that vegetables in a freſh ſtate, while their oily, reſinous, and other active parts are already blended with a watery fluid, would yield their virtues to water more freely and more plentifully than when their native moiſture has been diſſipated by drying. Experience however, ſhows that dry vegetables in general give out more than freſh ones, water ſeeming to have little action upon them in their recent ſtate. If, of two equal quantities of mint, one be infuſed freſh in water, and the other dried, and then infuſed in the like quantity of water for the ſame length of time, the infuſion of the dry herb will be remarkably the ſtrongeſt: and the caſe appears to be the ſame in all the vegetables that have been tried.

In all the preparations deſcribed in this chapter, it is to be underſtood that the ſubjects muſt be moderately and newly dried, unleſs when they are expreſsly ordered to be taken freſh; in which caſe it is to be judged that their virtues are deſtroyed or impaired by drying.

The native colours of many vegetables are communicated to water along with their medicinal matter; many impart a colour different from their own; and others, though of a beautiful and deep colour themſelves, give ſcarcely any to the menſtruum. Of the firſt kind are the yellow and red flowers; of the ſecond the leaves of moſt plants: of the third ſome of the blue flowers, as thoſe of cyanus and larkſpur. Acid liquors change the infuſions of moſt flowers, the yellow ones excepted, to a red; and alkalis, both fixed and volatile to a green.

From animal ſubſtances water extracts the gelatinous and nutritious parts; whence glues, jellies, broths, &c.; and along with theſe, it takes up principles of more activity, as the acrid matter of cantharides. It diſſolves alſo ſome portion of calcined calcareous earths, both of the animal and of the mineral kingdom, but has no action on any other kind of earthy matter.

The effect of boiling differs from that of infuſion in ſome material particulars. One of the moſt obvious differences is, that as the eſſential oils of vegetables, in which their ſpecific odours reſide, are volatile in the heat of boiling water, they exhale in the boiling along with the watery ſteam, and thus are loſt to the remaining decoction: whereas both in cold, and ſometimes in hot infuſions, they are preſerved; although in the latter they are by no means perfectly ſo. Odorous ſubſtances, and thoſe in general whoſe virtues depend on their volatile parts, are therefore unfit for this treatment. The ſoluble parts of theſe may, nevertheleſs, be united in this form with thoſe bodies of a more fixed nature, by boiling the latter till their virtues be ſufficiently extracted, and then infuſing the former in this decoction.

The extraction of the virtue of the ſubject is uſually promoted or accelerated by a boiling heat: but this rule is leſs general than it is commonly ſuppoſed to be. We have already obſerved, that Peruvian bark gives out its virtue more perfectly by cold infuſion than by coction. In ſome caſes, boiling occaſions a manifeſt diſunion of the principles of the ſubject: thus, when almonds are triturated with cold water, their oil, blended with the mucilaginous or other ſoluble matter of the almond, unites with the water into a milky liquor called *an emulſion;* but on boiling them in water, the oil ſeparates and riſes to the ſurface; and if the moſt perfect emulſion be made to boil, a like ſeparation happens.

This alſo appears to take place, though in a leſs evident manner, in boiling ſundry other vegetables; thus tobacco, aſarum, and ipecacuanha, loſe their active powers by boiling: nor does it appear that this change is effected merely by the diſcharge of volatile parts. From ſome late experiments, it has been found, that the diſtilled water of ipecacuanha was infinitely leſs emetic than the infuſion from which it was diſtilled, and that the boiling liquor gradually aſſumes a black colour, indicating ſome kind of decompoſition of parts: the ſame circumſtances probably take place in boiling tobacco, aſarum, and perhaps all vegetables whatever, though from their not producing ſuch ſenſible operations on the living body, they cannot be ſo clearly diſcovered as in ipecacuanha, tobacco, or aſarum. The experiments we allude to were made by Dr Irving, when a ſtudent in the college of Edinburgh; and they gained him the prize given by the Harveian Society of that place, for the beſt experimental inquiry concerning ipecacuanha.

It is for the above-mentioned reaſons that we think many of the infuſions ſhould be made with cold water: it is, however, to be acknowledged, that this is not always abſolutely neceſſary, and in extemporaneous practice it may be often very inconvenient; it is, however, proper to point out the advantages to be expected from this more tedious, but much more complete and elegant, method.

Vinegar extracts the virtues of ſeveral medicinal ſubſtances in tolerable perfection: but at the ſame time its acidity makes a remarkable alteration in them, or ſuperadds a virtue of a different kind; and hence it is more rarely employed with this intention than purely aqueous or ſpirituous menſtrua. Some drugs, however, for particular purpoſes, vinegar excellently aſſiſts, or coincides with, as ſquills, garlic, ammoniac, and others: and in many caſes where this acid is itſelf principally depended on, it may be advantageouſly impregnated with the flavour of certain vegetables; moſt of the odoriferous flowers impart to it their fragrance, together with a fine purpliſh or red colour; violets, for inſtance, if freſh parcels of them are infuſed in vinegar in the cold for a little time, communicate to the liquor a pleaſant flavour, and deep purpliſh red colour. Vinegar, like other acids, added to watery infuſions or decoctions, generally precipitates a part of what the water had diſſolved.

Decoction of marſhmallows. E.

372 Take of dried marſhmallow roots, four ounces; raiſins of the ſun, ſtoned, two ounces; water, ſeven pounds. Boil to five pounds; place apart the ſtrained liquor till the feces have ſubſided, then pour out the clear liquor.

The Edinburgh college have ſubſtituted this for the more complicated formula of the *Decoctum ad Nephriticos* of their former pharmacopœia, and it fully anſwers the intentions of that preparation: it is intended chiefly as an emolient, to be liberally drank of in nephritic paroxyſms; in which caſes, by ſoftening and relaxing the parts, it frequently relieves the pain, and procures an eaſy paſſage for the ſabulous matter. This medicine is now made more ſimple than before, without any diminution of its virtue, by the rejection of wild carrot ſeed, reſtharrow root, figs, lintſeed, and liquorice. The carrot ſeeds were indeed unfit for this form, as they give out little of their virtue to watery liquors.

Decoction of hartſhorn. L.

373 Take of burnt and prepared hartſhorn, two ounces; gum arabic, ſix drams; diſtilled water, three pints. Boil conſtantly ſtirring, to two pints, and ſtrain.

This decoction is uſed as common drink in acute diſeaſes attended with a looſeneſs; and where acrimonious humours abound in the primæ viæ. The gum is added, in order to render the liquor lightly glutinous, and thus enable it to ſuſtain more of the calx; which is the ingredient on which the colour, but probably not the virtue, of the medicine depends. Calcined hartſhorn has no quality from which it ſeems capable either of conſtringing and ſtrengthening the veſſels, giving a greater degree of conſiſtency to thin fluids, or obtunding acrimonious humours. It blunts and abſorbs acid juices; but acrimony and acidity are very different: there are few (perhaps none of the acute) diſorders of adults attended with the latter; and few of infants are unaccompanied therewith. Some have propoſed ſtarch as an ingredient in theſe kinds of decoctions; a ſmall quantity of this ſoft, gelatinous, farinaceous ſubſtance would ſeem to be greatly preferable to the earthy calx. It may be obſerved, that the water is not enabled by the boiling to diſſolve any part of the calx: and that in the decoction, the earth is only diffuſed in ſubſtance through the water, as it would be by agitation.

For theſe reaſons, this formula is now rejected by the Edinburgh college, notwithſtanding the reputation in which it was held by Dr Sydenham, and other names of the firſt eminence. But as an abſorbent of a ſimilar nature, the Edinburgh college have introduced the following formula.

Chalk julep. E.

374 Take of prepared chalk, one ounce; pureſt refined ſugar, half an ounce; mucilage of gum arabic, two ounces; rub them together: and add by degrees, water, two pounds and a half; ſpirituous cinnamon water, two ounces. Mix them.

In the former edition of the Edinburgh pharmacopœia, a preparation of this kind had the title of *decoctum cretaceum*, and the chalk was directed to be boiled with the water and gum. In the preſent formula, the chalk is much more completely ſuſpended by the mucilage and ſugar, which laſt gives alſo to the mixture an agreeable taſte; it is proper to employ the fineſt ſugar, as the redundant acid in the coarſer kinds might form with the chalk a kind of ſalt. It would perhaps have been more proper to have added an aromatic, by ſuſpending the entire powder of cinnamon, or its oil, by means of the mucilage and ſugar; the method here directed is, however, leſs exceptionable in this than in many other preparations, as the precipitated matter of the ſpirituous water will probably be inviſcated in the ſaccharine and mucilaginous matter. This is a very elegant form of exhibiting chalk, and is an uſeful remedy in diſeaſes ariſing from, or accompanied with, acidity in the primæ viæ. It has been moſt frequently employed in fluxes proceeding from that cauſe. At the ſame time that the mucilage ſerves to keep the chalk uniformly diffuſed, it alſo conſiderably improves its virtues by ſheathing the internal ſurface of the inteſtines ſo often abraded in theſe affections. It is indeed probable, that chalk, as being ſomewhat aſtringent, is in ſome of theſe complaints preferable to magneſia; both, however, are improper in dyſentery, or other fluxes attended with putreſcent matter in the primæ viæ, or a general tendency to a putrefaction of the fluids.

Decoction of Peruvian bark. L.

375 Take of Peruvian bark, powdered, one ounce; diſtilled water, one pint and three ounces. Boil, for ten minutes, in a covered veſſel, and ſtrain the liquor while hot.

Although a cold watery infuſion of bark is in general preferable to any decoction, yet this form has at leaſt the advantage of being more quickly prepared. And the decoction here directed, which is boiled only for a ſhort time, and ſtrained while hot, is preferable to any other.

This decoction ſhould be paſſed only through a coarſe ſtrainer, and drank while turbid: if ſuffered to ſtand till clear, the more efficacious parts of the bark will ſubſide. We have formerly obſerved, that the virtues of this drug conſiſt chiefly in its reſinous ſubſtance, which, though it may be totally melted out by the heat of boiling water, remains only partially ſuſpended in that menſtruum.

Decoction for a clyſter. L.

376 Take of the dried leaves of mallow, one ounce; dried camomile-flowers, half an ounce; water, one pint. Boil and ſtrain.

The title of this decoction ſufficiently expreſſes its uſe, as the baſis of glyſters. The ingredients ſhould be very lightly boiled, or at leaſt the camomile flowers ſhould not be put in till towards the end, a part of their virtue being ſoon loſt by boiling.

Decoction for fomentation. L.

377 Take of the dried leaves of ſouthernwood, the dried tops of ſea-wormwood, dried camomile flowers, each one ounce; dried bay-leaves, half an ounce; diſtilled water ſix pints. Boil them a little, and ſtrain.

Common decoction. E.

Take of camomile flowers, one ounce; carvy ſeeds, half an ounce; water, five pounds. Boil for a quarter of an hour, and ſtrain. 378

This decoction is intended to anſwer the purpoſes of both the foregoing. It is leſs loaded with ingredients than either, but not perhaps for that reaſon the leſs uſeful.

It is indeed to be acknowledged, that theſe impregnations are for the moſt part unneceſſary for the purpoſe of glyſters; and in ordinary caſes the weight of the water uſually ſolicits a diſcharge before theſe medicines can produce any effect.

As to fomentations, their virtues in our opinion are totally to be aſcribed to the influence of the warm water. And when the herbs themſelves are applied, they act only as retaining heat and moiſture for a longer time.

Decoction of hellebore. L.

Take of the root of white hellebore, powdered, one ounce; diſtilled water, two pints; rectified ſpirit of wine, two ounces. Boil the water with the root to one pint; and, the liquor being cold and ſtrained, add to it the ſpirit. 379

White hellebore, as we formerly obſerved, is now very rarely employed internally; and the preſent formula is entirely intended for external uſe. Recourſe is ſometimes had to it with advantage in cutaneous eruptions, particularly in tinea capitis. But where the incruſtations are entirely removed, leaving a very tender ſkin, it is neceſſary that the decoction ſhould be diluted previous to its employment.

Decoction of barley. L.

Take of pearl-barley, two ounces; diſtilled water, four pints. The barley being firſt waſhed with cold water from the adhering impurities, pour upon it about half a pint of water, and boil the barley a little time. This water being thrown away, add the diſtilled water, boiling, to the barley; boil it to two pints, and ſtrain. 380

Compound decoction of barley. L.

Take of the decoction of barley, two pints; raiſins, ſtoned, figs, ſliced, each two ounces; liquorice-root, ſliced and bruiſed, half an ounce; diſtilled water one pint. Boil to two pints, and ſtrain. 381

Barley-water. E.

Take of pearl-barley, two ounces; water, five pints. Firſt waſh the barley from the mealy matter that adheres to it with ſome cold water; then boil it a little with about half a pint of freſh water, which will acquire a conſiderable tinge from it. Throw away this tinged water; put the barley into the five pints of boiling water preſcribed; and continue the boiling till half the water be waſted. 382

Theſe liquors are to be drank freely as a diluter, in fevers and other diſorders; hence it is of conſequence that they ſhould be prepared ſo as to be as elegant and agreeable as poſſible; for this reaſon they are inſerted in the pharmacopœia, and the ſeveral circumſtances which contribute to their elegance ſet down; if any one of them be omitted, the beverage will be leſs grateful. However trivial medicines of this claſs may appear to be, they are of greater importance in the cure of acute diſeaſes than many more elaborate preparations.

Barley-water, however, is much more frequently prepared by nurſes than apothecaries, particularly in its ſimple ſtate. The compound decoction contains a large proportion of ſaccharine and mucilaginous matter, and may be employed for the ſame purpoſes as the decoction of marſhmallows of the Edinburgh pharmacopœia.

Decoction of the woods. E.

383 Take of guaiacum ſaw-duſt, three ounces; raiſins of the ſun, ſtoned, two ounces; ſaſſafras wood, ſhaved, liquorice ſliced, each one ounce; water, ten pounds. Boil the guaiacum and raiſins with the water, over a gentle fire, to the conſumption of one half; adding, towards the end, the ſaſſafras and liquorice. Strain out the liquor; and having ſuffered it to reſt for ſome time, pour off the clear from the feces without expreſſion.

This decoction is very well contrived; and if its uſe be duly continued, it will do great ſervice in ſome cutaneous diſeaſes, in what has been called foulneſs of the blood and juices, and in ſome diſorders of the breaſt; particularly in phlegmatic habits. It may be taken by itſelf to the quantity of a quarter of a pint two or three times a-day, or uſed as an aſſiſtant in a courſe of mercurial or antimonial alteratives; the patient in either caſe keeping warm, in order to promote the operation of the medicine. The ſaw-duſt expoſes a larger ſurface to the action of the water than the ſhavings, directed in the former edition of the pharmacopœia.

Decoction of ſarſaparilla. L.

384 Take of the root of ſarſaparilla, ſliced, ſix ounces; diſtilled water, eight pints. Macerate for two hours, with an heat of about 195°; then take out the root, and bruiſe it; return the bruiſed root to the liquor, and again macerate it for two hours. Then, the liquor being boiled to four pints, preſs it out, and ſtrain.

This decoction is an article in very common uſe, particularly in venereal affections. And there can be little doubt, that by this proceſs the medical powers of the ſarſaparilla are fully extracted. But it has of late been much queſtioned, whether this article be in any degree intitled to the high character which was once given of it. Some, as we have already obſerved, are even diſpoſed to deny its poſſeſſing any medical property whatever: but the general opinion is, that it has ſomewhat of a diaphoretic effect; and this effect is more readily obtained when it is exhibited under the form of decoction than under any other.

Compound decoction of ſarſaparilla. L.

385 Take of the root of ſarſaparilla, ſliced and bruiſed, ſix ounces; bark of the root of ſaſſafras, raſpings of guaiacum-wood, liquorice root, bruiſed, of each one ounce; bark of the root of mezereon, three drams; diſtilled water, ten pints. Macerate, with a gentle heat, for ſix hours; then boil it down to five pints, adding, towards the end, the bark of the root of mezereon, and ſtrain the liquor.

This compound decoction is an elegant mode of preparing an article once highly celebrated under the title of the *Liſbon diet drink.* That formula, for a long time after its firſt introduction into Britain, was kept a ſecret; but an account of the method of preparation was at length publiſhed in the Phyſical and Literary Eſſays of Edinburgh, by Dr Donald Monro. And of the formula there given, which is in many reſpects an unchemical one, the preſent may juſtly be conſidered as an improvement. Even in its original form, but ſtill more in the preſent ſtate, there can be no doubt, that it furniſhes us with a very uſeful medicine, particularly in thoſe obſtinate ulcers originating from venereal infection, which reſiſt the power of mercury. And it is highly probable, that its good effects principally depend on the impregnation it receives from the mezereon. Perhaps, however, even thus improved, it is more complicated and expenſive than is neceſſary: at leaſt we are inclined to think, that every advantage derived from it may with equal eaſe and certainty be obtained from impregnating with the mezereon, in the manner here directed, a ſimple decoction of the guaiacum, bardana, or althæa, without having recourſe to ſeveral articles, or employing one ſo expenſive as the ſarſaparilla.

Decoction of ſeneka. E.

386 Take of ſeneka, or rattleſnake root, one ounce; water, two pounds. Boil to ſixteen ounces, and ſtrain.

The virtues of this decoction will be eaſily underſtood from thoſe of the root from which it is prepared. The doſe, in hydropic caſes, and rheumatic, or arthritic complaints, is two ounces, to be repeated three or four times a-day, according to its effect.

Decoction of elm. L.

387 Take of the freſh inner bark of elm, bruiſed, four ounces; diſtilled water, four pints. Boil to two pints, and ſtrain.

It has been chiefly, if not entirely, under this form of decoction, that the elm-bark has been employed for combating thoſe cutaneous eruptions againſt which it has of late been ſo highly celebrated. Any experience which we have had of it, however, in actual practice, by no means confirms the very favourable account which ſome have given of its uſe.

Mucilage of ſtarch. L.

388 Take of ſtarch, three drams; diſtilled water, one pint. Rub the ſtarch, by degrees adding the diſtilled water; then boil it a little time.

The mucilage thus formed of ſtarch is very uſeful for anſwering theſe purpoſes where a glutinous ſubſtance is required, and in particular it is often ſucceſsfully employed under the form of glyſter.

Mucilage of gum arabic.

389 Take of gum arabic, powdered, four ounces; boiling diſtilled water, eight ounces. Rub the gum with the water till it be diſſolved. *L.*

Take of gum arabic, beat into powder, and warm water, each equal weights. Digeſt, and frequently ſtir them till the gum be diſſolved, then preſs the ſolution through linen. *E.*

It is very neceſſary to paſs the mucilage through linen, in order to free it from pieces of wood and other impurities, which always adhere to the gum; the linen may be placed in a funnel.

Mucilage of gum arabic is very uſeful in many operations in pharmacy: it is alſo much uſed for properties peculiar to thoſe ſubſtances of its own claſs, and of all the gums it ſeems to be the pureſt.

Mucilage of gum tragacanth. E.

390 Take of gum tragacanth, powdered, one ounce; hot water, eight ounces. Macerate twenty-four hours; Then mix them, by rubbing briſkly, that the gum may be diſſolved; and preſs the mucilage through linen cloth.

This gum is more difficultly ſoluble in water than gum arabic, and ſeems to be conſiderably more adheſive; it is therefore fitter for forming troches, and ſuch like purpoſes. It has been thought to be more peculiarly what has been called a *pectoral*, than the other gums: but this does not ſeem to be certainly founded. This mucilage is perhaps preferable to the foregoing in thoſe operations in pharmacy where much tenacity is required; as in the ſuſpenſion of mercury, or other ponderous bodies.

Mucilage of quince-ſeed. L.

391 Take of ſeeds of the quince, one dram; diſtilled water, eight ounces, by meaſure. Boil with a ſlow fire until the water thickens; then paſs it through linen.

This is a pleaſant ſoft mucilage, of a ſomewhat ſweetiſh taſte, and a light agreeable ſmell: in theſe reſpects, and in its eaſy ſolubility in water, it differs from the mucilage of gum tragacanth, to which ſome have ſuppoſed it ſimilar: it has another difference, to its diſadvantage, being apt to grow mouldy in keeping.

Compound infuſion of gentian. L.

392 Take of the root of gentian, one dram: freſh outer-rind of lemons, half an ounce; dried outer rind of Seville oranges, one dram and an half. Boiling water, 12 ounces, by meaſure. Macerate for an hour, and ſtrain.

Bitter infuſion. E.

Take of gentian root, half an ounce; dried peel of Seville oranges, one dram; coriander ſeeds, half a dram; proof-ſpirit, four ounces; water, one pound. Firſt pour on the ſpirit, and three hours thereafter add the water; then macerate without heat for a night, and ſtrain.

Theſe formulæ do not materially differ. That of the London college is the moſt expeditious mode of preparation; but that of the Edinburgh college poſſeſſes other advantages, which are in our opinion more than ſufficient to outweigh that circumſtance.

In the former edition of the Edinburgh pharmacopœia the water was directed to be boiling: this was at leaſt unneceſſary, and was probably liable to the objections obſerved againſt decoctions. The proof-ſpirit is alſo an uſeful addition to the bitter infuſion, as it now ſtands in the Edinburgh pharmacopœia: beſides that it aſſiſts in extracting the reſinous parts, and preſerving the infuſion for fermentation, it communicates an agreeable pungency to the liquor. To anſwer in ſome meaſure theſe intentions, it was formerly directed to add to the filtrated liquor a quantity of aromatic water. This was certainly a piece of very bad pharmacy; for, beſides that the ſpirit in this preparation, when diluted with the water of the infuſion, was now no longer able to retain the ſuſpended matter, it would alſo diſpoſe the infuſion to part with its proper extractive matter; and in this way the reſinous matter of the aromatic water, and the gummy parts of the bitter infuſion, would both in ſome degree ſeparate to the bottom of the veſſel. By the formula now laid down, the infuſion contains the different principles of the ingredients in a manner more nearly approaching to their natural and entire ſtate.

Simple infuſion of ſenna. L.

393 Take of ſenna an ounce and a half; ginger, powdered, one dram; boiling diſtilled water, one pint. Macerate them for an hour in a covered veſſel; and the liquor being cold, ſtrain it.

This, although a ſimple, is a very elegant infuſion of ſenna, the ginger acting as an uſeful corrigent. But if the ſenna were employed to the quantity of a dram and an half or two drams only, with the ſame menſtruum, in place of the quantity here ordered, it would be a no leſs uſeful medicine, and might be employed for one doſe, as it is beſt when freſh. Of the preſent infuſion, an ounce or two is a ſufficient doſe.

Tartarized infuſion of ſenna. L.

394 Take of ſenna, one ounce and a half; coriander ſeeds, bruiſed, half an ounce; cryſtals of tartar, two drams; diſtilled water, one pint. Diſſolve the cryſtals of tartar by boiling in the water; then pour the water, as yet boiling, on the ſenna and ſeeds. Macerate for an hour in a covered veſſel, and ſtrain when cold.

In the laſt edition of the London pharmacopœia this had the name of *infuſum ſennæ commune*.

Formerly an alkaline ſalt was uſed in the infuſion of ſenna inſtead of the acid one here directed. The firſt was ſuppoſed to promote the operation of the medicine, by ſuperadding a degree of purgative virtue of its own, and by enabling the water to extract ſomewhat more from the capital ingredient than it would be capable of doing by itſelf; while acids were alleged to have rather a contrary effect. Experience however has ſufficiently ſhown, that alkaline ſalts increaſe the offenſiveneſs of the ſenna, while cryſtals of tartar conſiderably improve the colour of the infuſion, and likewiſe render the taſte to ſome perſons leſs diſagreeable. Soluble tartar ſhould ſeem a good ingredient to theſe kinds of compoſitions, as it not only improves the taſte, but promotes the purgative virtue of the medicine: this addition alſo renders the infuſion leſs apt to gripe, or occaſion flatulencies.

Infuſion of tamarinds with ſenna. E.

395 Take of tamarinds, ſix drams; cryſtals of tartar, ſenna, each one dram; coriander ſeeds, half a dram; brown ſugarcandy, half an ounce; boiling water, eight ounces. Macerate in a cloſe earthen veſſel which has not been vitrified with lead; ſtir the liquor now

and then, and after it has ſtood four hours ſtrain it. It may alſo be made with double, triple, &c. the quantity of ſenna.

Both this and the former infuſions might be made with cold water. By this means the aromatic quality of the coriander ſeeds would probably be extracted in a more perfect ſtate; but the cryſtals of tartar are ſo difficultly ſoluble in cold water, that for extemporaneous uſe it is in ſome meaſure neceſſary to prepare them in the manner here directed. It is not indeed probable that when ſuch ſoluble matters as acids and ſugar are preſented to water, the water ſhall be able to extract ſuch a quantity of the finer volatile part of aromatics as to afford any conſiderable flavour to the liquor. Where an aromatic is required, we would therefore propoſe, that ſome agreeable aromatic water ſhould be mixed with the liquor immediately before ſwallowing it; or that a quantity of aromatic oil ſhould be incorporated with the cold infuſion by means of gum, or a part of the ſugar which might be reſerved for that purpoſe. It is a very neceſſary caution not to make this infuſion in veſſels glazed with lead, otherwiſe the acid might corrode the lead, and communicate its poiſonous effects to the infuſion.

Both theſe infuſions are mild and uſeful purges; the latter in particular is excellently ſuited for delicate ſtomachs at the ſame time that it is very much calculated for febrile and other acute diſeaſes. It is obſervable, that ſugar added to neutral ſalts rather increaſes than diminiſhes their nauſeouſneſs; but when uſed along with an acid, ſuch as tamarinds, or a ſalt wherein the acid predominates, as in cryſtals of tartar, it is found very much to improve their taſte. The acid in this infuſion, or rather the combination of acid and ſweet, are found to cover the taſte of the ſenna very effectually: the aromatic ſerves alſo the ſame purpoſe, but would perhaps be better applied in the way above propoſed.

Infuſion of the roſe. L.

396 Take of red roſe-buds, the heels being cut off, half an ounce; vitriolic acid, diluted three drams; boiling diſtilled water two pints and a half; double-refined ſugar one ounce and a half. To the water firſt poured on the petals in a glaſs veſſel, add the diluted vitriolic acid and macerate for half an hour. Strain the liquor when cold, and add the ſugar.

Infuſion commonly called *tincture of roſes*. E.

Take of red roſes, dried, one ounce; boiling water, five pounds; vitriolic acid, one dram; white ſugar, two ounces. Macerate the roſes with the boiling water in an unglazed veſſel four hours; then having poured on the acid, ſtrain the liquor, and add the ſugar.

Some have directed the vitriolic acid to be dropped upon the roſes before the water is put to them; but this method is certainly faulty; for ſuch of the roſes as this cauſtic liquor falls on undiluted will be burnt up by it, and have their texture deſtroyed. Others have made an infuſion of the roſes in water firſt, and then added the acid, from an apprehenſion, that if this acid be added to the water, it would weaken its power as a menſtruum; but whatever the acid ſpirit will hinder the water from extracting, it muſt precipitate if added afterwards; though, in this preparation, the vitriolic acid bears ſo ſmall a proportion to the water, that its effects in this reſpect will be very little; and it appears to be of ſo little conſequence which of the two ways be followed, only that by the above formula the veſſels are expoſed a ſhorter time to the action of the acid. The infuſion ſhould be made in a glaſs or ſtoneware veſſel, rather than a glazed earthen one; for the acid will be apt to corrode the glazing of the latter.

This infuſion is of an elegant red colour, and makes a very grateful addition to juleps in hæmorrhagies, and in all caſes which require coolers and ſubaſtringents. It is ſometimes taken with boluſes or electuaries of the bark, and likewiſe makes a good gargle. But although in our pharmacopœias it has its name from the roſes, yet its virtues are to be aſcribed chiefly, or perhaps ſolely to the vitriolic acid.

Infuſion of rhubarb. E.

397 Take of rhubarb half an ounce; boiling water, eight ounces; ſpirituous cinnamon water, one ounce. Macerate the rhubarb in a glaſs veſſel with the boiling water for a night, then having added the cinnamon water, ſtrain the liquor.

In this infuſion cold water might perhaps be employed with advantage; we alſo object to the ſpirituous cinnamon-water on the ſame grounds as we did before to the aromatic water in the bitter infuſion of the former Edition of the Edinburgh pharmacopœia. This, however, appears to be one of the beſt preparations of rhubarb when deſigned as a purgative; water extracting its virtue more effectually than either vinous or ſpirituous menſtrua. In this reſpect rhubarb differs from moſt of the other vegetable cathartics: and we think the London college might have given it a place in their pharmacopœia as well as wine or tincture of rhubarb.

Lime water.

398 Take of quicklime, half a pound: boiling diſtilled water, twelve pints. Mix, and ſet it aſide in a covered veſſel for an hour; then pour off the liquor, which keep in a cloſe veſſel. *L.*

Take half a pound of freſh burnt quicklime, put it into an earthen veſſel, and gradually ſprinkle on it four ounces of water, keeping the veſſel ſhut while the lime grows hot and falls into powder; then pour on it twelve pounds of water, and mix the lime thoroughly with the water by ſtirring. After the lime has ſubſided renew the ſtirring: and let this be done about ten times, always keeping the veſſel ſhut (during the ebullition), that the acceſs of the air may be the more effectually prevented. Laſtly, let the water be filtered through paper placed in a funnel cloſe ſhut at its top; and it muſt be kept in very cloſe veſſels. E.

The reaſon of adding the water by degrees to the lime is, that when poured on at once it reduces the external part to a kind of muddy ſubſtance, or ſoft paſte, which in ſome meaſure defends the internal part from being acted on by the water. It does not appear that the different proportions of water in the two above preſcriptions occaſion any ſenſible difference in the ſtrength of the product: the quicklime is far from yielding all its ſoluble parts to either proportion; the remainder giving a ſtrong impregnation to many freſh quantities of water, though not ſo ſtrong as to the firſt. The caution of keeping the water in cloſe-ſtopped veſſels ought to be ſtrictly attended to; for in open ones the calcareous matter diſſolved in the liquor ſoon begins to ſeparate, and forms a white cruſt on the ſurface. This cruſt is not of a ſaline nature, as ſome have imagined; but an inſipid earth, no longer miſcible with watery liquors. The theory of the production of this earth will be eaſily underſtood from what we have ſaid on the article FIXED AIR. The ſeparation firſt takes place at the ſurface, as being the part immediately applied to the common air. As long as the cruſt remains entire, the cloſeneſs of its texture ſo excludes the air, that the reſt of the matter ſtill remains impregnated with lime; but when this pellicle is broken by any means, it ſoon ſinks to the bottom, and expoſes a new ſurface for the ſeparation of the lime. In this way a ſucceſſion of cruſts and precipitations are formed, till the whole of the once cauſtic and ſoluble quicklime is now found at the bottom of the veſſel in the ſtate of a mild inſoluble earth, leaving the water perfectly inſipid.

The formation of theſe cruſts, and their ſucceſſive precipitations, are owing to the abſorption of fixed air, or aerial acid, from the atmoſphere; and the mild inſoluble ſtate of theſe precipitations is alſo owing to the ſame cauſe.

The diſtilled water recommended by the London college is certainly preferable to common fountain water; the purity of which can rarely be depended on.

Lime-water has been thought of great ſervice in ſcrofulous complaints; but perhaps on no very good foundation. It has alſo been uſed both internally and externally for various affections of the ſkin. It ſeems to be very conſiderably aſtringent, and has been uſeful in ſome kinds of alvine fluxes, in diabetes, leucorrhæa, and in ſundry other diſorders proceeding from a laxity or debility of the ſolids.

Its more common uſe is in affections of the ſtomach accompanied with acidity and flatulence. For which laſt complaint, the mild or aerated earths are leſs proper, on account of the ſeparation of air on their meeting with an acid in the ſtomach. Lime-water is alſo capable of diſſolving mucus; and may therefore be uſed where a redundance of the inteſtinal mucus affords a nidus for worms, or gives riſe to other complaints. It has alſo been found, that lime-water injected into the anus immediately kills aſcarides. The lithontriptic powers of lime-water ſeem at preſent to be much doubted. Lime-water is given in doſes proportioned to the nature of the complaints: in ſome caſes, as in diabetes, it may be given in divided portions to the extent of two quarts a-day. It is uſed externally for waſhing what are called *foul* or *ill-conditioned ulcers*; it is alſo injected into the vagina and other parts affected with preternatural diſcharges from laxity.

The uſe of lime-water in ſcurvy is very doubtful.

Vinegar of ſquills.

399 Take of ſquills, dried, one pound; vinegar ſix pints; proof-ſpirit, half a pint. Macerate the ſquills in the vinegar with a gentle heat, in a glaſs veſſel, for four-and-twenty hours; then preſs out the liquor, and ſet it by that the feces may ſubſide; laſtly, pour off the liquor, and add to it the ſpirit. *L.*

Take of dried, root of ſquills, two ounces, diſtilled vinegar, two pounds and a half; rectified ſpirit of wine, three ounces. Macerate the ſquills with the vinegar eight days; then preſs out the vinegar, to which add the ſpirit; and when the feces have ſubſided, pour off the clear liquor. *E.*

Vinegar of ſquills is a medicine of great antiquity; we find in a treatiſe attributed to Galen, an account of its preparation, and of many particular virtues then aſcribed to it. It is a very powerful ſtimulant, aperient, and what is called an attenuant of tenacious juices; and hence it is frequently uſed, with great ſucceſs, in diſorders of the breaſt occaſioned by a load of thick phlegm, and for promoting urine in hydropic caſes. The doſe of this medicine is from a dram to half an ounce: where crudities abound in the firſt paſſages, it may be given at firſt in a larger doſe, to evacuate them by vomitting. It is moſt conveniently exhibited along with cinnamon, or other agreeable aromatic waters, which prevent the nauſea it would otherwiſe, even in ſmall doſes, be apt to occaſion,

Aromatic vinegar. Suec.

Take of tops of roſemary, leaves of ſage, each four ounces; flowers of lavender, two ounces; cloves two drams; vinegar; eight pounds. Macerate for four days, expreſs the liquor, and ſtrain it. 400

This may be conſidered as an elegant improvement of what had formerly a place in the foreign pharmacopœias, under the title of *acetum prophylacticum*, which contained not only the preſent articles, but alſo a confuſed farrago of others, as wormwood, rue, garlic, cinnamon, &c.

It is ſaid, that during the plague at Marſeilles, four perſons, by the uſe of the acetum prophylacticum as a preſervative, attended, unhurt, multitudes of thoſe who were infected: that under colour of thoſe ſervices, they robbed both the ſick and the dead: and that one of them being afterwards apprehended, ſaved himſelf from the gallows by diſcovering the remedy. The preparation was hence called *Vinaigre des quatre voleurs*; "The vinegar, of the four thieves." It is not to be doubted that vinegar impregnated with antiſeptic vegetables, will contribute greatly to prevent the effects of contagious air. And in the preſent aromatic vinegar we have a ſtronger and better impregnation, than from the numerous articles which were before employed. We are far, however, from imagining that it will be able to counteract the contagion of the plague; but it may on different occaſions be more powerful than vinegar in its ſimple ſtate, for impregnating with antiſeptic vapours the chambers of the ſick.

Vinegar of roſes. Suec.

Take of the flowers of red roſes dried, any quantity; add to them twelve times their weight of vinegar. Macerate for four days, and ſtrain through paper. 401

This has been chiefly uſed for embrocating the head and temples in ſome kinds of headach, &c. in which it has now and then been of ſervice. It has alſo been uſed for certain caſes of ophthalmia. But before it can be applied to the eyes, it will in general require be diluted with water.

Vinegar of lead. Suec.

402 Take of litharge, triturated, half a pound; vinegar, two pounds. Digeſt them together, frequently ſtirring the mixture with a wooden rod, till the colour of blue paper be not changed by the vinegar; preſerve for uſe the clear liquor which is above the ſediment.

This liquor is of the ſame nature with ſolutions of ſugar of lead, or acetated ceruſe, as it is now called. It is only externally againſt cutaneous eruptions, redneſs, inflammations, &c. But even in theſe caſes ſome think it is not void of danger: and it is alleged, that there are examples of its continued uſe having occaſioned ſundry ill conſequences. Of this, however, we are very doubtful. By means of the acetated ceruſe every purpoſe to be anſwered by this may be accompliſhed. This liquor differs only in the proportions from the water of acetated litharge of the London pharmacopœia.

Vinegar of colchicum. Roſs.

403 Take of the recent root of colchicum cut into ſlices, one ounce; vinegar, one pound. Macerate with a gentle heat for two days: then ſtrain after ſlight expreſſion.

Although in our pharmacopœias a place be given to the oxymel and ſyrup of colchicum, both of which are formed from the vinegar, yet the vinegar itſelf is not directed to be kept in its ſeparate ſtate; under this form, however, it may often be employed with advantage.

Infuſion of Peruvian bark. Suec.

404 Take of Peruvian bark, bruiſed, an ounce and a half; river water, boiling, a pound and a half. Digeſt for two hours, ſhaking the veſſel frequently; then ſtrain the liquor with expreſſion.

The Peruvian bark, as we have already had occaſion to obſerve, gives out its medical properties to water not leſs readily in the way of infuſion than of decoction. And in the former, the extractive matter is even more in a ſtate of ſolution. An infuſion, however not only more elegant, but ſtronger than the preſent, might be obtained, from employing cold inſtead of boiling water, and from continuing the maceration for a greater length of time. But in whatever manner it be formed, an infuſion will often ſit on the ſtomach, when the bark either in ſubſtance or decoction cannot be retained.

Tar-water. Suec.

405 Take of tar two pounds; water, one gallon. Stir them ſtrongly together with a wooden rod; and after ſtanding to ſettle for twelve hours, pour off the water for uſe.

Tar-water has lately been recommended to the world as a certain and ſafe medicine in almoſt all diſeaſes; a ſlow yet effectual alterative in cahexies, ſcurvies, chlorotic, hyſterical, hypochondriacal and other chronical complaints; and a ſudden remedy in acute diſtempers which demand immediate relief, as pleuriſies, peripneumonies, the ſmall-pox, and all kinds of fevers in general. The medicine, though certainly far inferior to the character that has been given of it, is doubtleſs in many caſes of conſiderable utility: it ſenſibly raiſes the pulſe; and occaſions ſome conſiderable evacuation, generally by perſpiration or urine, though ſometimes by ſtool or vomit. Hence it is ſuppoſed to act by increaſing the vis vitæ, and enabling nature to expel the morbific humours.

We ſhall here inſert, from the firſt public recommender of this liquor (Biſhop Berkeley), ſome obſervations on the manner of uſing it. "Tar-water, when right, is not paler than French, nor deeper coloured than Spaniſh, white wine, and full as clear; if there be not a ſpirit very ſenſibly perceived, in drinking, you may conclude the tar-water is not good. It may be drank either cold or warm. In colics, I take it to be beſt warm. As to the quantity, in common chronical indiſpoſitions, a pint a-day may ſuffice, taken on an empty ſtomach, at two or four times, *viz.* night and morning, and about two hours after dinner and breakfaſt; more may be taken by ſtonger ſtomachs. But thoſe who labour under great and inveterate maladies, muſt drink a greater quantity, at leaſt a quart every twenty-four hours. All of this claſs muſt have much patience and perſeverance in the uſe of this, as well as of all other medicines, which, though ſure, muſt yet in the nature of things be ſlow in the cure of inveterate chronical diſorders. In acute caſes, fevers of all kinds, it muſt be drank in bed warm, and in great quantity (the fever ſtill enabling the patient to drink), perhaps a pint every hour, which I have known to work ſurpriſing cures. But it works ſo quick, and gives ſuch ſpirits, that the patients often think themſelves cured before the fever has quit left them."

Notwithſtanding theſe encomiums, tar-water ſeems to be faſt loſing its reputation. It is not probable that water can take up any of the more active principles of the tar; and it would perhaps be more convenient to ſeparate its acid by diſtillation, and mix it with water occaſionally: for it is pretty certain, that the water can only take up the acid of the tar, perhaps charged with a very ſmall quantity of oily matter in the ſtate of an acid ſoap.

Decoction of catechu. Gen.

Take of catechu, three drams: ſpring water, two pounds: boil it to one pound; and add to the ſtrained liquor, of ſyrup of quinces, three ounces. 406

This decoction may be conſidered as nearly ſimilar to the decoctum japonicum, and decoctum terræ japonicæ of the former editions of our pharmacopœia: and like theſe it will be found a very agreeable and uſeful medicine in fluxes that are not critical or ſymptomatic, and in a weak lax ſtate of the inteſtines. A ſpoonful or two may be taken every hour, or oftener: thus managed it produces much better effects than if larger doſes are given at once. But for extracting the powers of the catechu, boiling is not requiſite. By ſimple infuſion in warm water, all its active parts are readily and completely diſſolved. It may in this manner alſo be readily united with cinnamon or other aromatics. And an infuſum japonicum is, we think, a formula juſtly intitled to a place in our pharmacopœias.

Chap. XX. *Medicated Wines.*

407 The original intention of medicated wines was, that medicines, which were to be continued for a length of time, might be taken in the moſt familiar and agreeable form: by this means a courſe of remedies was complied with, notwithſtanding the repugnance and averſion which the ſick often manifeſt to thoſe directly furniſhed from the ſhops; and hence the inferior ſort of people had their medicated ales. Nevertheleſs, as vinous liquors excellently extract the virtues of ſeveral ſimples, and are not ill fitted for keeping, they have been employed as officinal menſtrua alſo; and ſubſtances of the greateſt efficacy are truſted in this form. As compounds of water and inflammable ſpirit, they take up ſuch parts of vegetables and animals as are ſoluble in thoſe liquors; though moſt of them abound at the ſame time with a mucilaginous or viſcous ſubſtance, which renders them leſs effectual menſtrua than purer mixtures of water and ſpirit. They contain likewiſe a ſubtile acid, which ſomewhat further obſtructs their action on certain vegetable and animal matters; but enables them in proportion to its quality, to diſſolve ſome bodies of the metallic kind, and thus impregnate themſelves with the corroborating virtues of ſteel, the alterative and emetic powers of antimony, and the noxious qualities of lead.

To all the medicated wines, after they have been ſtrained, you may add about one twentieth their quantity of proof ſpirit, to preſerve them from fermentation. They may be conveniently kept in the ſame kind of glaſs bottles that wines generally are for common uſes, which ſhould likewiſe be corked with the ſame care.

Wine of aloes. L

408 Take of ſocotorine aloes, eight ounces; white canella, commonly called *winter's bark*, two ounces; Spaniſh white wine, ſix pints; proof ſpirit, two pints. Powder the aloes and white canella ſeparately; when mixed, pour on them the wine and ſpirit: afterwards digeſt for fourteen days, now and then ſhaking them; laſtly, ſtrain. It will not be amiſs to mix white ſand, cleanſed from impurities, with the powder, in order to prevent the moiſtened aloes from getting into lumps.

Aloetic wine, or *ſacred tincture.* E.

Take of ſocotorine aloes, one ounce; leſſer cardamom ſeeds, ginger, each one dram; Spaniſh white wine, two pounds. Digeſt for ſeven days, ſtirring now and then, and afterwards ſtrain.

This medicine has long been in great eſteem, not only as a cathartic, but likewiſe as a ſtimulus; the wine diſſolving all that part of the aloes in which theſe qualities reſide, a portion only of the leſs active reſinous matter being left. The aromatic ingredients are added to warm the medicine, and ſomewhat alleviate the ill flavour of the aloes: white canella, or cloves, are ſaid, among numerous materials that have been tried, to anſwer this end the moſt ſucceſſively; hence the introduction of the former of theſe into the formula of the London college.

The ſacred tincture appears from long experience to be a medicine of excellent ſervice in languid, phlegmatic habits, not only for cleanſing the primæ viæ, but likewiſe for ſtimulating the ſolids, warming the habit, promoting or exciting the uterine purgations, and the hæmorrhoidal flux. The doſe, as a purgative, is from one to two ounces or more. It may be introduced into the habit, ſo as to be productive of excellent effects, as an alterant, by giving it in ſmall doſes, at proper intervals: thus managed, it does not for a conſiderable time operate remarkably by ſtool; but at length proves purgative, and occaſions a lax habit of much longer continuance than that produced by the other common cathartics.

Bitter wine. E.

409 Take of root of gentian, half an ounce: Peruvian bark one ounce; Seville orange-peel, dried, two drams; white canella one dram; proof ſpirit four ounces; Spaniſh white-wine, two pounds and a half. Firſt pour on the ſpirit, after twenty-four hours add the wine; then macerate for three days, and ſtrain.

This wine is intended to ſupply the place of the ſtomachic tincture, as it was formerly called. The wine is a menſtruum fully capable of extracting the active powers of the different ingredients; and it ſupplies us with a very uſeful and elegant ſtomachic medicine, anſwering the purpoſes intended much better than the celebrated elixir of Van Helmont, and other unchemical and uncertain preparations, which had formerly a place in our pharmacopœias.

Wine of antimony. L.

Take of vitrified antimony powdered, one ounce; Spaniſh white wine, a pint and an half. Digeſt for twelve days, frequently ſhaking the veſſel, and filter the wine through paper.

Antimonial wine. E.

410 Take of glaſs of antimony, finely powdered, one ounce; Spaniſh white wine, fiften ounces. Macerate for three days, ſtirring them now and then, and afterwards ſtrain the liquor through paper.

However carefully the ſettling and decantation are performed, the filtration of the wine through paper appears to be neceſſary, leſt ſome of the finer parts of the glaſs ſhould chance to remain ſuſpended in ſubſtance. It is not here, as in moſt other wines and tinctures, where the matter left undiſſolved by the menſtruum is of little conſequence; the antimonial glaſs, after the action of the wine, continues as virulent as ever, and capable of impregnating freſh parcels of the liquor as ſtrongly as the firſt, and this in appearance, inexhauſtibly. After thirty repeated infuſions, it has been found ſcarce ſenſibly diminiſhed in weight.

The antimonial wine poſſeſſes the whole virtues of that mineral, and may be ſo doſed and managed as to perform all that can be effected by any antimonial preparation; with this advantage, that as the active part of the antimony is here already diſſolved and rendered miſcible with the animal fluids, its operation is more certain. Given from ten to fifty or ſixty drops, it generally acts as an alterative and diaphoretic, in larger doſes as a diuretic and carthartic; while three or four drams prove for the moſt part violently emetic.

It has been chiefly uſed with this laſt intention, in ſome maniacal and apoplectic caſes; and hence it gained the name of *emetic wine*.

The quantity of the reguline part muſt however, vary according to the proportions of the acid matter in different wines, and the operation of the medicine muſt be thereby leſs certain in degree; the vitrum is preferable to the crocus for making this preparation. See the different preparations of *Antimony*.

Wine of tartarized antimony. L.

411 Take of tartarized antimony, two ſcruples; boiling diſtilled water, two ounces: Spaniſh white wine, eight ounces; diſſolve the tartarized antimony in the boiling diſtilled water, and add the wine.

Wine of antimonial tartar. E.

Take of antimonial tartar, commonly called *emetic tartar*, twenty-four grains; and diſſolve it in a pound of Spaniſh white wine.

Watery ſolutions of emetic tartar, on ſtanding, precipitate a part which is leſs completely in a ſaline ſtate; by this means, and eſpecially if the ſolution be not ſhaken before uſing it, the doſe of that medicine is ſomewhat ambiguous: in the above formula, the acid matter of the wine increaſes the ſaline ſtate of the antimony, and therefore its ſolubility, whereby the operation of the medicine is more certain, and in many caſes more powerful. From the certainty of its effects, this preparation might be very convenient in large hoſpitals or armies, where great numbers of the ſick, and inaccurate nurſing frequently occaſion an uncertain or dangerous practice.

In the formula employed by the Edinburgh college, each ounce of the wine contains two grains of the tartarized antimony; but in that of the London college, each ounce of the menſtruum contains four grains: hence, while an ounce of the one may be employed for exciting full vomiting, the ſame quantity of the other would be too ſtrong a doſe. It is much to be regretted, that in articles of this active nature, the proportions employed by the two colleges ſhould differ ſo conſiderably: that it would perhaps have been better, had the London college adopted the proportions employed by that of Edinburgh, as they have followed them in adopting this formula.

Wine of iron. L.

412 Take of filings of iron, four ounces; Spaniſh white wine, four pints. Digeſt for a month, often ſhaking the veſſel and then ſtrain.

This formula of the London pharmacopœia is now not only ſimplified, but improved, when compared with their former *vinum chalybeatum*: for the cinnamon and other articles which were then conjoined with the iron, were certainly rather prejudicial than otherwiſe; but at the ſame time, rheniſh wine, formerly employed, is perhaps to be conſidered as a better menſtruum than the Spaniſh wine now directed. It may ſtill, however, be juſtly conſidered as a good chalybeate; and we think the Edinburgh college have done wrong in rejecting the formula from their pharmacopœia.

By the London college it was formerly prepared by maceration, without heat; now, however, they direct digeſtion for the ſpace of a month. Some have objected to the uſe of heat, that it impregnated the wine more ſtrongly with the metal, and thus rendered it more unpleaſant to the taſte: but if this was the only inconvenience the remedy would be eaſy, diluting it with more wine. Heat has another effect, much leſs deſirable, and which art cannot remedy: making a diſagreeable alteration in the quality of the wine itſelf: hence it is neceſſary that it ſhould be very moderate.

Steel wine is a very uſeful preparation of this metal, and frequently exhibited in chlorotic and other indiſpoſitions where chalybeates are proper. Boerhaave recommends it as one of the nobleſt medicines he was acquainted with for promoting that power in the body by which blood is made, when weakened by a bare debility of the over-relaxed ſolids, and an indolent, cold, aqueous indiſpoſition of the juices: for in this caſe, ſays he, no virtue of any vegetable or animal ſubſtance, no diet, nor regimen, can effect that which is effected by iron: but it proves hurtful where the vital powers are already too ſtrong, whether this proceeds from the fluids or the ſolids. The doſe is from a dram to half an ounce; which may be repeated two or three times a-day.

Some direct ſolutions of iron, made in wine or other vegetable acids, to be evaporated to the conſiſtence of an extract, under the title of *extractum martis*. Theſe preparations have no advantage, in point of virtue, above the common chalybeates: though in ſome forms, that of pills in particular, they may be rather more commodiouſly exhibited than moſt of the officinal chalybeates of equal efficacy. They may be made into pills by themſelves, and are tenacious enough to reduce other ſubſtances into that form.

Wine of ipecacuanha. L.

Take of the root of ipecacuanha, bruiſed, two ounces; Spaniſh white wine, two pints. Digeſt for ten days, and ſtrain. 413

Wine, or tincture, of ipecacuanha. E.

Take of ipecacuanha, in powder, one ounce; Spaniſh white wine, fifteen ounces. After three days maceration, let the tincture be filtrated for uſe.

Both theſe wines are very mild and ſafe emetics, and equally ſerviceable in dyſenteries alſo with the ipecacuanha in ſubſtance; this root yielding nearly all its virtues to the Spaniſh white wine here ordered, as it does a good ſhare of them even to aqueous liquors. The common doſe is an ounce, more or leſs, according to the age and ſtrength of the patient. The college of Edinburgh added formerly a ſcruple of cochineal, which imparts a fine red colour to the liquor; this article is now omitted, on a complaint that the red colour of the matters evacuated ſometimes alarmed the patient, as if it proceeded from a diſcharge of blood.

Wine of millepeds. E.

Take of live millepeds, bruiſed, one ounce; Rheniſh wine, eight ounces. Infuſe them together for twelve hours, and afterwards preſs the liquor through a ſtrainer. 414

This wine has been commended as an admirable cleanſer of all the viſcera, yielding to nothing in the jaundice and obſtructions of the kidneys or urinary paſſages, of excellent ſervice in almoſt all chronical diſtempers, even in ſcrofulous and ſtrumous ſwellings, and in defluctions of rheum upon the eyes. But thoſe who expected theſe extraordinary virtues from it have often been deceived; and at preſent there are few who have any great dependence on it; and hence it is omitted by the London college, probably without any loſs. It is directed to be given from half an ounce to two ounces.

Wine of rhubarb. L.

415 Take of ſliced rhubarb, two ounces and an half; leſſer cardamom ſeeds, bruiſed and huſked, half an ounce; ſaffron two drams; Spaniſh white wine, two pints; proof-ſpirit, eight ounces. Digeſt for ten days, and ſtrain.

Rhubarb wine. E.

Take of rhubarb, two ounces: white canella, one dram; proof ſpirit, two ounces; Spaniſh white wine, fifteen ounces. Macerate for ſeven days, and ſtrain.

By aſſiſting the ſolvent power of the menſtruum, the proof-ſpirit in the above formulæ is a very uſeful addition. This is a warm, cordial, laxative medicine. It is uſed chiefly in weakneſs of the ſtomach and bowels, and ſome kinds of looſeneſſes for evacuating the offending matter, and ſtrengthening the tone of the viſcera. It may be given from half a ſpoonful to three or four ſpoonfuls or more, according to the circumſtances of the diſorder, and the purpoſes it is intended to anſwer.

Tobacco-wine.

416 Take of the dried leaves of the beſt Virginian tobacco, one ounce; Spaniſh white wine, one pound. Macerate for four days, and then ſtrain the liquor.

We have already, under the article NICOTIANA, offered ſome obſervations on its late introduction into practice by Dr Fowler, as a very uſeful remedy in the cure of dropſies and dyſuries. From his treatiſe on that ſubject the preſent formula is taken; and we may obſerve, that while in practice we have frequently experienced from the tobacco thoſe good effects for which Dr Fowler recommends it, we are inclined to give the preſent formula the preference to every other which he has propoſed. It ſeems to extract more fully the active principles of the tobacco than either water or ſpirit taken ſeparately. For further obſervations on the medical virtues of tobacco, ſee the article NICOTIANA.

Squill-wine. Suec.

417 Take of dried ſquills ſliced, one ounce; ginger, one dram; French white wine, two pounds. Macerate for three days, and then ſtrain.

By the wine employed as a menſtruum, the active properties of the ſquills may be readily extracted; and in ſome caſes at leaſt the preſent formula may juſtly be conſidered as intitled to a preference over either the vinegar or oxymel of ſquills, which have a place in our pharmacopœias. The ginger here added to the ſquills operates as an uſeful corrigent; and on this account the preſent formula is preferable to the ſquill-wine of ſome other pharmacopœias, where the ſquills alone are uſed: For it is chiefly uſed in thoſe caſes where it is intended that the ſquills ſhould exert their effects, not on the alimentary canal, but on the kidneys or other excretories.

Zedoary wine. Dan.

418 Take of the root of zedoary, gently bruiſed, two pounds; ſpirit of wine, eight pounds. Let them be macerated for a month; then add ſpring water, eight pounds. Diſtil from thence twelve pounds.

Though this formula has the name of a wine, yet it is in reality a diſtilled ſpirit, nothing from the zedoary but a portion of its eſſential oil being united with the ardent ſpirit; and we are inclined to think, that the active powers of this article, both as depending on aroma and bitterneſs might be better obtained by a ſimple infuſion in Spaniſh white wine.

CHAP. XXI. *Tinctures.*

419 RECTIFIED ſpirit of wine is the direct menſtruum of the reſins and eſſential oils of vegetables, and totally extracts theſe active principles from ſundry vegetable matters, which yield them to water either not at all, or only in part. It diſſolves likewiſe the ſweet ſaccharine matter of vegetables; and generally thoſe parts of animal-bodies in which their peculiar ſmell and taſte reſide.

The virtues of many vegetables are extracted almoſt equally by water and rectified ſpirit; but in the watery and ſpirituous tinctures of them there is this difference, that the active parts in the watery extractions are blended with a large proportion of inert gummy matter, on which their ſolubility in this menſtruum in a great meaſure depends, while rectified ſpirit extracts them almoſt pure from gum. Hence, when the ſpirituous tinctures are mixed with watery liquors, a part of what the ſpirit had taken up from the ſubject generally ſeparates and ſubſides, on account of its having been freed from that matter which, being blended with it in the original vegetable, made it ſoluble in water. This, however, is not univerſal; for the active parts of ſome vegetables, when extracted by rectified ſpirit, are not precipitated by water, being almoſt equally ſoluble in both menſtrua.

Rectified ſpirit may be tinged by vegetables of all colours except blue; the leaves of plants in general, which give out but little of their natural colour to watery liquors, communicate to ſpirit the whole of their green tincture, which for the moſt part proves elegant, though not very durable.

Fixed alkaline ſalts deepen the colour of ſpirituous tinctures; and hence they have been ſuppoſed to promote the diſſolving power of the menſtruum, though this does not appear from experience: in the trials that have been made to determine this affair, no more was found to be taken up in the deep-coloured tinctures than in the paler ones, and often not ſo much; if the alkali be added after the extraction of the tincture, it will heighten the colour as much as when mixed with the ingredients at firſt. Nor does the addition of theſe ſalts make tinctures uſeleſs only, but likewiſe prejudicial, as they in general injure the flavour of aromatics, and ſuperadd a quality, ſometimes contrary to the intention of the medicine. Volatile alkaline ſalts, in many caſes, promote the action of the ſpirits. Acids generally weaken it; unleſs when the acid has been previouſly combined with the vinous ſpirit into a compound or new qualities, called *dulcified ſpirit*.

Tincture of wormwood. E.

420 Take of the flowering tops of wormwood, properly dried, four ounces; rectified ſpirit of wine, two pounds. Macerate for two days; then preſs out the ſpirit, and pour it on two ounces of wormwood. Macerate again for four days; then preſs the tincture through a cloth, and afterwards ſtrain it through paper.

The aromatic parts of wormwood are more eſpecially found in the flowering tops, and its bitterneſs in the leaves: but as the latter are replete with a mucilaginous matter, which might impede the action of the menſtruum on the aromatic parts in this very elegant formula, the flowering tops are infuſed firſt, and their tincture made to extract the bitter parts of the leaves and ſtalks. This preparation may therefore be conſidered as containing the whole virtues of the plant.

In the tincture of wormwood we have one of the ſtrongeſt of the vegetable bittters. It is ſometimes uſed as an anthelmintic, and ſtill more frequently in ſtomach ailments: But to moſt people it is a very diſagreeable medicine.

Tincture of aloes. L.

421 Take of ſocotorine aloes, powdered, half an ounce; extract of liquorice, an ounce and an half; diſtilled water, proof-ſpirit, of each eight ounces. Digeſt in a ſand bath, now and then ſhaking the veſſel, until the extract be diſſolved, and then ſtrain.

In this ſimple tincture all the active parts of the aloes, whether of a gummy or reſinous nature, are ſuſpended in the menſtruum. The extract of liquorice ſerves both to promote the ſuſpenſion and to cover the taſte of the aloes; and in theſe caſes where we wiſh for the operation of the aloes alone, without the aid either of an adjuvans or corrigens, this is perhaps one of the beſt formulæ under which aloes can be exhibited in a fluid ſtate.

Compound tincture of aloes. L.

422 Take of tincture of myrrh, two pints; ſaffron, ſocotorine aloes, of each three ounces. Digeſt for eight days, and ſtrain.

Elixir of aloes, commonly called *Elixir proprietatis*, E.

Take of myrrh in powder, two ounces; ſocotorine aloes, an ounce and a half; Engliſh ſaffron, one ounce; rectified ſpirit of wine, proof-ſpirit, of each one pound. Digeſt the myrrh with the ſpirit for the ſpace of four days; then add the aloes in powder, and the ſaffron; continue the digeſtion for two days longer, ſuffer the feces to ſubſide, and pour off the clear elixir.

Theſe two formulæ, though the mode of preparation be ſomewhat varied, do not materially differ from each other; and both may be conſidered as being the *elixir proprietatis* of Paracelſus, improved with regard to the manner of preparations. The myrrh, ſaffron, and aloes, have been uſually directed to be digeſted in the ſpirit together: by this method, the menſtruum ſoon loads itſelf with the latter, ſo as ſcarcely to take up any of the myrrh; while a tincture, extracted firſt from the myrrh, readily diſſolves a large quantity of the others. The alkaline ſalt, commonly ordered in theſe preparations with a view to promote the diſſolution of the myrrh, we have already obſerved to be uſeleſs; and accordingly it is now omitted. Inſtead of employing the rectified ſpirit alone, the Edinburgh college have uſed an equal portion of proof-ſpirit, which is not only a more complete menſtruum, but alſo renders the medicine leſs heating.

This medicine is highly recommended, and not undeſervedly, as a warm ſtimulant and aperient. It ſtrengthens the ſtomach and other viſcera, cleanſes the firſt paſſages from tenacious phlegm, and promotes the natural ſecretions in general. Its continued uſe has frequently done much ſervice in cachectic and icteric caſes, uterine obſtructions, and other ſimilar diſorders; particularly in cold pale phlegmatic habits. Where the patient is of a hot bilious conſtitution and florid complexion, this warm ſtimulating medicine is leſs proper, and ſometimes prejudicial. The doſe may be from twenty drops to a tea-ſpoonful or more, two or three times a-day, according to the purpoſes which it is intended to anſwer.

Vitriolic elixir of aloes or *proprietatis*. E.

423 Take of myrrh, ſocotorine aloes, each an ounce and a half; Engliſh ſaffron, one ounce: dulcified ſpirit of vitriol, one pound. Digeſt the myrrh with the ſpirit for four days in a cloſe veſſel; then add the ſaffron and aloes. Digeſt again four days; and when the feces have ſubſided, pour off the elixir.

The Edinburgh college have reformed this preparation conſiderably; and eſpecially by directing the myrrh to be digeſted firſt, for the ſame reaſons as were obſerved on the preceding article. Here the dulcified ſpirit of vitriol is very judiciouſly ſubſtituted for the ſpirit of ſulphur, ordered in other books of pharmacy to be added to the foregoing preparation; for that ſtrong acid precipitates from the liquor great part of what it had before taken up from the other ingredients; whereas, when the acid is previouſly combined with the vinous ſpirit, and thereby dulcified, as it is called, it does not impede its diſſolving power. This elixir poſſeſſes the general virtues of the preceding, and is, in virtue of the menſtruum, preferred to it in hot conſtitutions and weakneſſes of the ſtomach.

Aromatic tincture. E.

424 Take of cinnamon, ſix drams: leſſer cardamom ſeeds, one ounce; garden-angelica root, three drams; long pepper, two drams; proof-ſpirit, two pounds and an half. Macerate for ſeven days, and filter the tincture.

This preparation is improved from the preceding editions by the omiſſion of ſome articles, either ſuperfluous or foreign to the intention; galangal, gentian, zedoary, bay-berries, and calamus aromaticus. As now reformed, it is a ſufficiently elegant warm aromatic.

This very warm aromatic is too hot to be given without dilution. A tea-ſpoonful or two may be taken in wine or any other convenient vehicle, in languors, weakneſs of the ſtomach, flatulencies, and other ſimilar complaints; and in theſe caſes it is often employed with advantage.

Tincture of aſafœtida. L.

425 Take of aſafœtida, four ounces; rectified ſpirit of wine, two pints. Digeſt with a gentle heat for ſix days, and ſtrain.

Fetid tincture. E.

Take of aſafœtida, two ounces; vinous ſpirit of ſal ammoniac one pound. Macerate for ſix days in a cloſe ſhut veſſel, and ſtrain.

Of theſe two formulæ, the laſt is perhaps moſt generally uſeful: The vinous ſpirit of ſal ammoniac is not only a more powerful menſtruum than the rectified ſpirit of wine, but alſo coincides with the general virtues of the remedy.

This tincture poſſeſſes the virtues of the aſafœtida itſelf; and may be given from ten drops to fifty or ſixty. It was firſt propoſed to be made with proof-ſpirit; this diſſolves more of the aſafœtida than a rectified one; but the tincture proves turbid; and therefore rectified ſpirit, which extracts a tranſparent one, is very juſtly preferred where ardent ſpirit is to be employed: and with this menſtruum we can at leaſt exhibit the aſafœtida in a liquid form to a greater extent.

Tincture of balſam of Peru. L.

426 Take of balſam of Peru, four ounces; rectified ſpirit of wine, one pint. Digeſt until the balſam be diſſolved.

The whole of the Peruvian balſam is diſſolved by ſpirit of wine; this therefore may be conſidered as a good method of freeing it from its impurities; while at the ſame time it is thus reduced to a ſtate under which it may be readily exhibited: but at preſent it is very little employed, unleſs in compoſition, either under this or any other form.

Tincture of balſam of Tolu.

427 Take of balſam of Tolu, one ounce and an half; rectified ſpirit of wine, one pint. Digeſt until the balſam be diſſolved and ſtrain. *L.*

Take of balſam of Tolu, an ounce and an half; rectified ſpirit of wine, one pound. Digeſt until the balſam be diſſolved, and then ſtrain the tincture. *E.*

This ſolution of balſam of Tolu poſſeſſes all the virtues of the balſam itſelf. It may be taken internally, with the ſeveral intentions for which that valuable balſam is proper, to the quantity of a tea-ſpoonful or two, in any convenient vehicle. Mixed with the plain ſyrup of ſugar, it forms an elegant balſamic ſyrup.

Compound tincture of benzoin. L.

428 Take of benzoin, three ounces; ſtorax ſtrained, two ounces; balſam of Tolu one ounce; ſocotorine aloes, half an ounce; rectified ſpirit of wine, two pints. Digeſt with a gentle heat for three days, and ſtrain.

Traumatic balſam. E.

Take of benzoin, three ounces; balſam of Peru, two ounces; hepatic aloes, half an ounce; rectified ſpirit of wine, two pounds. Digeſt them in a ſand heat for the ſpace of ten days, and then ſtrain the balſam.

Although the London college have changed the name of this compoſition, yet they have made very little alteration on the formula which, in their laſt edition, had the name of *Traumatic balſam*; a name which it ſtill retains in the Edinburgh pharmacopœia; and both may be conſidered as elegant contractions of ſome very complicated compoſitions, which were celebrated under different names; ſuch as Baume de Commandeur, Wade's balſam, Friar's balſam, Jeſuit's drops, &c. Theſe, in general, conſiſted of a confuſed farrago of diſcordant ſubſtances. They, however derived conſiderable activity from the benzoin and aloes; and every thing to be expected from them may readily be obtained from the preſent formulæ.

The compound tincture of benzoin, or traumatic balſam, ſtands highly recommended, externally, for cleanſing and healing wounds and ulcers, for diſcuſſing cold tumours, allaying gouty, rheumatic, and other old pains and aches; and likewiſe internally, for warming and ſtrengthening the ſtomach and inteſtines, expelling flatulencies, and relieving colic complaints. Outwardly, it is applied cold on the part with a feather; inwardly, a few drops are taken at a time, in wine or any other convenient vehicle.

There is, however, reaſon to think that its virtues have been conſiderably over-rated; and at preſent it is much leſs employed than formerly, recourſe being chiefly had to it in caſes of recent wounds, with the view of ſtopping hæmorrhagies, and of promoting healing by the firſt intention, as it is called.

Tincture of the Spaniſh fly.

Take of bruiſed cantharides, two drams; cochineal, powdered, half a dram; proof-ſpirit one pint and an half. Digeſt for eight days and ſtrain. *L.* 429

Take of cantharides, one dram; proof-ſpirit, one pound. Digeſt for four days, and ſtrain through paper. *E.*

Theſe tinctures poſſeſs the whole virtues of the fly, and are the only preparations of it deſigned for internal uſe: tinctures being by far the moſt commodious and ſafe form for the exhibition of this active drug. The two tinctures are ſcarcely different in virtue from each other. The cochineal is uſed only as a colouring ingredient: the gum-guaiacum, camphor, and eſſential oil of juniper-berries, which were formerly added, however well adapted to the intentions of cure, could be of little conſequence in a medicine limited to ſo ſmall a doſe. If any additional ſubſtances ſhould be thought requiſite for promoting the effect of the cantharides, whether as a diuretic, as a detergent in ulcerations of the urinary paſſages, or as a ſpecific reſtringent of ſeminal gleets and the fluor albus, they are more advantageoſluy joined extemporaneouſly to the tincture, or interpoſed by themſelves at proper intervals. The uſual doſe of theſe tinctures is from ten to twenty drops; which may be taken in a glaſs of water, or any other more agreeable liquor, twice a day; and increaſed by two or three drops at a time according to the effect.

The tincture of cantharides has of late been highly celebrated as a ſucceſsful remedy in diabetic caſes;

and in ſome inſtances of this kind, its uſe has been puſhed to a very conſiderable extent, without giving riſe to any ſtrangurious affections: But we have not found it productive of a change for the better in any of thoſe caſes of diabetes in which we have tried it.

Tincture of cardamom.

430 Take of leſſer cardamom ſeeds, huſked and bruiſed, three ounces; proof-ſpirit, two pints. Digeſt for eight days, and ſtrain. *L.*

Take of leſſer cardamom-ſeeds, ſix ounces proof-ſpirit, two pounds and a half. Macerate for eight days, and ſtrain through paper. *E.*

Tincture of cardamom has been in uſe for a conſiderable time. It is a pleaſant, warm cordial; and may be taken, along with any proper vehicle, from a dram to a ſpoonful or two.

Compound tincture of cardamom. L.

431 Take of leſſer cardamom ſeeds, huſked, carraway-ſeeds, cochineal, each, powdered, two drams; cinnamon, bruiſed, half an ounce; raiſins, ſtoned, four ounces; proof-ſpirit, two pints. Digeſt for fourteen days, and ſtrain.

This tincture contains ſo ſmall a proportion of cardamoms as to be hardly intitled to derive its name from that article; and from the large proportion of raiſins which it contains, the influence of the aromatics muſt be almoſt entirely prevented, while, at the ſame time, from theſe it cannot be ſuppoſed to obtain any active impregnation.

Tincture of caſcarilla. L.

432 Take of the bark of caſcarilla, powdered, four ounces; proof-ſpirit two pints. Digeſt with a gentle heat for eight days, and ſtrain.

Proof ſpirit readily extracts the active powers of the caſcarilla: and the tincture may be employed to anſwer moſt of theſe purpoſes for which the bark itſelf is recommended: But in the cure of intermittents, it in general requires to be exhibited in ſubſtance.

Tincture of caſtor.

433 Take of Ruſſia caſtor, powdered, two ounces; proof-ſpirit, two pints. Digeſt for ten days, and ſtrain. *L.*

Take of Ruſſia caſtor, an ounce and a half; rectified ſpirit of wine, one pound; digeſt them with a gentle heat for ſix days, and afterwards ſtrain off the liquor. *E.*

An alkaline ſalt was formerly added in this laſt preſcription which is here judiciouſly rejected, as being at leaſt an uſeleſs, if not a prejudicial, ingredient. It has been diſputed whether a weak or rectified ſpirit, and whether cold or warm digeſtion, are preferable for making this tincture. To determine this point, the following experiment has been mentioned. "Some fine Siberia caſtor having been infuſed in good French brandy without heat, for twenty days, the tincture proved very weak: On the ſame individual caſtor (the magma or reſiduum of the former tincture) the ſame quantity of rectified ſpirit was poured as before of brandy; and after a few hours warm digeſtion, a tincture was extracted much ſtrongger than the other." But this experiment is not ſatisfactory: the effects of the two menſtrua, and of heat, having been reſpectively compared in very different circumſtances.

From other trials, it appears that caſtor, macerated without heat, gives out its finer and moſt grateful parts to either ſpirit, but moſt perfectly to the rectified. That heat enables both menſtrua to extract greateſt part of its groſſer, and more nauſeous matter; and proof-ſpirit extracts this laſt more readily than rectified.

The tincture of caſtor is recommended in moſt kinds of nervous complaints and hyſteric diſorders: In the latter it ſometimes does ſervice, though many have complained of its proving ineffectual. The doſe is from twenty drops to forty, fifty, or more.

Compound tincture of caſtor. E.

434 Take of Ruſſia caſtor one ounce; aſafœtida, half an ounce; vinous ſpirit of ſal ammoniac one pound. Digeſt for ſix days in a cloſe ſtopped phial, frequently ſhaking the veſſel; and then ſtrain the tincture.

This compoſition is a medicine of real efficacy, particularly in hyſterical diſorders, and the ſeveral ſymptoms which accompany them. The ſpirit here uſed is an excellent menſtruum, both for the caſtor and the aſafœtida, and greatly adds to their virtues.

Tincture of catechu. L.

435 Take of catechu, three ounces; cinnamon, bruiſed, two ounces; proof-ſpirit, two pints. Digeſt for three days, and ſtrain.

Japonic tincture. E.

Take of Japan earth, three ounces; cinnamon, two ounces; proof-ſpirit, two pounds and a half. After digeſtion for eight days, let the tincture be paſſed through a ſtrainer.

A tincture of this kind, with the addition of Peruvian bark, ambergris, and muſk, to the ingredients above directed, was formerly kept in the ſhops. The tincture here received is preferable for general uſe: where any other ingredients are required, tinctures of them may be occaſionally mixed with this in extemporaneous preſcription. The cinnamon is a very uſeful addition to the catechu, not only as it warms the ſtomach, &c. but likewiſe as it improves the roughneſs and aſtringency of the other.

The tincture is of ſervice in all kinds of defluxions, catarrhs, looſeneſſes, uterine fluors, and other diſorders, where mild aſtringent medicines are indicated. Two or three tea-ſpoonfuls may be taken every now and then in red wine or in any other proper vehicle.

Tincture of cinnamon.

436 Take of cinnamon, bruiſed one ounce and an half; proof-ſpirit, one pint. Digeſt for ten days, and ſtrain. *L.*

Take of cinnamon, three ounces; proof-ſpirit, two pounds and a half. Macerate for eight days, and ſtrain. *E.*

The tincture of cinnamon poſſeſſes the reſtringent virtues of the cinnamon, as well as all its aromatic cordial ones; and in this reſpect it differs from the diſtilled waters of that ſpice.

Compound tincture of Cinnamon. L.

437 Take of cinnamon, bruiſed, ſix drams; leſſer cardamom-ſeeds, huſked, three drams; long pepper, ginger, of each, in powder, two drams; proof-ſpirit, two pints. Digeſt for eight days and ſtrain.

From the different articles which this tincture contains it muſt neceſſarily be of a more hot and fiery nature than the former, though much leſs ſtrongly impregnated with the cinnamon.

Tincture of colomba. L.

438 Take of colomba-root, powdered two ounces and an half: proof ſpirit, two pints. Digeſt for eight days and ſtrain.

The colomba readily yields its active qualities to the menſtruum here employed: and accordingly, under this form, it may be advantageouſly employed againſt bilious vomitings, and thoſe different ſtomach ailments, in which the colomba has been found uſeful; but where there does not occur ſome objection to its uſe in ſubſtance, that form is in general preferable to the tincture, which is now for the firſt time introduced into the London pharmacopœia.

Tincture of orange peel. L.

439 Take of the freſh exterior peel of Seville oranges, three ounces; proof-ſpirit, two pints. Digeſt for three days, and ſtrain.

By this menſtruum, both the bitter quality of the orange ſkins, and likewiſe their peculiar eſſential oil, are extracted: hence it may be employed for any purpoſe in medicine which theſe are capable of anſwering. It is, however, but rarely uſed; and, as well as the former, has now only for the firſt time a place in the London pharmacopœia.

Tincture of Peruvian-bark.

440 Take of Peruvian bark, powdered four ounces; proof-ſpirit, two pints. Digeſt with a gentle heat for eight days, and ſtrain. *L.*

Take of Peruvian bark, four ounces; proof-ſpirit, two pounds and a half. Digeſt for ten days, and ſtrain. *E.*

A medicine of this kind has been for a long time pretty much in eſteem, and uſually kept in the ſhops, though but lately received into the pharmacopœias. Some have employed highly-rectified ſpirit of wine as a menſtruum; which they have taken care fully to ſaturate, by digeſtion on a large quantity of the bark. Others have thought of aſſiſting the action of the ſpirit by the addition of a little fixed alkaline ſalt, which does not however appear to be of any advantage; and others have given the preference to the vitriolic acid, which was ſuppoſed by giving a greater conſiſtence to the ſpirit, to enable it to ſuſtain more than it would be capable of doing by itſelf; at the ſame time that the acid improves the medicine by increaſing the roughneſs of the bark. This laſt tincture, and that made with rectified ſpirit, have their advantages; though, for general uſe, that above directed is the moſt convenient of any, the proof-ſpirit extracting nearly all the virtues of the bark. It may be given from a tea-ſpoonful to half an ounce, or an ounce, according to the different purpoſes it is intended to anſwer.

Compound tincture of Peruvian bark. L.

441 Take of Peruvian bark, powdered, two ounces; exterior peel of Seville oranges, dried, one ounce and an half; Virginian ſnake-root, bruiſed, three drams; ſaffron, one dram; cochineal, powdered, two ſcruples; proof-ſpirit, twenty ounces. Digeſt for fourteen days, and ſtrain.

This has been for a conſiderable time celebrated under the title of *Huxham's tincture of bark*.

The ſubſtances here joined to the bark, in ſome caſes, promote its efficacy in the cure of intermittents, and not unfrequently are abſolutely neceſſary. In ſome ill habits, particularly where the viſcera and abdominal glands are obſtructed, the bark, by itſelf, proves unſucceſsful, if not injurious; while given in conjunction with ſtimulating ſtomachics and deobſtruents, it more rarely fails of the due effect. Orange-peel and Virginian ſnake-root are among the beſt additions for this purpoſe; to which it is thought by ſome neceſſary to join chalybeate medicines alſo.

As a corroborant and ſtomachic, it is given in doſes of two or three drams; but when employed for the cure of intermittents, it muſt be taken to a greater extent. For this purpoſe, however, it is rarely employed, unleſs with thoſe who are averſe to the uſe of the bark in ſubſtance, or whoſe ſtomachs will not retain it under that form.

Tincture of ſaffron. E.

442 Take of Engliſh ſaffron, one ounce; proof-ſpirit, fifteen ounces. After digeſting them for five days, let the tincture be ſtrained through paper.

This tincture is ſimilar in virtue to the ſaffron wine. A ſpirituous menſtruum is here preferred to the wine as a tincture drawn with the former retains its elegant colour longer, and is not apt to depoſite in keeping any part of what it had taken up from the ſaffron. The ſhops have been accuſtomed to employ treacle-water as a menſtruum for ſaffron, with a view to the promoting its efficacy with the intention of operating as an alexipharmac; but the acid in that compound water ſoon deſtroys the colour of the tincture.

Tincture of muriated iron. L.

443 Take of the ruſt of iron, half a pound; muriatic acid three pounds; rectified ſpirit of wine, three pints. Pour the muriatic acid on the ruſt of iron in a glaſs veſſel; and ſhake the mixture now and then during three days. Set it by, that the feces may ſubſide; then pour off the liquor: evaporate this to one pint, and, when cold, add to it the vinous ſpirit.

Tincture of iron. E.

Take of the ſcales of iron, purified and powdered, three ounces; muriatic acid, as much as is ſufficient to diſſolve the powder. Digeſt with a gentle heat; and the powder being diſſolved, add of rectified ſpirit of wine as much as will make up of the whole liquor two pounds and a half.

Of theſe two formulæ, that of the Edinburgh college is, in our opinion, in ſeveral reſpects intitled to the preference. The ſcales are much fitter for giving a proper ſolution than the ruſt. The ſtrength of the muriatic acid is ſo variable, that the quantity is left to the judgment of the operator. If the acid be ſuperabundant, the ſolution is of a green colour; if it be fully ſaturated with the iron, it is more or leſs of a reddiſh or yellow colour; and this ſerves as a pretty accurate criterion. As the muriatic acid combines leſs intimately with rectified ſpirit than any of the foſſil acids, ſo the after proceſs of dulcification ſcarcely, if at all, impairs the ſolvent power of the acid; though, when the dulcification happens to be more than uſually complete, a ſmall quantity of ferruginous matter is ſometimes precipitated on adding the rectified ſpirit to the ſolution. But as the rectified ſpirit increaſes the volatility of the acid, ſo if it was added at firſt, we ſhould loſe much more of the menſtruum by the heat employed during the digeſtion. When this tincture is well prepared, it is of a yellowiſh-red colour; if the acid be ſuperabundant, it is more or leſs of a greeniſh hue; and if the rectified ſpirit has been impregnated with the aſtringent matter of oak caſks, it aſſumes an inky colour.

All the tinctures of iron are no other than real ſolutions of the metal made in acids, and combined with vinous ſpirits. The tinctures here directed differ from each other only in ſtrength, the acid being the ſame in both. In our former pharmacopœias, there was a tincture from the matter which remains after the ſublimation of the martial flowers; which, though it appears to be a good one, is now expunged as ſuperfluous. Some have recommended dulcified ſpirit of nitre as a menſtruum; but though this readily diſſolves the metal, it does not keep it ſuſpended. The marine is the only acid that can be employed for this purpoſe.

Theſe tinctures are greatly preferable to the calces or croci of iron, as being not only more ſpeedy, but likewiſe more certain in their operation. The latter, in ſome caſes paſs off through the inteſtinal tube with little effect; while the tinctures ſcarce ever fail. From ten to twenty drops of either of the tinctures may be taken two or three times a-day, in any proper vehicle; though it is ſeldom adviſable to extend the doſe of any tinctures of iron ſo far as the laſt of theſe quantities, eſpecially with the tincture in ſpirit of ſalt, which is exceedingly ſtrong of the iron.

Tincture of ſoot. E.

444 Take of ſhining wood-ſoot, one ounce; aſafœtida, half an ounce; rectified ſpirit of wine, proof-ſpirit, of each half a pound. Digeſt for ſix days, and ſtrain.

The proof-ſpirit is not liable to any objection here, as giving a turbid tincture; for when ſoot is added, whatever ſpirit be employed, the tincture will not prove tranſparent. Fuller, in his Pharmacopœia Domeſtica, has a medicine under the title of *hyſteric tincture*, ſimilar to this, only with a little myrrh, which is no very material addition to aſſafœtida and ſoot. Theſe medicines are found ſerviceable, not only in hyſteric caſes, but likewiſe in other nervous diſorders. They may be given from a tea-ſpoonful to a table-ſpoonful twice a-day.

This medicine has by ſome been thought ſerviceable in obſtructions of the menſes; but its activity may be conſidered as depending much more on the aſafœtida than on the ſoot.

Tincture of galbanum. L.

Take of galbanum, cut into ſmall pieces, two ounces; proof-ſpirit, two pints. Digeſt with a gentle heat for eight days, and ſtrain. 445

This tincture is now for the firſt time introduced by the London college, and may be uſefully employed for anſwering ſeveral purpoſes in medicine. Galbanum is one of the ſtrongeſt of the fetid gums; and although leſs active, yet much leſs diſagreeable than aſafœtida: and under the form of tincture it may be ſucceſsfully employed in caſes of flatulence and hyſteria, where its effects are immediately required, particularly with thoſe who cannot bear aſafœtida.

Compound tincture of gentian. L.

Take of gentian root, ſliced and bruiſed, two ounces; exterior dried peel of Seville oranges, one ounce; leſſer cardamom ſeeds, huſked and bruiſed, half an ounce; proof ſpirit, two pints. Digeſt for eight days, and ſtrain. 446

Bitter tincture or ſtomachic elixir. E.

Take of gentian-root, two ounces; Seville orange-peel, dried, one ounce; white canella, half an ounce; cochineal, half a dram; proof-ſpirit, two pounds and a half. Macerate for four days, and ſtrain through paper.

Theſe are very elegant ſpirituous bitters. As the preparations are deſigned for keeping, lemon-peel, an excellent ingredient in the watery bitter infuſions, has, on account of the periſhableneſs of its flavour, no place in theſe. The aromatics are here a very commodious ingredient, as in this ſpirituous menſtruum they are free from the inconvenience with which they are attended in other liquors, of rendering them untranſparent.

Elixir of guaiacum. E.

Take of gum-guaiacum, one pound; balſam of Peru, three drams; rectified ſpirit of wine, two pounds and a half. Digeſt for ten days, and ſtrain. 447

This tincture may be conſidered as nearly agreeing in medical virtues with the two following. It is, however, leſs in uſe; but it may be employed with advantage in thoſe caſes where an objection occurs to the menſtruum uſed in forming the others.

Tincture of gum-guaiacum. L.

Take of gum-guaiacum, four ounces; compound ſpirit of ammonia, a pint and a half. Digeſt for three days, and ſtrain. 448

Volatile elixir of guaiacum. E.

Take of gum-guaiacum, four ounces; balſam of Peru, two drams; diſtilled oil of ſaſſafras, half a dram; vinous ſpirit of ſal ammoniac, a pound and an half. Macerate for ſix days in a cloſe veſſel, and ſtrain.

In the laſt of theſe formulæ, the vinous ſpirit of ſal ammoniac is leſs acrimonious than the menſtruum directed by the London college; and the balſam of Peru, and diſtilled oil of ſaſſafras, are uſeful additions, by

BRITISH MUSEUM

733 k

by increaſing the permanence of its operation as a general ſtimulant, or more particularly as a diaphoretic.

Theſe are very elegant and efficacious tinctures; the volatile ſpirit excellently diſſolving the gum, and at the ſame time promoting its medicinal virtue. In rheumatic caſes, a tea or even table ſpoonful, taken every morning and evening in any convenient vehicle, particularly in milk, has proved of ſingular ſervice.

Tincture of black hellebore. L.

449 Take of black hellebore root, in coarſe powder, four ounces; cochineal, powdered, two ſcruples; proof-ſpirit, two pints. Digeſt with a gentle heat for eight days, and ſtrain.

Tincture of melampodium, or black hellebore. E.

Take of black hellebore root, four ounces; cochineal, half a dram; proof-ſpirit, two pounds and a half. Digeſt them together for eight days, and afterwards filter the tincture through paper.

This is perhaps the beſt preparation of hellebore when deſigned for an alterative, the menſtruum here employed extracting the whole of its virtues. It has been found, from experience, particularly ſerviceable in uterine obſtructions; in ſanguine conſtitutions, where chalybeates are hurtful, it has been ſaid that it ſeldom fails of exciting the menſtrual evacuations, and removing the ill conſequences of their ſuppreſſion. So great, according to ſome, is the power of this medicine, that wherever, from an ill conformation of the parts, or other cauſes, the expected diſcharge does not ſucceed on the uſe of it, the blood, as Dr Mead has obſerved, is ſo forcibly propelled, as to make its way through other paſſages. A tea ſpoonful of the tincture may be taken twice in a day in warm water or any other convenient vehicle.

The college of Edinburgh had formerly a tincture of this root with wine. Proof ſpirit is undoubtedly preferable, both as a menſtruum, and as being better fitted for keeping.

Tincture of jalap.

450 Take of powdered jalap root, eight ounces; proof-ſpirit, two pints. Digeſt with a gentle heat for eight days, and ſtrain. *L.*

Take of jalap in coarſe powder, three ounces; proof-ſpirit, fifteen ounces. Digeſt them for eight days, and ſtrain the tincture. E.

Rectified ſpirit of wine was formerly ordered for the preparation of this tincture; but rectified ſpirit diſſolving little more than the pure reſinous parts of the jalap, rendered the uſe of the medicine ſomewhat leſs commodious than that of the tincture prepared with proof-ſpirit. Moſt of the tinctures made in rectified ſpirit, diluted with water, ſo as to be fit for taking, form a turbid white mixture. Many of them are ſafely taken in this form, without any further addition: but the cathartic ones are never to be ventured on without an admixture of ſyrup or mucilage to keep the reſin united with the liquor; for if it ſeparates in its pure undivided ſtate, it never fails to produce violent gripes.

Some have preferred to the tinctures of jalap, a ſolution in ſpirit of wine of a known quantity of the reſin extracted from the root; and obſerve that this ſolution is more certain in ſtrength than any tincture that can be drawn from the root directly. For, as the purgative virtue of jalap reſides in its reſin, and as all jalap appears from experiment not to be equally reſinous ſome ſorts yielding five, and others not three, ounces of reſin from ſixteen; it follows, that although the root be always taken in the ſame proportion to the menſtruum, and the menſtruum always exactly of the ſame ſtrength, it may, nevertheleſs, according to the degree of goodneſs of the jalap, be impregnated with different quantities of reſin, and conſequently prove different in degree of efficacy. Though this objection againſt the tincture does not reach ſo far as ſome ſeem to ſuppoſe, it certainly behoves the apothecary to be careful in the choice of the root. The inferior ſorts may be employed for making reſin of jalap, which they yield in as great perfection, though not in ſo large quantity, as the beſt. Neumann thinks even the worm-eaten jalap as good for that purpoſe as any other.

Tincture of gum kino. E.

Take of gum-kino, two ounces; proof ſpirit, a pound and an half. Digeſt eight days, and ſtrain. 451

The ſubſtance called *gum-kino* ſeems to be really a gum reſin; on which account proof-ſpirit is the moſt proper menſtruum. This preparation muſt therefore poſſeſs the virtues of the ſubſtance; and it is perhaps one of the beſt forms under which it can be exhibited in obſtinate diarrhœas, and in caſes of lienteria: but in hemorrhagies, it is in general proper to exhibit it either in ſubſtance or diffuſed; yet we cannot help thinking that the want of this tincture is an omiſſion in the London pharmacopœia.

Compound tincture of lavender. L.

Take of ſpirit of lavender, three pints; roſemary, one pint; cinnamon bruiſed, nutmegs bruiſed, of each half an ounce; red ſaunders, one ounce. Digeſt for ten days, and ſtrain. 452

Compound ſpirit of lavender. E.

Take of ſimple ſpirit of lavender three pounds; ſimple ſpirit of roſemary, one pound; cinnamon, one ounce; cloves, two drams: nutmeg, half an ounce; red ſaunders, three drams. Macerate ſeven days, and ſtrain.

Theſe two compoſitions, although varying a little from each other, both with reſpect to their ingredients and names, may yet be conſidered as preciſely the ſame. Although the London college, in the preſent edition of their pharmacopœia, have made many uſeful alterations with reſpect to names, yet the propriety of the change here adopted may perhaps be doubted: For it cannot with juſtice be ſtyled a tincture of lavender, when the diſtilled ſpirit of that plant is employed only as a menſtruum. If, therefore, it ſeemed neceſſary to refer it to the head of tinctures, it ought to have been denominated from the cinnamon or nutmegs; but ſince the activity of this article very much depends on the ſpirit of lavender,

vender, the old name is in our opinion juſtly preferable to the new one.

The red ſaunders is of no farther uſe in theſe compoſitions than as a colouring ingredient. If a yellow ſpirit was liked, the yellow ſaunders would be an excellent article, as it not only communicates a fine colour, but likewiſe a conſiderable ſhare of medicinal virtue. A ſpirit diſtilled from the flowers of lavender and ſage, in due proportion, and digeſted in the cold for a little time with ſome cinnamon, nutmegs, and yellow ſaunders, proves a very elegant and grateful one. Where eſſential oils are employed, particular care muſt be had in the choice of them; for on their goodneſs that of the medicine depends. The digeſtion of the ſpirit with the ſpices, &c. ſhould be performed without heat, otherwiſe the flavour of the medicine will be injured. Theſe ſpirits are grateful reviving cordials: though conſiderably more ſimple, they are not leſs elegant or valuable than many other more elaborate preparations. This medicine has long been held in great eſteem, under the name of *Palſy drops* in all kinds of languors, weakneſs of the nerves, and decays of age. It may be conveniently taken on ſugar, from ten to eighty or a hundred drops.

Tincture of muſk. E.

453 Take of muſk, two drams; rectified ſpirit of wine one pound. Digeſt for ten days, and ſtrain.

Rectified ſpirit is the moſt complete menſtruum for muſk; but in this form it is often impoſſible to give ſuch a quantity of muſk as is neceſſary for our purpoſe; and hence this article is more frequently employed under the form of julep or bolus.

Tincture of myrrh.

454 Take of myrrh, bruiſed, three ounces; proof-ſpirit, a pint and an half; rectified ſpirit of wine, half a pint. Digeſt with a gentle heat for eight days, and ſtrain. *L.*

Take of myrrh three ounces; proof-ſpirit two pounds and a half. After digeſtion for ten days ſtrain off the tincture. *E.*

The pharmaceutical writers in general have been of opinion, that no good tincture can be drawn from myrrh by ſpirit of wine alone, without the aſſiſtance of fixed alkaline ſalts. But it appears from proper experiments, that theſe ſalts only heighten the colour of the tincture, without enabling the menſtruum to diſſolve any more than it would by itſelf. Rectified ſpirit extracts, without any addition, all that part of the myrrh in which its peculiar ſmell and taſte reſide, viz. the reſin: and proof-ſpirit diſſolves almoſt the whole of the drug, except its impurities; hence the combination of theſe two directed by the London college is perhaps preferable to either by itſelf.

Tinctures of myrrh is recommended internally for warming the habit, attenuating viſcid juices, ſtrengthening the ſolids, opening obſtructions, particularly thoſe of the uterine veſſels, and reſiſting putrefaction Boerhaave greatly eſteems it in all languid caſes proceeding from ſimple inactivity; in thoſe female diſorders which are occaſioned by an aqueous, mucous, ſluggiſh indiſpoſition of the humours, and a relaxation of the veſſels; in the fluor albus, and all diſeaſes ariſing from a like cauſe. The doſe is from fifteen drops to forty or more. The medicine may doubtleſs be given in theſe caſes to advantage; though with us, it is more commonly uſed externally for cleanſing foul ulcers and promoting the exfoliation of carious bones.

Tincture of opium. L.

Take of hard purified opium, powdered, ten drams; proof-ſpirit, one pint. Digeſt for ten days, and ſtrain. 455

Tincture of opium, commonly called *liquid laudanum.* E.

Take of opium, two ounces; ſpirituous cinnamon-water, one pound and a half. Digeſt four days, and ſtrain off the tincture.

Theſe are very elegant liquid opiates, the menſtruum in the laſt diſſolves nearly the whole ſubſtance of the opium, and effectually covers its ill flavour. It were to be wiſhed that the ſhops were furniſhed with a liquid opiate, in which the proportion of menſtruum was ſtill much larger, ſo as to admit of the doſe being determined by weight or meaſure; the method by drops ſeeming too precarious for a medicine of ſo powerful a kind. The following preparation is contrived with this view.

Take of thebaic extract, half a dram; highly rectified ſpirit of wine, called *alcohol,* ten ounces; ſimple cinnamon-water twenty ounces. Digeſt them together until the opium be diſſolved, and then filter the ſolution through paper.

This preparation is apprehended to be free from all the inconveniences attending the common opiate tinctures. The menſtruum diſſolves the whole of the opium except the impurities, and conſequently the tincture is not liable to any uncertainty in point of ſtrength. The doſe may be aſcertained to the greateſt exactneſs; one grain of opium is contained in one ounce by meaſure, which is equal nearly to ſeven drams by weight. Neither the tinctures in wine nor proof-ſpirit are ſo well adapted for keeping as could be wiſhed: in long ſtanding, a part of the opium is gradually thrown off from both, and conſequently the tinctures become gradually weaker: the part which thus ſeparates, amounts ſometimes, it is ſaid, to near one-fourth of the quantity of opium at firſt diſſolved: it floats on the ſurface of the vinous tincture, and in the ſpirituous ſinks to the bottom. In the preparation here recommended, it has not been obſerved that any ſeparation happens.

Inſtead of the cinnamon water, pure water may be employed in the mixture; and where aromatic additions are wanted, either with a medicinal intention or for covering the ill ſmell of the opium, any proper tincture or diſtilled water may be extemporaneouſly joined. Saffron, an addition once employed by the Edinburgh college, has been conſidered as a corrector of opium; but the qualities it was ſuppoſed to correct are merely imaginary; nor indeed can that article be of much importance with any intention in the ſmall quantity that enters a doſe of the tincture; a grain of opium being accompanied with only half a grain of ſaffron.

A preparation in ſome reſpects ſimilar to that here recommended was introduced into the Edinburgh

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BRITISH MUSEUM

pharmacopœia publiſhed in 1774, under the title of *tinctura meconii*. Each ounce of this tincture contained four grains of opium; and it was propoſed that the doſes of it ſhould be meaſured, not by drops, but by weight: but as modern phyſicians are much more bold in giving opium than their preceſſors, ſuch a ſcrupulous accuracy in the doſe is not thought at all neceſſary; and it is not probable that any dangerous conſequence will ever ariſe, merely from a difference in the ſize of drops. This, however, might be the caſe, where the thebaic tincture is by accident taken for the tincture of meconium. To ſuch miſtakes, however, it was feared that the analogy of the articles, as well as the caution neceſſary with reſpect to both, might lead; and it was on many accounts ſafer to have but one liquid laudanum only. It is, however, much to be regretted, that the liquid laudanum of the London and Edinburgh college, which by the former is now ſtyled *tinctura opii*, by the latter *tinctura thebaica*, ſhould differ ſo much from each other in point of ſtrength.

Camphorated tincture of opium. L.

456 Take of hard purified opium, flowers of benzoin, each one dram; camphor, two ſcruples: eſſential oil of aniſeed one dram; proof-ſpirit, two pints. Digeſt for three days.

Paregoric elixir. E.

Take of flowers of benzoin, Engliſh ſaffron, each three drams; opium, two drams; eſſential oil of aniſeeds, half a dram; vinous ſpirit of ſal ammoniac, ſixteen ounces. Digeſt for four days in a cloſe veſſel and ſtrain.

Theſe too, though differing not merely in name, may be conſidered as agreeing very nearly in their nature.

The moſt material differences in the laſt formula from the firſt are the ſubſtitution of the vinous ſpirit of ſal ammoniac for the proof-ſpirit, and a larger proportion of opium; the vinous ſpirit of ſal ammoniac is not only perhaps, a more powerful menſtruum, but in moſt inſtances coincides with the vritues of the preparation; but as the opium is the ingredient on which we place the principal dependence, ſo its proportion is increaſed, in order that we may give it in ſuch a doſe as that the acrimony of the menſtruum ſhall not prove hurtful to the ſtomach.

The London formula is taken from Le Mort, with the omiſſion of three unneceſſary ingredients, honey, liquorice, and alkaline ſalt. It was originally called *elixir aſthmaticum*, which name it does not ill deſerve. It contributes to allay the tickling which provokes frequent coughing; and at the ſame time is ſuppoſed to open the breaſt, and give greater liberty of breathing: the opium procures (as it does by itſelf) a temporary relief from the ſymptoms; while the other ingredients tend to remove the cauſe, and prevent their return. It is given to children againſt the chincough, &c. from five drops to twenty: to adults, from twenty to an hundred. In the London formula, half an ounce by meaſure contains about a grain of opium; but in the Edinburgh formula the proportion of opium is larger.

Tincture of rhubarb.

Take of rhubarb, ſliced, two ounces; leſſer cardamom ſeeds, huſked and bruiſed, half an ounce; ſaffron, two drams; proof-ſpirit, two pints. Digeſt for eight days and ſtrain. L. 457

Take of rhubarb, three ounces; leſſer cardamom ſeeds, half an ounce: proof-ſpirit two pounds and a half. Digeſt for ſeven days, and ſtrain. E.

Compound tincture of rhubarb. L.

Take of rhubarb ſliced, two ounces; ginger powdered, ſaffron, each two drams; liquorice root, bruiſed; half an ounce; diſtilled water, one pint; proof-ſpirit twelve ounces. Digeſt for fourteen days, and ſtrain.

Bitter tincture of rhubarb. E.

Take of rhubarb two ounces; gentian-root, half an ounce; Virginian ſnake-root, one dram; proof ſpirit, two pounds and a half. Digeſt for ſeven days, and then ſtrain the tincture.

Sweet tincture of rhubarb. E.

It is made by adding to two pounds and a half of the ſtrained tincture of rhubarb, four ounces of ſugar-candy.

The laſt of theſe preparations is improved from the former editions. Two ounces of liquorice and one of raiſins are ſupplied, by an increaſe of the ſugar-candy.

All the foregoing tinctures of rhubarb are deſigned as ſtomachics and corroborants, as well as purgatives; ſpirituous liquors excellently extract thoſe parts of the rhubarb in which the two firſt qualities reſide, and the additional ingredients conſiderably promote their efficacy. In weakneſſes of the ſtomach, indigeſtion, laxity of the inteſtines, diarrhœas, colic, and other ſimilar complaints, theſe medicines are frequently of great ſervice: the ſecond is alſo in many caſes, an uſeful addition to the Peruvian bark, in the cure of intermittents, particularly in cachectic habits, where the viſcera are obſtructed; with theſe intentions, a ſpoonful or two may be taken for a doſe, and occaſionally repeated.

Elixir of aloes and rhubarb, commonly called *ſacred elixir.* E.

Take of rhubarb, cut ſmall, ten drams: ſoccotorine aloes, in powder, ſix drams; leſſer cardamom ſeeds, half an ounce; proof-ſpirit, two pounds and a half. Digeſt for ſeven days, and then ſtrain the elixir. 458

This preparation is very much employed as a warming cordial purge, and for the general purpoſes of aloetics; with which, however, it combines the medicinal properties of rhubarb.

Compound tincture of ſavin. L.

Take extract of ſavin, one ounce; tincture of caſtor, one pint; myrrh, half a pint. Digeſt till the extract of ſavin be diſſolved, and then ſtrain. 459

This preparation had a place in the laſt edition of our pharmacopœia, under the title of *Elixir myrrhæ compoſitum.*

This preparation is improved from one deſcribed in ſome former diſpenſaries under the name of *uterine elixir*. It is a medicine of great importance in uterine obſtructions, and in hypochondriacal caſes; though, poſſibly, means might be contrived of ſuperadding more effectually the virtues of ſavin to a tincture of myrrh and caſtor. It may be given from five drops to twenty or thirty, or more, in pennyroyal water, or any other ſuitable vehicle.

Tincture of ſquill. L.

460 Take of ſquills, freſh dried, four ounces; proof-ſpirit, two pints. Digeſt for eight days, and pour off the liquor.

For extracting the virtues of ſquills, the menſtruum which has hitherto been almoſt ſolely employed is vinegar. There are however, caſes in which ardent ſpirit may be more proper; and by the menſtruum here directed its virtues are fully extracted Hence it is with propriety that the London college have introduced this form, as well as the vinegar and oxymel. But, in general, the purpoſes to be anſwered by ſquills may be better obtained by employing it in ſubſtance than in any other form.

Antiphthiſical tincture. E.

461 Take of ſugar of lead an ounce and a half; vitriol of iron, one ounce; rectified ſpirit of wine, one pound. Let a tincture be extracted without heat.

The reducing of the ſalts *ſeparately* into powder, and performing the digeſtion *without heat*, are very neceſſary circumſtances: for if the ingredients be attempted to be pulverized together, they will grow ſoft and almoſt liquid; and if heat be uſed, ſcarce any tincture will be obtained.

This tincture is ſometimes given in doſes of twenty or thirty drops for reſtraining immoderate ſecretions, particularly the colliquative ſweats attending hectic fevers and phthiſical diſorders; whence the name *antiphthiſical* tincture. It is undoubtedly a medicine of great efficacy in theſe caſes, but too dangerous to be raſhly ventured on. Some have ſuppoſed that it does not contain any of the ſugar of lead; but experiments made for that purpoſe have ſhown the contrary.

We muſt however, conſider the above preparation as unſcientific. Both the acetous and vitriolic acid have a greater attraction for iron than for lead: and though the vitriolic be capable of diſcharging the acetous acid, yet it makes not only in its entire ſtate a leſs perfect union with lead than the acetous acid, but it is now alſo combined with iron, for which it has a greater attraction, and can therefore only act on the ſalt of lead in proportion as it is ſuperabundant in the ſalt of copperas; but in proportion as the vitriolic diſengages the acetous acid from the lead, the laſt, in its turn will attach itſelf to the iron. On the whole it is difficult to aſcertain the preciſe nature of this preparation; it ſeems always, however, to contain a quantity of lead in a ſaline ſtate, ſufficient to expunge it from prudent practice: or, at leaſt, if in theſe caſes in which it has hitherto been employed, lead be thought neceſſary, the ſalt of lead may with more ſafety and advantage be given in its ſolid ſtate, particularly when combined with opium: and it is probably on this account that the preſent formula has now no place in the London pharmacopœia.

Tincture of ſenna. L.

462 Take of ſenna, one pound; caraway-ſeeds, bruiſed, one ounce and an half; leſſer cardamom-ſeeds, huſked and bruiſed, half an ounce; raiſins, ſtoned, ſixteen ounces; proof-ſpirit, one gallon. Digeſt for fourteen days, and ſtrain.

Compound tincture of ſenna, commonly called *Elixir of health*. E.

Take of ſenna leaves, two ounces; jalap root, one ounce; coriander ſeeds, half an ounce; proof ſpirit, two pounds and a half. Digeſt for ſeven days, and to the ſtrained liquor add four ounces of ſugarcandy.

Both theſe tinctures are uſeful carminatives and cathartics, eſpecially to thoſe who have accuſtomed themſelve to the uſe of ſpirituous liquors; they oftentimes relieve flatulent complaints and colics, where the common cordials have little effect; the doſe is from one to two ounces. Several preparations of this kind have been offered to the public under the name of *Daffy's elixir*: the two above are equal to any, and ſuperior to moſt of them. The laſt in particular is a very uſeful addition to the caſtor oil, in order to take off its mawkiſh taſte: and as coinciding with the virtues of the oil, it is therefore much preferable to brandy, ſhrub, and ſuch like liquors, which otherwiſe are often found neceſſary to make the oil ſit on the ſtomach.

Tincture of ſnake root.

463 Take of Virginian ſnake-root, three ounces; proof-ſpirit, two pints. Digeſt for eight days, and ſtrain. *L.*

Take of Virginian ſnake-root, two ounces; cochineal. one dram; proof ſpirit, two pounds and a half. Digeſt in a gentle heat for four days, and then ſtrain the tincture. *E.*

The tincture of ſnake-root was in a former pharmacopœia directed to be prepared with the tincture of ſalt or tartar, which being now expunged, it was propoſed to the college to employ rectified ſpirit; but as the heat of this ſpirit prevents the medicine from being taken in ſo large a doſe as it might otherwiſe be, a weaker ſpirit was choſen The tincture made in this menſtruum, which extracts the whole virtues of the root, may be taken to the quantity of a ſpoonful or more every five or ſix hours; and to this extent it often operates as an uſeful diaphoretic.

Tincture of valerian. L.

464 Take of the root of wild valerian, in coarſe powder, four ounces; proof-ſpirit, two pints. Digeſt with a gentle heat eight days, and ſtrain.

The valerian root ought to be reduced to a pretty fine powder, otherwiſe the ſpirit will not ſufficiently extract its virtues. The tincture proves of a deep colour, and conſiderably ſtrong of the valerian; though it has not been found to anſwer ſo well in the cure of epileptic diſorders as the root in ſubſtance, exhibited in the form of powder, or bolus. The doſe of the tincture is from half a ſpoonful to a ſpoonful or more two or three times a-day.

Volatile

Volatile tincture of Valerian.

Take of the root of wild valerian, four ounces; compound ſpirit of ammonia, two pints. Digeſt for eight days, and ſtrain. *L.*

465 Take of wild valerian root two ounces; vinous ſpirit of ſal ammoniac, one pound. Macerate for ſix days in a cloſe veſſel and ſtrain. *E.*

Both the compound and vinous ſpirit of ſal ammoniac are here excellent menſtrua, and at the ſame time conſiderably promote the virtues of the valerian, which in ſome caſes wants an aſſiſtance of this kind. The doſe may be a tea ſpoonful or two.

Tincture of veratrum, or *white hellebore.*

466 Take of white hellebore root, eight ounces; proof-ſpirit, two pounds and a half. Digeſt them together for ten days, and filter the tincture through paper.

This tincture is ſometimes uſed for acuating cathartics, &c. and as an emetic in apoplectic and maniacal diſorders. It may likewiſe be ſo managed as to prove a powerful alterative and deobſtruent in caſes where milder remedies have little effect. But a great deal of caution is requiſite in its uſe: the doſe at firſt ought to be only a few drops; if conſiderable, it proves, violently emetic or cathartic.

Acid elixir of vitriol. E.

467 Take of rectified ſpirit of wine, two pounds; drop into it by little and little ſix ounces of vitriolic acid; Digeſt the mixture with a very gentle heat in a cloſe veſſel for three days, and then add of cinnamon, an ounce and a half; ginger, one ounce. Digeſt again in a cloſe veſſel for ſix days, and then filter the tincture through paper placed in a glaſs funnel.

The intention in this proceſs is, to obtain a tincture of aromatic vegetables, in ſpirit of wine, combined with a conſiderable proportion of vitriolic acid. When the tincture is firſt drawn with vinous ſpirit, and the acid added afterwards, the acid precipitates great part of what the ſpirit had before taken up: and on the other hand, when the acid is mixed with the ſpirit immediately before the extraction, it prevents the diſſolution of all that it would have precipitated by the former way of treatment: by previouſly uniting the acid and the vinous ſpirit together by digeſtion, the inconvenience is ſomewhat leſſened.

This is a valuable medicine in weakneſs and relaxations of the ſtomach and decays of conſtitution, particularly in thoſe which proceed from irregularities, which are accompanied with ſlow febrile ſymptoms, or which follow the ſuppreſſion of intermittents. It frequently ſucceeds after bitters and aromatics by themſelves had availed nothing; and indeed great part of its virtues depend on the vitriolic acid; which, barely diluted with water, has, in thoſe caſes where the ſtomach could bear the acidity, produced happy effects.

Fuller relates (in his *Medicina Gymnaſtica)* that he was recovered by Mynſicht's elixir, from an extreme decay of conſtitution, and continual retchings to vomit. It may be given from 10 to 30 or 40 drops or more, according to the quantity of acid, twice or thrice a-day, at ſuch times as the ſtomach is moſt empty. It is very uſefully conjoined with the bark, both as covering its diſagreeable taſte and coinciding with its virtues.

Sweet elixir of vitriol. E.

468 This is made of the ſame aromatics, and in the ſame manner as the aromatic tincture; except that, in place of the vinous, the dulcified ſpirit of vitriol is employed.

This is deſigned for perſons whoſe ſtomachs are too weak to bear the foregoing acid elixir; to the taſte, it is gratefully aromatic, without any perceptible acidity. The dulcified ſpirit of vitriol, here directed, occaſions little or no precipitation on adding it to the tincture.

A medicine of this kind was formerly in great eſteem under the title of *Vigani's volatile elixir of vitriol;* the compoſition of which was firſt communicated to the public in the *Pharmacopœia reformata*. It is prepared by digeſting ſome volatile ſpirits of vitriol upon a ſmall quantity of mint leaves curiouſly dried, till the liquor has acquired a fine green colour. If the ſpirit, as it frequently does, partakes too much of the acid, this colour will not ſucceed: in ſuch caſe it ſhould be rectified from a little fixed alkaline ſalt.

Camphorated ſpirit of wine. E.

469 Take of camphor, one ounce; rectified ſpirit of wine, one pound. Mix them together, that the camphor may be diſſolved. It may alſo be made with a double, triple, &c. proportion of camphor.

This ſolution of camphor is employed chiefly for external uſes, againſt rheumatic pains, paralytic numbneſſes, inflammations, for diſcuſſing tumours, preventing gangrenes, or reſtraining their progreſs. It is too pungent to be exhibited internally, even when diluted, nor does the dilution ſucceed well; for on the admixture of aqueous liquors, the camphor gradually ſeparates and runs together into little maſſes.

Hoffman, Rothen, and others, mention a camphorated ſpirit not ſubject to this inconvenience. It is prepared by grinding the camphor with ſomewhat more than an equal weight of fixed alkaline ſalt, then adding a proper quantity of proof-ſpirit, and drawing off one half of it by diſtillation. This ſpirit was propoſed to be received into our pharmacopœias, under the title of *Spiritus camphoræ tartarizatus*. But on trial it did not anſwer expectation: ſome of the camphor riſes with the ſpirit in diſtillation, though but a ſmall quantity; whence, mixed with a large portion of water, it does not ſenſibly render it turbid; but in a proper quantity, it exhibits the ſame appearance as the more common camphorated ſpirit: it did not appear, that ſpirit diſtilled from camphor, with or without the alkaline ſalt, differed at all in this reſpect.

The moſt convenient method of uniting camphor with aqueous liquors, for internal uſe, ſeems to be by the mediation of almonds, or of mucilages; triturated with theſe, it readily mingles with water into the form of an emulſion, at the ſame time that its pungency is conſiderably abated. It may alſo be commodiouſly exhibited in the form of an oily draught, expreſſed oils totally diſſolving it.

The anodyne liniment, commonly called *Anodyne balſam*. E.

Take of opium, an ounce; white Caſtile ſoap, four ounces; camphor, two ounces; eſſential oil of roſemary, half an ounce; rectified ſpirit of wine, two pounds. Digeſt the opium and ſoap in the ſpirit for three days; then to the ſtrained liquor add the camphor and oil, diligently ſhaking the veſſel.

The ſeveral ingredients in this formula are exceedingly well ſuited for the purpoſes expreſſed in the title of this preparation; the anodyne balſam has accordingly been uſed with much ſucceſs to allay pains in ſtrained limbs, and ſuch like topical affections.

Saponaceous balſam or liniment. E.

471 This is made in the ſame manner and of the ſame ingredients as the anodyne balſam, only omitting the opium.

It is intended as a ſimplification and improvement of what had formerly the name of *Opodeldock*, and is employed with the ſame intentions as the two preceding.

Tincture of antimony. Roſſ.

472 Take of antimony, in powder, half a pound; ſalt of tartar, one pound; rectified ſpirit, three pints. Mix the antimony with the ſalt of tartar, and inject them by little and little into a crucible placed in a ſtrong fire. Let the mixture melt thin, and continue in this ſtate for half an hour; after which it is to be poured out into a hot and dry iron mortar. Powder the maſs while hot, put into it a heated matraſs, and pour the ſpirit on it. Digeſt them together for three days, and then ſtrain the tincture.

In this proceſs the alkaline ſalt unites with the ſulphur of the antimony into a hepar; which communicates to the ſpirit a tincture ſimilar to the tincture of ſulphur. This antimonial tincture is ſuppoſed to contain likewiſe ſome of the reguline parts of the mineral, and is ſaid to have ſometimes provoked a puke when taken on an empty ſtomach, even in a ſmall doſe. It ſtands recommended in doſes from ten to ſixty drops or more, as a deobſtruent, promoter of urine, and purifier of the blood. But there is probably no purpoſe to be anſwered by it, which may not be more effectually obtained by other antimonial preparations, particularly the wine of tartar of antimony.

Tincture of colocynth. Suec.

473 Take of colocynth, cut ſmall, and freed from the ſeeds, one ounce; anniſeed, one dram; proof-ſpirit, fourteen ounces. Macerate for three days, and ſtrain through paper.

In this tincture we have the active purgative power of the colocynth. And although it be ſeldom uſed as a cathartic by itſelf, yet even in ſmall quantity it may be advantageouſly employed to promote the operation of others.

Volatile tincture of copper. Gen.

474 Take of filings of copper, one dram; ſpirit of ſal ammoniac, an ounce and a half. Mix them, and keep them in a veſſel cloſely ſtopped, which is to be frequently agitated, till the liquor becomes of a beautiful violet colour.

In this formula the copper is brought to a ſaline ſtate by means of the volatile alkali. It may therefore be conſidered as very analogous to the ammoniacal copper. And where recourſe is had to it in practice, it is employed with the ſame intentions.

Tincture of quaſia. Suec.

Take of quaſia, bruiſed, two ounces; proof-ſpirit, two pounds and an half. Digeſt for three days, and then ſtrain through paper. 475

By proof-ſpirit the medical properties, as well as the ſenſible qualities of the quaſia are readily extracted. And under this form it may be advantageouſly employed for anſwering different purpoſes in medicine.

Tincture of lac. Suec.

Take of gum lac, powdered, one ounce; myrrh, three drams; ſpirit of ſcurvy-graſs, a pint and an half. Digeſt in a ſand heat for three days; after which, ſtrain off the tincture for uſe. 476

This tincture is principally employed for ſtrengthing the gums, and in bleedings and ſcorbutic exulcerations of them: it may be fitted for uſe with theſe intentions, by mixing it with honey of roſes or the like. Some recommend it internally againſt ſcorbutic complaints, and as a corroborant in gleets, female weakneſſes, &c. Its warmth, pungency, and manifeſtly aſtringent bitteriſh taſte, point out its virtues in theſe caſes to be conſiderable, though common practice among us has not yet received it.

Tincture of nux vomica. Roſſ.

Take of nux vomica, an ounce and a half; proof-ſpirit, two pounds. Digeſt for ſome days, and then ſtrain it. 477

The nux vomica, a very active vegetable, has of late as we have already had occaſion to obſerve, been introduced into practice as taken internally, for the cure of intermittents and of contagious dyſentery. In theſe affections it may be employed under the form of tincture as well as in ſubſtance; and in this way it moſt readily admits of being combined with other articles, either as adjuvantia or corrigentia.

Tincture of amber. Suec.

Take of yellow amber, powdered, one ounce; vitriolic æther, four ounces. Digeſt for three days in a veſſel accurately cloſed, frequently ſhaking the veſſel, and after this ſtrain through paper. 478

The tincture of amber was formerly prepared with rectified ſpirit of wine: but the menſtruum here directed gives a more complete ſolution, and forms a more elegant and active tincture. It poſſeſſes the whole virtues of the concrete; and although it has no place in our pharmacopœia, yet it is perhaps to be conſidered as one of the moſt valuable preparations of amber. It has been recommended in a variety of affections, particularly thoſe of the nervous kind, as hyſterical and epileptic complaints. It may be taken from a few drops to the extent of a tea-ſpoonful in a glaſs of wine or any ſimilar vehicle.

Chap. XXII. Mixtures.

Camphorated mixture. L.

479 Take of camphor, one dram; rectified ſpirit of wine, ten drops; double-refined ſugar, half an ounce; boiling diſtilled water, one pint. Rub the camphor firſt with the ſpirit of wine, then with the ſugar; laſtly, add the water by degrees, and ſtrain the mixture.

While camphor is often exhibited in a ſolid ſtate, it is frequently alſo advantageous to employ it as diffuſed in watery fluids. And with this intention the preſent formula is perhaps one of the moſt ſimple, the union being effected merely by the aid of a ſmall quantity of ſpirit of wine and a little ſugar. But perhaps the more common form of emulſion in which the union is effected, by triturating the camphor with a few almonds, is not to be conſidered as inferior to this. For the unctuous quality of the almonds ſerves in a conſiderable degree to cover the pungency of the camphor without diminiſhing its activity. Camphor under the preſent form as well as that of emulſion, is very often uſeful in fevers, taken to the extent of a table ſpoonful every three or four hours.

Chalk mixture. L.

480 Take of prepared chalk, one ounce; double-refined ſugar, ſix drams; gum-arabic, powdered, two ounces; diſtilled water, two pints. Mix them.

Chalk drink. E.

Take of prepared chalk, one ounce; pureſt refined ſugar, half an ounce; mucilage of gum-arabic, two ounces. Rub them together, and add by degrees, water, two pounds and an half; ſpirituous cinnamon water, two ounces.

Theſe two preparations agree pretty much both in their name and in their nature. But of the two formulæ that of the Edinburgh college is moſt agreeable to the palate, from containing a proportion of cinnamon water, by which the diſagreeable taſte of the chalk is taken off.

In the former edition of the Edinburgh pharmacopœia, a preparation of this kind ſtood among the decoctions, and the chalk was directed to be boiled with the water and gum: by the preſent formula, the chalk is much more completely ſuſpended by the mucilage and ſugar; which laſt gives alſo to the mixture an agreeable taſte. It is proper to employ the fineſt ſugar, as the redundant acid in the coarſer kinds might form with the chalk a kind of earthy ſalt. It would perhaps have been more proper to have added an aromatic, by ſuſpending the entire powder of cinnamon, or its oil, by means of the mucilage and ſugar: The method here directed is, however, leſs exceptionable in this than many other preparations, as the precipitated matter of the ſpirituous water will probably be inviſcated in the ſaccharine and mucilaginous matter. This is a very elegant form of exhibiting chalk, and is an uſeful remedy in diſeaſes ariſing from, or accompanied with, acidity in the primæ viæ. It is frequently employed in diarrhœa proceeding from that cauſe. The mucilage not only ſerves to keep the chalk uniformly diffuſed, but alſo improves its virtues by ſheathing the internal ſurface of the inteſtines. The doſe of this medicine requires no nicety. It may be taken to the extent of a pound or two in the courſe of a day.

Muſk mixture. L.

Take of muſk, two ſcruples; gum-arabic, powdered, double refined ſugar, of each one dram; roſe-water, ſix ounces by meaſure. Rub the muſk firſt with the ſugar, then with the gum, and add the roſe-water by degrees. 481

This had formerly the name of *julepum e moſcho*, and was intended as an improvement upon the hyſteric julep with muſk of Bates. Orange-flower water is directed by that author; and indeed this more perfectly coincides with the muſk than roſe-water: but as the former is difficultly procurable in perfection, the latter is here preferred. The julep appears turbid at firſt: on ſtanding a little time it depoſites a brown powder, and becomes clear, but at the ſame time loſes great part of its virtue. This inconvenience may be prevented by thoroughly grinding the muſk with gum-arabic before the addition of the water; by means of the muſk, the whole ſubſtance of the gum is made to remain ſuſpended in the water. Volatile ſpirits are in many caſes an uſeful addition to muſk, and likewiſe enable water to keep ſomewhat more of the muſk diſſolved than it would otherwiſe retain.

Almond milk. L.

Take of ſweet almonds, one ounce and an half; double-refined ſugar, half an ounce; diſtilled water, two pints. Beat the almonds with the ſugar; then, rubbing them together, add by degrees the water, and ſtrain the liquor. 482

Common emulſion. E.

Take of ſweet almonds, one ounce; bitter almonds, one dram; common-water, two pounds and a half. Beat the blanched almonds in a ſtone mortar, and gradually pour on them the common water, working the whole well together, then ſtrain off the liquor.

Arabic emulſion. E.

This is made in the ſame manner as the preceding; only adding, while beating the almonds, of mucilage of gum-arabic, two ounces. 483

All theſe may be conſidered as poſſeſſing nearly the ſame qualities. But of the three the laſt is the moſt powerful demulcent.

Great care ſhould be taken, that the almonds be not become rancid by keeping; which will not only render the emulſion extremely unpleaſant, a circumſtance of great conſequence in a medicine that requires to be taken in large quantities, but likewiſe give it injurious qualities little expected from preparations of this claſs. The addition of the bitter almonds now ordered by the Edinburgh college in preparing theſe emulſions, may perhaps preſerve them in ſome degree from ſuffering the above changes; but is much more uſeful as giving the emulſion an agreeable flavour. And although the ſubſtance of bitter almonds be of a deleterious nature, yet nothing is to be apprehended from the quantity here employed.

Theſe liquors are principally uſed for diluting and obtunding acrimonious humours; particularly in heat of urine and ſtranguries ariſing either from a natural ſharpneſs of the juices, or from the operation of cantharides and other irritating medicines: in theſe caſes, they are to be drank frequently, to the quantity of half a pint or more at a time.

Some have ordered emulſions to be boiled, with a view to deprive them of ſome imaginary crudity; but by this proceſs they quickly ceaſe to be emulſions, the oil ſeparating from the water, and floating diſtinctly on the ſurface. Acids and vinous ſpirits produce a like decompoſition. On ſtanding alſo for ſome days, without addition, the oily matter ſeparates and riſes to the top, not in a pure form, but like thick cream. Theſe experiments prove the compoſition of the emulſions made from the oily ſeeds of kernels, and at the ſame time point out ſome cautions to be attended to in their preparation and uſe.

Ammoniacum milk. L.

484 Take of ammoniacum, two drams; diſtilled water, half a pint. Rub the gum-reſin with the water, gradually poured on, until it becomes a milk. In the ſame manner may be made a milk of aſafœtida, and of the reſt of the gum-reſins.

The ammoniacum milk is uſed for attenuating tough phlegm, and promoting expectoration, in humoural aſthmas, coughs, and obſtructions of the viſcera. It may be given to the quantity of two ſpoonfuls twice a-day.

The lac aſafœtida is employed in ſpaſmodical, hyſterical, and other nervous affections. And it is alſo not unfrequently uſed under the form of injection. It anſwers the ſame purpoſes as aſafœtida in ſubſtance.

Compound ſpirit of vitriolic æther. L.

485 Take of ſpirit of vitriolic æther, two pounds; oil of wine, three drams. Mix them.

This is ſuppoſed to be, if not preciſely the ſame, at leaſt very nearly, the celebrated mineral anodyne liquor of Hoffman; as we learn from his own writings, that the liquor which he thus denominated was formed of dulcified ſpirit of vitriol and the aromatic oil which ariſes after it, but he does not tell us in what proportions theſe were combined. It has been highly extolled as an anodyne and antiſpaſmodic medicine; and with theſe intentions it is not unfrequently employed in practice.

Compound ſpirit of ammonia. L.

486 Take of ſpirit of ammonia, two pints; eſſential oil of lemon, nutmeg, of each two drams. Mix them.

This differs almoſt only in name from the following.

Volatile aromatic ſpirit, commmonly called *volatile oily ſpirit*, and *ſaline aromatic ſpirit*. E.

Take of vinous ſpirit of ſal ammoniac, eight ounces; diſtilled oil of roſemary, one dram and a half; diſtilled oil of lemon-peel, one dram. Mix them that the oils may be diſſolved.

By the method here directed, the oils are as completely diſſolved as when diſtillation is employed.

Volatile ſalts, thus united with aromatics, are not only more agreeable in flavour, but likewiſe more acceptable to the ſtomach, and leſs acrimonious than in their pure ſtate. Both the foregoing compoſitions turn out excellent ones, provided the oils are good, and the diſtillation ſkilfully performed. The doſe is from five or ſix drops to ſixty or more.

Medicines of this kind might be prepared extemporaneouſly, by dropping any proper eſſential oil into the dulcified ſpirit of ſal ammoniac, which will readily diſſolve the oil without the aſſiſtance of diſtillation. But it is perhaps preferable that they ſhould be kept in the ſhops ready mixed.

Succinated ſpirit of ammonia. L.

487 Take of alcohol, one ounce; water of pure ammonia, four ounces by meaſure; rectified oil of amber, one ſcruple; ſoap, ten grains. Digeſt the ſoap and oil of amber in the alcohol till they be diſſolved; then add the water of pure ammonia, and mix them by ſhaking.

This compoſition is extremely penetrating, and has lately come into eſteem, particularly for ſmelling to in lowneſſes and faintings, under the name of *eau de luce*. It has been hitherto brought from France. It is not quite limpid, for the oil of amber diſſolves only imperfectly in the ſpirit: if the volatile ſpirit be not exceedingly ſtrong, ſcarcely any of the oil will be imbibed.

The *eau de luce* is not only uſed with the view of making an impreſſion on the noſe, but is taken internally in the ſame caſes. It has likewiſe of late been celebrated as a remedy for the bite of the rattleſnake, when uſed internally, and applied externally to the wounded part.

Camphorated ſpirit. L.

488 Take of camphor, four ounces; rectified ſpirit of wine, two pints. Mix them, ſo that the camphor may be diſſolved.

Of this we have already had occaſion to ſpeak in the preceding chapter under the title given to it by the Edinburgh college.

Simple oily emulſion. Gen.

489 Take of almond oil, one ounce; ſyrup of althea, an ounce and a half; gum arabic, half an ounce; ſpring-water, ſix ounces. Mix, and make an emulſion according to art.

Volatile oily emulſion. Gen.

Take of almond oil, an ounce and a half; ſyrup of althea one ounce; gum arabic, half an ounce; volatile alkaline ſalt, one dram; ſpring water ſeven ounces. Mix them according to art.

Both theſe are elegant and convenient modes of exhibiting oil internally. And under theſe forms it is often advantageouſly employed in caſes of cough, hoarſeneſs, and ſimilar affections. By means of the alkali, a more intimate union of oil with water is obtained than can be had with the intermedium either of ſyrup or vegetable mucilage; and in ſome caſes, the alkali both contributes to anſwer the intention in view, and prevents the oil from exciting ſickneſs at ſtomach: But in other inſtances, the pungency which it imparts is diſagreeable to the patient and unfavourable to the diſeaſe. According to theſe circumſtances, therefore, where an oily mixture is to be employed, the practitioner will be determined in his choice to have recourſe either to the one or the other formula.

Acid julep. Gen.

490 Take of weak vitriolic acid, three drams; ſimple ſyrup, three ounces; ſpring water, two pounds. Mix them.

In this ſtate the vitriolic acid is ſufficiently diluted to be taken with eaſe in conſiderable doſes. And it may thus be advantageouſly employed in various affections; concerning which we have already had occaſion to make a few remarks in Chemistry, n° 617. (ſee *Chemistry-Index*), and which are to be anſwered, either by its action on the ſtomach, or on the ſyſtem in general.

Æther julep. Gen.

491 Take of pure vitriolic æther, two ſcruples; ſpring-water, ſix ounces; refined ſugar, half an ounce. Mix them according to art.

Although it is in general proper that æther ſhould be diluted only when it is to be immediately uſed, yet it is ſometimes neceſſary that it ſhould be put into the hands of the patient in the ſtate in which it is to be taken. In ſuch inſtances the preſent formula is a very proper one; for the addition of a little mucilage tends both to cover the pungency of the æther in the mouth, and to retain it in a ſtate of mixture with the water.

Amber julep. Gen.

492 Take of tincture of amber, two drams; refined ſugar half an ounce; ſpring-water, ſix ounces. Mix them according to art.

Under this form the tincture of amber is ſo far diluted and ſweetened, as to form an agreeable mixture; and in this manner it may often be advantageouſly employed for counteracting nervous affections, and anſwering thoſe other purpoſes for which we have already mentioned that this article is had recourſe to in practice.

Saline mixture, or julep. Suec.

493 Take of fixed vegetable alkali, three drams; river-water, half a pound. To this lixivium add, lemon-juice half a pound, or as much as is ſufficient to ſaturate the alkali; ſyrup of black currants, one ounce.

This mixture is frequently preſcribed in febrile diſeaſes as a means of promoting a ſlight diſcharge by the ſurface: For where the ſkin is parched with great increaſed heat, it generally operates as a gentle diaphoretic. It often alſo promotes a diſcharge by the kidneys, and is not unfrequently employed to reſtrain vomiting. With theſe intentions it is in daily uſe among Britiſh practitioners, although it has no place in our pharmacopœias, from its being entirely an extemporaneous preſcription.

Mineral ſolution of arſenic.

494 Take of white arſenic, reduced to a ſubtile powder, fixed vegetable alkali, each ſixty-four grains; diſtilled water, half a pint. Put them into a florentine flaſk, and let this be placed in a ſand heat, ſo that the water may boil gently till the arſenic be completely diſſolved; then add to the ſolution when cold half an ounce of ſpirit of lavender, and as much diſtilled water as to make the ſolution amount to a pint by meaſure, or fifteen ounces and an half by weight.

For the introduction of this remedy we are indebted to Dr Fowler of Stafford. We have already had occaſion to mention it in our article Arsenic, n° 14; ſee alſo Chemistry, n° 1266, &c. In the former of theſe places we have obſerved, that if it be not preciſely the ſame, it is at leaſt ſuppoſed to be very analogous to a remedy which has had a very extenſive ſale in ſome parts of England under the name of the *taſteleſs ague drop;* and which has been employed with very great ſucceſs in the cure of obſtinate intermittents. But whether the preſent formula, in any degree approaches to the taſteleſs ague drop or not, there can be no doubt from the concurring teſtimony of many eminent practitioners, that it is equally ſucceſsful in combating intermittents. For this purpoſe it is given according to the age and other circumſtances of the patient in doſes from two to twenty drops, once, twice, or oftener in the courſe of the day: And its uſe has been found to be attended with remarkable ſucceſs, although with ſome patients even very ſmall doſes have been found to excite ſevere vomiting. Beſides diſtinctly marked intermittents, this ſolution has alſo been ſometimes ſucceſsful in obſtinate periodical headachs, and in cutaneous affections of the leprous kind, reſiſting every other mode of cure. And perhaps in every caſe where arſenic can be employed with ſafety or advantage internally, this preparation is preferable to any other with which we are yet acquainted.

Chap. XXIII. *Syrups.*

495 Syrups are ſaturated ſolutions of ſugar, made in water, or watery or vinous infuſions, or in juices. They were formerly conſidered as medicines of much greater importance than they are thought to be at preſent. Syrups and diſtilled waters were for ſome ages uſed as the great alteratives; inſomuch that the evacuation of any peccant humour was never attempted till by a due courſe of theſe it had firſt been ſuppoſed to be regularly prepared for expulſion. Hence aroſe the exuberant collection of both, which we meet with in pharmacopœias, and like errors have prevailed in each. As multitudes of diſtilled waters have been compounded from materials unfit to give any virtue over the helm; ſo numbers of ſyrups have been prepared from ingredients, which in this form cannot be taken in ſufficient doſes to exert their virtues: for two-thirds of a ſyrup conſiſt of ſugar, and greateſt part of the remaining third is an aqueous fluid.

Syrups are at preſent chiefly regarded as convenient vehicles for medicines of greater efficacy; and uſed for ſweetening draughts and juleps, for reducing the lighter powders into boluſes, pills, or electuaries, and other ſimilar purpoſes. Some likewiſe may not improperly be conſidered as medicines themſelves; as thoſe of ſaffron, buckthorn-berries, and ſome others.

To the chapter on *Syrups* the London college in their pharmacopœia have premiſed the following general obſervations.

In the making of ſyrups, where we have not directed either the weight of the ſugar, or the manner in which it ſhould be diſſolved, this is to be the rule:

Take of double-refined ſugar, twenty-nine ounces; any kind of liquor, one pint. Diſſolve the ſugar in the liquor in a water-bath; then ſet it aſide for twenty-four hours; take off the ſcum, and pour off the ſyrup from the feces if there be any.

The following are the general rules which have commonly been given with reſpect to the preparation of ſyrups.

I. All the rules laid down for making decoctions are likewiſe to be obſerved in the decoctions for ſyrups. Vegetables, both the decoctions and infuſions, ought to be dry, unleſs they are expreſsly ordered otherwiſe.

II. In both the London and Edinburgh pharmacopœias, only the pureſt or double refined ſugar is allowed.

In the ſyrups prepared by boiling, it has been cuſtomary to perform the clarification with whites of eggs after the ſugar had been diſſolved in this decoction of the vegetable. This method is apparently injurious to the preparation; ſince not only the impurities of the ſugar are thus diſcharged, but a conſiderable part likewiſe of the medicinal matter, which the water had before taken up from the ingredients, is ſeparated along with them. Nor indeed is the clarification and deſpumation of the ſugar, by itſelf, very adviſable; for its purification by this proceſs is not ſo perfect as might be expected; after it has undergone this proceſs, the refiners ſtill ſeparate from it a quantity of oily matter, which is diſagreeable to weak ſtomachs. It appears, therefore, moſt eligible to employ fine ſugar for all the ſyrups; even the purgative ones (which have been uſually made with coarſe ſugar, as ſomewhat coinciding with their intention) not excepted; for, as purgative medicines are in general ungrateful to the ſtomach, it is certainly improper to employ an addition which increaſes their offenſiveneſs.

III. Where the weight of the ſugar is not expreſſed, twenty nine ounces are to be taken in every pint of liquor. The ſugar is to be reduced into powder, and diſſolved in the liquor by the heat of a water-bath, unleſs ordered otherwiſe.

Although in the formula of ſeveral of the ſyrups, a double weight of ſugar to that of the liquor is directed, yet leſs will generally be ſufficient. Firſt, therefore, diſſolve in the liquor an equal weight of ſugar, then gradually add ſome more in powder, till a little remains undiſſolved at the bottom, which is to be afterwards incorporated by ſetting the ſyrup in a water-bath.

The quantity of ſugar ſhould be as much as the liquor is capable of keeping diſſolved in the cold: if there is more, a part of it will ſeparate, and concrete into cryſtals or candy; if leſs, the ſyrup will be ſubject to ferment, eſpecially in warm weather, and change into a vinous or ſour liquor. If in cryſtallizing, only the ſuperfluous ſugar be ſeparated, it would be of no inconvenience; but when part of the ſugar has candied the remaining ſyrup is found to have an under proportion, and is as ſubject to fermentation as if it had wanted ſugar at firſt.

IV. Copper-veſſels, unleſs they be well tinned, ſhould not be employed in the making of acrid ſyrups, or ſuch as are compoſed of the juices of fruits.

The confectioners, who are the moſt dexterous people at theſe kinds of preparations, to avoid the expence of frequently new tinning their veſſels, rarely make uſe of any other than copper ones, untinned, in the preparation even of the moſt acid ſyrups, as of oranges and lemons. Nevertheleſs, by taking due care that their coppers be well ſcoured and perfectly clean, and that the ſyrup remain no longer in them than is abſolutely neceſſary, they avoid giving it any ill taſte or quality from the metal. This practice, however, is by no means to be recommended to the apothecary.

V. The ſyrup, when made, is to be ſet by till next day: if any ſaccharine cruſt appears upon the ſurface it is to be taken off.

Syrup of vinegar. E.

496 Take of vinegar, two pounds and an half; refined ſugar, three pounds and an half. Boil them till a ſyrup be formed.

This is to be conſidered as ſimple ſyrup merely acidulated, and is by no means unpleaſant. It is often employed in mucilaginous mixtures and the like; and on account of its cheapneſs it is often preferred to ſyrup of lemons.

Syrup of marſhmallow.

497 Take of freſh root of marſhmallow, bruiſed one pound; double-refined ſugar, four pounds; diſtilled water, one gallon. Boil the water with the marſhmallow root to one half, and preſs out the liquor when cold. Set it by twelve hours; and, after the feces have ſubſided, pour off the liquor. Add the ſugar, and boil it to the weight of ſix pounds. *L.*

Take of marſhmallow roots, ſomewhat dried, nine ounces; water ten pounds; pureſt ſugar, four pounds. Boil the water with the roots, to the conſumption of one half, and ſtrain the liquor, ſtrongly expreſſing it. Suffer the ſtrained liquor to reſt till the feces have ſubſided; and when it is free from the dregs, add the ſugar; then boil ſo as to make a ſyrup. *E.*

The ſyrup of marſhmallows ſeems to have been a ſort of favourite among diſpenſatory writers, who have taken great pains to alter and amend it, but have been wonderfully tender in retrenching any of its articles. In the laſt preſcription, it is lopt of its ſuperfluities, without any injury to its virtues. It is uſed chiefly in nephritic caſes, for ſweetening emollient decoctions, and the like: of itſelf it can do little ſervice, notwithſtanding the high opinion which ſome have entertained of it; for what can be expected from two or three ſpoonfuls of the ſyrup, when the decoction, from which two or three pounds are made, may be taken at a draught or two? It is ſometimes uſeful in tickling coughs, by inviſcating irritating matter diſtilling in the fauces: in this way it ſometimes affords a conſiderable relief.

Syrup of clove July-flowers.

498 Take of freſh clove July-flowers, the heels being cut off, two pounds; boiling diſtilled water, ſix pints. Macerate the flowers for twelve hours in a glaſs veſſel; and in the ſtrained liquor diſſolve the double-refined ſugar, that it may be made a ſyrup. *L.*

Take of clove July-flowers, freſh gathered and freed from the heels, one pound; pureſt ſugar, ſeven pounds and a quarter; boiling water four pounds. Macerate the flowers in the water for a night; then to the ſtrained liquor add the ſugar previouſly beat, and diſſolve it by a gentle heat, to make the whole into a ſyrup. *E.*

This ſyrup is of an agreeable flavour, and a fine red colour: and for theſe it is chiefly valued. Some have ſubſtituted for it one eaſily preparable at ſeaſons when the flowers are not to be procured: an ounce of clove ſpice is infuſed for ſome days in twelve ounces of white wine, the liquor ſtrained, and with the addition of twenty ounces of ſugar, boiled to a proper conſiſtence; a little cochineal renders the colour of this ſyrup exactly ſimilar to that prepared from the clove July-flower; and its flavour is of the ſame kind, though not ſo pleaſant. The abuſe may be readily detected by adding to a little of the ſyrup ſome alkaline ſalt or ley; which will change the genuine ſyrup to a green colour; but in the counterfeit, it will make no ſuch alteration, only varying the ſhade of the red.

As the beauty of the colour is a principal quality in this ſyrup, no force in the way of expreſſion ſhould be uſed in ſeparating the liquor from the flowers.

Syrup of colchicum. E.

499 Take of colchicum root, freſh and ſucculent, cut into ſmall pieces, one ounce; vinegar, ſixteen ounces; pureſt ſugar, twenty-ſix ounces. Macerate the root in the vinegar two days, now and then ſhaking the veſſel: then ſtrain it with a gentle preſſure. To the ſtrained liquor add the ſugar, and boil a little, ſo as to form a ſyrup.

This ſyrup ſeems to be the beſt preparation of the colchicum; great care is required to take up this root in the proper ſeaſon: and from errors of this kind we are to aſcribe the uncertainty in the effects of this medicine as found in the ſhops.

The ſyrup of colchicum is often ſucceſsfully employed as a diuretic, and may be taken from a dram or two to the extent of an ounce or more.

Syrup of orange-peel.

500 Take of freſh outer-rind of Seville-oranges, eight ounces; boiling diſtilled water, five pints. Macerate for twelve hours in a cloſe veſſel; and in the ſtrained liquor diſſolve double-refined ſugar to make a ſyrup. *L.*

Take of yellow rind of Seville orange-peel freſh, ſix ounces; boiling water, three pounds. Infuſe them for a night in a cloſe veſſel; then ſtrain the liquor; let it ſtand to ſettle; and having poured it off clear from the ſediment, diſſolve in it four pounds and a quarter of white ſugar, ſo as to make it into a ſyrup with a gentle heat. *E.*

In making this ſyrup, it is particularly neceſſary that the ſugar be previouſly powdered, and diſſolved in the infuſion with as gentle a heat as poſſible, to prevent the exhalation of the volatile parts of the peel. With theſe cautions, the ſyrup proves a very elegant and agreeable one, poſſeſſing great ſhare of the fine flavour of the orange-peel.

Syrup of Saffron. L.

501 Take of ſaffron, one ounce; boiling diſtilled water, one pint. Macerate the ſaffron, in the water, for twelve hours, in a cloſe veſſel; and diſſolve double-refined ſugar in the ſtrained liquor, that it my be made a ſyrup.

Saffron is very well fitted for making a ſyrup, as in this form a ſufficient doſe of it is contained in a reaſonable compaſs. This ſyrup is at preſent frequently preſcribed; it is a pleaſant cordial, and gives a fine colour to juleps.

Syrup of lemon juice.

502 Take of lemon juice, ſtrained, after the feces have ſubſided, two pints; double-refined ſugar, fifty ounces. Diſſolve the ſugar, that it may be made a ſyrup. *L.*

Take of juice of lemons, ſuffered to ſtand till the feces have ſubſided, and afterwards ſtrained, two pounds and a half; double-refined ſugar, fifty ounces. Diſſolve the ſugar in the juice, ſo as to make a ſyrup *E.*

Syrup of mulberry-juice. L.

Syrup of raſpberry juice. L.

Syrup of black currants. L.

Theſe three are directed by the London college to be prepared in the ſame manner as ſyrup of lemons, which immediately precedes them.

All theſe four are very pleaſant cooling ſyrups; and with this intention they are occaſionally uſed in draughts and juleps, for quenching thirſt, abating heat &c. in bilious or inflammatory diſtempers. They are ſometimes likewiſe employed in gargariſms for inflammations of the mouth, and tonſils.

Syrup of the white poppy. L.

503 Take of the heads of white poppies, dried, and the ſeeds taken out, three pounds and an half; double-refined ſugar, ſix pounds; diſtilled water, eight gallons. Slice and bruiſe the heads, then boil them in the water, to three gallons, in a water-bath ſaturated with ſea-ſalt, and preſs out the liquor. Reduce this by boiling to about the meaſure of four pints, and ſtrain it while hot, firſt through a ſieve, then through a thin woolen cloth, and let it aſide for twelve hours, that the feces may ſubſide. Boil the liquor, poured off from the feces, to three pints, and diſſolve the ſugar in it that it may be made a ſyrup.

Syrup of white poppies, or of *meconium,* commonly called *diacodium.* E.

Take of white poppy heads, dried and freed from the ſeeds, two pounds; boiling water thirty pounds; pureſt ſugar, four pounds. Macerate the bruiſed heads in the water for a night; next boil till only one-third part of the liquor remain; then ſtrain it, expreſſing it ſtrongly. Boil the ſtrained liquor to the conſumption of one half, and ſtrain again; laſtly, add the ſugar, and boil to a ſyrup. It may alſo be made by diſſolving in two pounds and a half of ſimple ſyrup, one dram of the extract of white poppies.

This ſyrup, impregnated with the opiate matter of the poppy heads, is given to children in doſes of two or three drams; to adults from half an ounce to an ounce and upwards, for eaſing pain, procuring reſt, and anſwering the other intentions of mild opiates. Particular care is requiſite in its preparation, that it may be always made, as nearly as poſſible, of the ſame ſtrength; and accordingly the colleges have been very minute in their deſcription of the proceſs.

Syrup of the red poppy. L.

504 Take of the freſh flowers of the wild or red poppy, four pounds; boiling diſtilled water, four pints and an half. Put the flowers by degrees into the boiling water in a water-bath, conſtantly ſtirring them. After this, the veſſel being taken out of the bath, macerate for twelve hours; then preſs out the liquor, and ſet it apart, that the feces may ſubſide. Laſtly, make it into a ſyrup, with double-refined ſugar.

The deſign of putting the flowers into boiling water in a water-bath, is, that they may be a little ſcalded, ſo as to ſhrink enough to be all immerged in the water; without this artifice they can ſcarcely be all got in: but they are no longer to be continued over the fire than till this effect is produced, leſt the liquor become too thick, and the ſyrup be rendered ropy.

This ſyrup has been recommended in diſorders of the breaſt, cough, ſpitting of blood, pleuriſies, and other diſeaſes, both as an emollient and as an opiate. It is one of the lighteſt of the opiate medicines; and in this reſpect ſo weak, that ſome have doubted of its having any anodyne quality. We indeed preſume, that it might be very ſafely ſuperſeded altogether; and accordingly it has now no place either in the Edinburgh pharmacopœia, or ſome of the beſt foreign ones, though ſtill retained by the London college.

Roſe-ſyrup. L.

505 Take of the dried leaves of the damaſk roſe, ſeven ounces; double-refined ſugar, ſix pounds; boiling diſtilled water, four pints. Macerate the roſe leaves in water for twelve hours, and ſtrain. Evaporate the ſtrained liquor to two pints and an half, and add the ſugar, that it may be made a ſyrup.

Syrup of pale roſes. E.

Take of pale roſes, freſh gathered, one pound; boiling water, four pounds; white ſugar, three pounds. Macerate the roſes in the water for a night; then to the liquor ſtrained, and freed from the dregs, add the ſugar; and boil them into a ſyrup.

This ſyrup may likewiſe be made from the liquor remaining after the diſtillation of roſe water depurated from its feces.

The liquor remaining after the diſtillation of roſes (provided the ſtill has been perfectly clean) is as proper for making this ſyrup as a freſh infuſion; for the diſtillation only collects thoſe volatile parts which are diſſipated in the air while the infuſion is boiling to its conſiſtence. This ſyrup is an agreeable and mild purgative for children, in the doſe of half a ſpoonful or a ſpoonful. It likewiſe proves gently laxative to adults; and with this intention may be of ſervice in coſtive habits. Its principal uſe is in ſolutive glyſters.

Syrup of dry roſes. E.

506 Take of red roſes, dried, ſeven ounces; white ſugar, ſix pounds; boiling water, five pounds. Infuſe the roſes in the water for a night, then boil them a little; ſtrain out the liquor, and adding to it the ſugar, boil them to the conſiſtence of a ſyrup.

This ſyrup is ſuppoſed to be mildly aſtringent; but is principally valued on account of its red colour. The London college have omited it, having retained others at leaſt equal to it in that reſpect.

Syrup of ſquills. E.

507 Take of vinegar of ſquills, two pounds; white ſugar, three pounds and a half. Make them into a ſyrup with a gentle heat.

This ſyrup was formerly prepared with ſome ſpices, intended to alleviate the offenſiveneſs of the ſquills. But while they had not this effect, they often counteracted the intention in view, and are therefore omitted. It is uſed chiefly in doſes of a ſpoonful or two, for promoting expectoration, which it does very powerfully.

Simple or common ſyrup. E.

508 Take of pureſt ſugar, fifteen parts; water, eight parts. Let the ſugar be diſſolved by a gentle heat.

This preparation is a plain liquid ſweet, void of flavour or colour. It is convenient for ſundry purpoſes where theſe qualities are not wanted, or would be exceptionable.

Syrup of buckthorn.

509 Take of the juice of ripe and freſh buckthorn berries, one gallon; ginger, bruiſed, one ounce; all-ſpice, powdered, one ounce and an half; double-refined ſugar, ſeven pounds. Set by the juice for ſome days, that the feces may ſubſide, and ſtrain. Macerate the ginger and all-ſpice in a pint of the ſtrained juice for four hours, and ſtrain. Boil away the reſt of the juice to three pints; then add that part of the juice in which the ginger and all-ſpice have been macerated; and, laſtly, the ſugar, that it may be made a ſyrup. *L.*

Take of the juice of the ripe buckthorn berries, depurated, ſeven pounds and an half; white ſugar, three pounds and a half. Boil them to the conſiſtence of a ſyrup. *E.*

Both theſe preparations, in doſes of three or four ſpoonfuls, operate as briſk cathartics. The principal inconveniences attending them are, their being very unpleaſant, and their occaſioning a thirſt and dryneſs of the mouth and fauces, and ſometimes violent gripes. Theſe effects may be prevented by drinking freely of water gruel, or other warm liquids during the operation. The ungratefulneſs of the buckthorn is endeavoured to be remedied in the firſt of the above preſcriptions by the addition of aromatics, which, however, are ſcarcely ſufficient for that purpoſe. The ſecond alſo had formerly an aromatic material for the ſame intention, a dram of the eſſential oil of cloves; which being found ineffectual, is now rejected.

Syrup of balſam of Tolu. L.

510 Take of the balſam of Tolu, eight ounces; diſtilled water, three pints. Boil for two hours. Mix with the liquor, ſtrained after it is cold, the double refined ſugar that it may be made a ſyrup,

Balſamic ſyrup. E.

Take of ſimple ſyrup, juſt made, and warm from the fire two pounds; tincture of balſam of Tolu, one ounce. When the ſyrup has grown almoſt cold, ſtir into it the tincture, by little at a time, agitating them well together till perfectly united.

This laſt method of making the balſamic ſyrup was dropt in one of the preceding editions of the Edinburgh pharmacopœia, on a complaint that the ſpirit ſpoiled the taſte of the ſyrup; which it did in a great degree when the tincture was drawn with malt ſpirits, the nauſeous oil which all the common malt ſpirits are accompanied with communicating that quality; and this was particularly the caſe when the ſpirituous part was evaporated from the ſyrup, as was directed in the former edition of the Edinburgh pharmacopœia. Particular care therefore ſhould be taken that the ſpirit employed for making the tincture be perfectly clean, and well rectified from all ill flavour.

The intention of the contrivers of the two foregoing proceſſes ſeems to have been ſomewhat different. In the firſt, the more ſubtile and fragrant parts of the balſam are extracted from the groſſer reſinous matter, and alone retained in the ſyrup: the other ſyrup contains the whole ſubſtance of the balſam in larger quantity. They are both moderately impregnated with the agreeable flavour of the balſam.

In ſome pharmacopœias a ſyrup of this kind is prepared from a tincture of balſam of Peru, with roſe-water, and a proper quantity of ſugar.

Syrup of violets.

511 Take of the freſh petals of the violet, two pounds; boiling diſtilled water, five pints, Macerate for 24 hours; afterwards ſtrain the liquor, without preſſing, through thin linen. Add refined ſugar, that it may be made a ſyrup. *L.*

Take of freſh violets, one pound; boiling water four pounds; pureſt ſugar, ſeven pounds and a half. Macerate the violets in the water for 24 hours in a glaſs, or at leaſt a glazed earthen veſſel, cloſe covered; then ſtrain without expreſſion, and to the ſtrained liquor add the ſugar powdered, and make into a ſyrup. *E.*

This ſyrup is of a very agreeable flavour; and in the quantity of a ſpoonful or two proves to children gently laxative. It is apt to loſe, in keeping, the elegant blue colour, for which it is chiefly valued; and hence ſome having been induced to counterfeit it with materials whoſe colour is more permanent. This abuſe may be readily diſcovered, by adding to a little of the ſuſpected ſyrup any acid or alkaline liquor. If the ſyrup be genuine, the acid will change its blue colour to a red, and the alkali will change it to a green; but if counterfeit, theſe changes will not happen. It is obvious, from this mutability of the colour of the violet, that the preſcriber would be deceived if he ſhould expect to give any blue tinge to acidulated or alkalized juleps or mixtures by the addition of the blue ſyrup.

Syrup of ginger.

512 Take of ginger bruiſed, four ounces; boiling diſtilled water, three pints. Macerate for four hours, and ſtrain, then add refined ſugar, that it may be made a ſyrup. *L.*

Take of powdered ginger, three ounces; boiling water, four pounds; pureſt ſugar, ſeven pounds and a half. Macerate the ginger in the water in a cloſe veſſel for 24 hours; then to the liquor, ſtrained and freed from the feces, add the powdered ſugar, and make them into a ſyrup. *E.*

Theſe are agreeable and moderately aromatic ſyrups, lightly impregnated with the flavour and virtues of the ginger.

Acid ſyrup. Gen.

513 Take of weak ſpirit of vitriol, two drams; ſyrup of lemons, ſix ounces. mix them.

Where we wiſh to obtain a ſyrup, not only ſtrongly acidulated, but alſo powerfully aſtringent, this formula may be conſidered as well ſuited to anſwer the purpoſe.

Alkaline ſyrup. Gen.

514 Take of ſalt of tartar, three drams; ſimple ſyrup, ſix ounces. Mix them.

In this ſyrup we have in ſome degree the converſe of the preceding; and it may be uſefully employed either for the deſtruction of acid in the ſtomach, or for the formation of neutral or efferveſcent mixtures.

Syrup of garlic. Suec.

515 Take of the freſh root of garlic, ſliced, one pound; boiling water, two pounds. Macerate them in a cloſe veſſel for an hour. Add to the ſtrained liquor, refined ſugar, two pounds. Boil them to a ſyrup.

This ſyrup formerly held a place in our pharmacopœias, and was recommended for promoting expectoration in caſes of chronic catarrh and other affections of the breaſt: but, as well as the oxymel of garlic, it is now baniſhed from them; and there can be little doubt that the ſame intentions may in general be anſwered by leſs diſagreeable medicines. Yet where we wiſh to employ garlic in a watery menſtruum, this formula is perhaps one of the beſt under which it can be exhibited.

Syrup of almonds. Suec.

516 Take of ſweet almonds, one pound; bitter almonds, two drams. Let the almonds be blanched and beat in a ſtone mortar with a wooden peſtle; then by degrees add barley-water, two pounds; ſtrain the

liquor, and form it into a ſyrup, with as much double-refined ſugar as may be neceſſary.

The agreeable flavour of the almonds is in this formula communicated to a ſyrup, which may be advantageouſly employed to ſweeten mixtures, or to form a pleaſant drink when diffuſed in water; and the flavour is not a little improved by the addition of the proportion of bitter almonds here Directed. But even theſe cannot be ſuppoſed to communicate any active quality to this ſyrup, as they are employed in ſo ſmall a quantity: and ſtill leſs is to be expected from the ſweet almonds, which can communicate little more to the ſyrup than their mild oil.

Syrup of cinnamon. Roſſ.

517 Take of cinnamon, bruiſed, five ounces; ſpirituous cinnamon water, two pounds. Digeſt them in a cloſe glaſs veſſel for 24 hours; then add to the ſtrained liquor double-refined ſugar, three pounds. Boiled to a ſyrup.

This ſyrup is ſtrongly impregnated with the cinnamon: and where we wiſh to ſweeten any mixture, at the ſame time adding to it an agreeable aromatic, it is perhaps one of the beſt articles we can employ.

Emetic ſyrup. Brun.

518 Take of glaſs of antimony, finely powdered, two drams; Rheniſh wine, twelve ounces. Let them be digeſted for three days in a gentle heat; then ſtrain the liquor through paper, and mix with the ſtrained liquor 30 ounces of double-refined ſugar. Let it be formed into a ſyrup, and kept in a cloſe veſſel.

There can be no doubt of this ſyrup being ſtrongly impregnated with the emetic quality of the antimony; and it will at leaſt have ſo far the advantage of being very agreeable to the taſte, that it may be readily taken by very young people. But every good effect to be obtained from it may be had with more certainty, by adding to ſimple ſyrup any quantity that may be thought neceſſary of the antimonial tartar previouſly diſſolved in a ſmall proportion of water.

Syrup of quickſilver. Suec.

519 Take of purified quickſilver, one dram; gum arabic, three drams; roſe-water, as much as ſufficient for reducing the gum to mucus. Let them be rubbed in a mortar till the quickſilver totally diſappears; then by degrees mix with it ſimple ſyrup, four ounces.

In this we have a preparation ſimilar to the mercurial ſolution of Dr Plenck formerly mentioned; and which, while it does not poſſeſs any other advantage than mere ſweetneſs of taſte, is liable to the objections formerly urged againſt that preparation.

CHAP. XXIV. *Medicated Honeys.*

520 The more fixed parts of vegetables, diſſolved in watery liquors may be thence transferred into honey by mixing the honey with the watery decoction or juice of the plant, and boiling them together till the aqueous part has exhaled, and the honey remains of its original conſiſtence. Honey has not probably however, any very peculiar advantage over ſugar, and it is liable to many inconveniences which ſugar is free from: in particular, it is much more liable to run into fermentation, and in many conſtitutions produces gripes, and often violent effects. The Edinburgh college have therefore rejected the whole of the oxymels from their laſt edition of the pharmacopœia. And the number of preparations with honey in moſt of the foreign pharmacopœias is now much diminiſhed. Still, however, there are ſeveral much employed by practitioners of eminence; and of courſe retained in the London pharmacopœia.

Honey of roſes. L.

521 Take of dried red roſe-buds, with the heels cut off, four ounces; boiling diſtilled water, three pints; clarified honey, five pounds. Macerate the roſe leaves in the water for ſix hours; then mix the honey with the ſtrained liquor, and boil the mixture to the thickneſs of a ſyrup.

This preparation is not unfrequently uſed as a mild cooling detergent, particularly in gargariſms for ulcerations and inflammation of the mouth and tonſils. The roſe buds here uſed ſhould be haſtily dried: the deſign of doing ſo is, that they may the better preſerve their aſtringency.

Honey of ſquills. L.

522 Take of clarified honey, three pounds; tincture of ſquills, two pints. Boil them in a glaſs veſſel to the thickneſs of a ſyrup.

The honey will here be impregnated with all the active parts of the ſquills which the tincture before contained, and may be employed as an uſeful expectorant or diuretic.

Oxymel of verdegriſe. L.

523 Take of prepared verdegriſe, one ounce; vinegar, ſeven ounces; clarified honey, fourteen ounces. Diſſolve the verdigriſe in the vinegar, and ſtrain it through linen; then add the honey, and boil the whole to a proper thickneſs.

This is an improvement of what was formerly known in our pharmacopœias under the title of *mel Ægyptiacum;* which, however, was, as then prepared, very uncertain with reſpect to ſtrength. It is uſed only externally for cleanſing foul ulcers; and keeping down fungous fleſh. It is alſo often ſerviceable in venereal ulcerations of the mouth and tonſils. But there is ſome danger from its application to places from the ſituation of which it is apt to be ſwallowed; for even a ſmall quantity of verdigriſe paſſing into the ſtomach may be productive of diſtreſſing, if not deleterious, effects.

Oxymel of meadow ſaffron. L.

524 Take of the freſh root of meadow-ſaffron, cut into thin ſlices, one ounce; diſtilled vinegar, one pint; clarified honey, two pounds. Macerate the root of meadow-ſaffron with the vinegar, in a glaſs veſſel, with a gentle heat, for 48 hours. Strain the liquor, preſſed out ſtrongly from the root, and add the honey. Laſtly, boil the mixture, frequently ſtirring it with a wooden ſpoon, to the thickneſs of a ſyrup.

This oxymel may be conſidered as very analogous to the ſyrup of colchicum, on which we have already made ſome obſervations. Under this form it was firſt introduced by Dr Stoerk. And although with certain conſtitutions the ſyrup is unqueſtionably preferable, yet it well deſerves a place in our pharmacopœias, as being an active medicine.

Oxymel of ſquills. L.

525 Take of clarified honey, three pounds; vinegar of ſquills, two pints. Boil them in a glaſs veſſel, with a ſlow fire, to the thickneſs of a ſyrup.

The honey was formerly employed for this preparation unclarified, and the ſcum, which in ſuch caſes ariſes in the boiling, taken off: by this means the impurities of the honey were diſcharged; but ſome of the medicinal parts of the ſquills, with which the vinegar was impregnated, were alſo ſeparated. For this reaſon the college of London have now judiciouſly ordered the honey for all theſe kinds of preparations to be previouſly clarified by itſelf.

Oxymel of ſquills is an uſeful aperient, detergent, and expectorant, and of great ſervice in humoural aſthmas, coughs, and other diſorders where thick phlegm abounds. It is given in doſes of two or three drams, along with ſome aromatic water, as that of cinnamon, to prevent the great nauſea which it would otherwiſe be apt to excite. In large doſes it proves emetic.

Simple oxymel. L.

526 Take of clarified honey, two pounds; diſtilled vinegar, one pint. Boil them in a glaſs veſſel, with a ſlow fire, to the thickneſs of a ſyrup.

This preparation may be conſidered as analogous to the *ſyrupus aceti* of the Edinburgh pharmacopœia. It is not inferior in efficacy to many more elaborate compoſitions. It is an agreeable, mild, cooling medicine. It is often uſed in cooling detergent gargariſms, and not unfrequently as an expectorant.

Oxymel of garlic. Dan.

527 Take of garlic, cut in ſlices, an ounce and an half; caraway ſeeds, ſweet fennel ſeeds, each two drams; clarified honey, ten ounces; vinegar, half a pint. Boil the vinegar for a little time, with the ſeeds bruiſed, in a glazed earthen veſſel; then add the garlic, and cover the veſſel cloſe; when grown cold, preſs out the liquor, and diſſolve in it the honey by the heat of a water bath.

This oxymel is recommended for attenuating viſcid juices, promoting expectoration, and the fluid ſecretions in general. It is doubtleſs a medicine of conſiderable efficacy, though very unpleaſant, the flavour of the garlic prevailing notwithſtanding the addition of the aromatic ſeeds.

Pectoral oxymel. Brun.

528 Take of elecampane roots, one ounce; orris root, half an ounce; gum ammoniac, one ounce; vinegar, half a pint; clarified honey, one pound; water, three pints. Let the roots, cut and bruiſed, be boiled in the water till one third is waſted: then ſtrain off the liquor; let it ſtand to ſettle; and having poured it off clear from the feces, add to it the honey and the ammoniac, previouſly diſſolved in the vinegar. Mix them together, by gently boiling them.

The title of this compoſition expreſſes its medical virtues. It is deſigned for thoſe diſorders of the breaſt that proceed from a load of viſcid phlegm, and obſtructions of the pulmonary veſſels. Two or three ſpoonfuls may be taken every night and morning, and continued for ſome time.

CHAP. XXV. *Powders.*

529 THIS form receives ſuch materials only as are capable of being ſufficiently dried to become pulveriſable without the loſs of their virtue. There are many ſubſtances, however, of this kind, which cannot be conveniently taken in powder: bitter, acrid, fetid drugs, are too diſagreeable; emollient and mucilaginous herbs and roots are too bulky; pure gums cohere, and become tenacious in the mouth; fixed alkaline ſalts liquefy on expoſing the compoſition to the air; and volatile alkalis exhale. Many of the aromatics, too, ſuffer a greater loſs of their odorous principle when kept in powder; as in that form they no doubt expoſe a much larger ſurface to the air.

The doſe of powders, in extemporaneous preſcription, is generally about half a dram: it rarely exceeds a whole dram, and is not often leſs than a ſcruple. Subſtances which produce powerful effects in ſmaller doſes are not truſted to this form, unleſs their bulk be increaſed by additions of leſs efficacy; thoſe which require to be given in larger ones are better fitted for other forms.

The uſual vehicle for taking the lighter powders is any agreeable thin liquid. The ponderous powders, particularly thoſe prepared from metallic ſubſtances, require a more conſiſtent vehicle, as ſyrups; for from thin ones they ſoon ſubſide. Reſinous ſubſtances, likewiſe are moſt commodiouſly taken in thick liquors; in thin ones they are apt to run into lumps, which are not eaſily again ſoluble.

General rules for making powders.

I. Particular care ought to be taken that nothing carious, decayed, or impure, be mixed in the compoſition of powders: the ſtalks and corrupted parts of plants are to be ſeparated.

II. The dry aromatics ought to be ſprinkled during their pulverization, with a few drops of any proper water.

III. The moiſter aromatics may be dried with a very gentle heat before they are committed to the mortar.

IV. Gums, and ſuch other ſubſtances as are difficultly pulveriſable, ſhould be pounded along with the drier ones, that they may paſs the ſieve together.

V. No part ſhould be ſeparated for uſe until the whole quantity put into the mortar has paſſed the ſieve, and the ſeveral ſiftings mixed together; for thoſe parts of the ſubject which are firſt powdered may prove different at leaſt in degree of efficacy, from the reſt.

VI. Powders of aromatics are to be prepared only in ſmall quantities at a time, and kept in glaſs veſſels very cloſely ſtopped.

If powders are long kept, and not carefully ſecured from the air, their virtue is in a great meaſure deſtroyed, although

Preparations and Compositions.

although the parts in which it conſiſts ſhould not in other circumſtances prove volatile. Thus, though the virtues of ipecacuanha are ſo fixed as to remain entire even in extracts made with proper menſtrua, yet if the powdered root be expoſed for a long time to the air, it loſes its emetic quality.

Aloetic powder. L.

530 Take of ſocotorine aloes, one pound; white canella, three ounces. Rub them ſeparately to powder, and then mix them.

This compoſition has long been known in the ſhops under the title of *hiera picra*. It furniſhes us with an uſeful aloetic purgative, the canella operating as a good corrigent for the aloes. But it is more frequently employed as the baſis of electuaries or pills, or of a tincture which was for a long time diſtinguiſhed by the appellation of *ſacred tincture*.

Aloetic powder with iron. L.

531 Take of ſocotorine aloes, powdered, an ounce and an half; myrrh, powdered, two ounces; dry extract of gentian, vitriolated iron, of each, in powder, one ounce. Mix them.

In this powder we have an aloetic and chalybeate conjoined. It conſiſts of nearly the ſame articles which formerly entered the compoſition of the *pilulæ ecphracticæ chalybeatæ*, as they were called; and it is perhaps more frequently employed when brought to the form of pills by means of ſyrups than in powder: but in either way it is an uſeful medicine, and is particularly employed with advantage in caſes of obſtructed menſtruation.

Aloetic powder with guaiacum. L.

532 Take of ſocotorine aloes, one ounce and an half; gum guaiacum, one ounce; aromatic powder, half an ounce. Rub the aloes and gum guaiacum ſeparately to powder; then mix all the ingredients together.

In the guaiacum as well as the aloes, we have a warm gummi-reſinous purgative: and both are corrected, as well as more minutely divided, from their combination with the aromatics. This therefore furniſhes us with an uſeful purgative: but when taken only in ſmall doſes, its chief effect is that of promoting perſpiration. It is, however, more frequently employed in the form of pills than in the ſtate of powder; and indeed it conſiſts of nearly the ſame ingredients which conſtituted the *pilulæ aromaticæ* of the former edition of the London pharmacopœia.

Aromatic powder. L.

533 Take of cinnamon, two ounces; ſmaller cardamom ſeeds, huſked, ginger, long pepper, of each one ounce. Rub them together to a powder.

Aromatic powder, or *aromatic ſpices.* E.

Take of nutmegs, leſſer cardamom ſeeds, ginger, each two ounces. Beat them together into a powder, to be kept in a phial well ſhut.

Both theſe compoſitions are agreeable, hot, ſpicy medicines; and as ſuch may be uſefully taken in cold phlegmatic habits and decayed conſtitutions, for warming the ſtomach, promoting digeſtion, and ſtrengthening the tone of the viſcera. The doſe is from ten grains to a ſcruple and upwards. The firſt is conſiderably the warmeſt. This principally ariſes from the quantity of long pepper which it contains. But it is perhaps to be doubted whether from this article any advantage be derived; and a powder not inferior to either might, we think, be formed, by ſubſtituting caſſia for the cinnamon employed by the one college, or the nutmegs by the other.

Preparations and Compositions.

Compound powder of aſarabacca. L.

Take of the dry leaves of the aſarabacca, ſweet marjoram, Syrian herb maſtich, dry flowers of lavender, each one ounce. Powder them together. 534

Sternutatory, or *cephalic powder.* E.

Take of the leaves of aſarum, three parts; marjoram, one part. Beat them together into a powder.

Though the former of theſe powders be more compounded than the latter, yet they differ very little. They are both agreeable and efficacious errhines, and ſuperior to moſt of thoſe uſually ſold under the name of *herb ſnuff*. They are often employed with great advantage in caſes of obſtinate headach, and of ophthalmias reſiſting other modes of cure. Taken under the form of ſnuff to the extent of five or ſix grains at a time, they will operate the ſucceeding day as a powerful errhine, inducing frequent ſneezing, but ſtill more a large diſcharge from the noſe. It is, however, neceſſary, during their operation, to avoid expoſure to cold.

Powder of ceruſe. L.

Take of ceruſe, five ounces; ſarcocoll, one ounce and an half; tragacanth, half an ounce. Rub them together into powder. 535

This compoſition is the *trochiſci albi* of Rhazes brought back to its original ſimplicity with regard to the ingredients, and without the needleſs trouble of making it into troches. It is employed for external purpoſes, as in collyria, lotions, and injections, for repelling acrimonious humours, and in inflammations.

Compound powder of crabs claws. L.

Take of crabs claws, prepared, one pound; chalk, red coral, each prepared, three ounces. Mix them. 536

Theſe powders have loſt ſeveral of their ingredients without any injury to their virtues; and poſſibly they would ſtill bear a farther reduction, for the crabs eyes and chalk are by themſelves at leaſt as effectual as any compoſition of them with coral. And perhaps every purpoſe to be obtained from them may be accompliſhed by a more ſimple abſorbent, as the chalk powder afterwards to be mentioned, or the powder of the lapilli cancrorum.

Compound powder of contrayerva. L.

Take of contrayerva, powdered, five ounces; compound powder of crabs claws, one pound and an half. Mix them. 537

This powder was formerly directed to be made up into balls with water, and was then called *lapis contrayervæ*; a piece of trouble now laid aſide as needleſs, for it was neceſſary to reduce the balls into powder again before they could be uſed. Nor did that form contribute, as has been imagined to their preſervation; for it is ſcarcely to be ſuppoſed that the powder will loſe more by being kept for a reaſonable length of time in a cloſe-ſtopt glaſs than the balls will in the humectation with water and exſiccation in the air before they are fit for being put by to keep. The medicine has much better claim to the title of an alexipharmac and ſudorific than the foregoing compoſitions. The contrayerva by itſelf proves very ſerviceable in low fevers, where the *vis vitæ* is weak, and a diaphoreſis to be promoted. It is poſſible that the crabs claws are of no farther ſervice than as they divide this powerful ingredient, and make it ſit more eaſily on the ſtomach.

Compound powder of chalk.

538 Take of prepared chalk, half a pound; cinnamon four ounces; tormentil, gum-arabic, of each three ounces; long pepper, half an ounce. Powder them ſeparately, and mix them.

Chalk powder. E.

Take of white chalk, prepared, four ounces, nutmeg, half a dram; cinnamon, one dram. Mix and make them into a powder; which may ſupply the [illegible]e of the cardialgic troches.

The addition of the aromatics in the above [illegible]la, coincides with the general intention of the re[illegible] which is indicated for weakneſs and acidity in the ſtomach; and in looſeneſs from acidity.

Compound powder of chalk with opium. L.

Take of compound powder of chalk, eight ounces: hard purified opium, powdered, one dram and an half. Mix them.

From the addition of the opium this remedy becomes ſtill more powerful than the above in reſtraining diarrhœa.

Compound powder of ipecacuanha. L.

539 Take ipecacuanha and hard purified opium, of each, powdered, one dram; vitriolated kali, powdered, one ounce. Mix them.

Sudorific, or Dover's powder. E.

Take of vitriolated tartar, three drams; opium, root of ipecacuanha powdered, of each one ſcruple. Mix and grind them accurately together, ſo as to make an uniform powder.

The vitriolated tartar, from the grittineſs of its cryſtals, is perhaps better fitted for tearing and dividing the tenacious opium than any other ſalt; this ſeems to be its only uſe in the preparation. The operator ought to be careful that the opium and ipecacuanha ſhall be equally diffuſed through the whole maſs of powder, otherwiſe different portions of the powder muſt have differences in degree of ſtrength.

The hard purified opium, directed by the London college, is, from this circumſtance preferable to opium in its ordinary ſtate, employed by the Edinburgh college.

This powder is one of the moſt certain ſudorifics that we know of; and as ſuch, was recommended by Dr Dover as an effectual remedy in rheumatiſm. Modern practice confirms its reputation, not only in rheumatiſm, but alſo in dropſy and ſundry other diſeaſes, where it is often difficult by other means to produce a copious ſweat. The doſe is from five to ten or twelve grains, according as the patient's ſtomach and ſtrength can bear it. It is convenient to avoid much drinking immediately after taking it, otherwiſe it is very apt to be rejected by vomiting before any other effects are produced.

Compound powder of jalap. E.

540 Take of jalap root, one ounce; cryſtals of tartar, two ounces. Mix, and diligently grind them together for ſome time, ſo as to form a very fine powder.

The uſe of the cryſtals in this preparation is to break down and divide the jalap into very minute particles, whereby its operation is thought to be meliorated; and on this account the two articles are directed to be pounded together, and not ſeparately. But whether from this circumſtance any advantage ariſes or not, there can be no doubt that this combination furniſhes us with a very uſeful and active purgative, in every caſe where it is neceſſary to produce both a full evacuation of the inteſtinal canal, and a free diſcharge from the ſyſtem in general, under the form of catharſis.

Compound powder of myrrh. L.

541 Take of myrrh, dried ſavin, dried rue, Ruſſian caſtor, of each, one ounce. Rub them together into a powder.

This is a reformation of the troches of myrrh, a compoſition contrived by Rhazes againſt uterine obſtructions. It may be taken in any convenient vehicle, or made into boluſes, from a ſcruple to a dram or more, two or three times a-day.

Opiate powder. L.

542 Take of hard purified opium, powdered, one dram; burnt and prepared hartſhorn, nine drams. Mix them.

The hartſhorn is here intended merely to divide the opium, and to give it the form of powder, although it may perhaps have alſo ſome influence in rendering the opium more active from deſtroying acid in the ſtomach. But whether in this way it has any effect or not, there can be no doubt that it is a very convenient formula for the exhibition of opium in powder; which on ſome occaſions is preferable to its being given either in a liquid form or in that of pills. As ten grains of this powder contain preciſely one of the opium, the requiſite doſe may be eaſily adapted to the circumſtances of the caſe. It is often ſucceſsfully employed as a ſweating powder; and has not, like Dover's powder, the effect of inducing ſickneſs or vomiting.

Compound powder of ſcammony.

543 Take of ſcammony, hard extract of jalap, each two ounces; ginger, half an ounce. Powder them ſeparately, and mix them. *L.*

Take of ſcammony, cryſtals of tartar, each two ounces; mix, and grind them diligently into a powder. *E.*

It is much to be regretted, that in the pharmacopœias publiſhed by authority in Britain, two compoſitions ſhould be diſtinguſhed by the ſame name, differing conſiderably from each other in their nature and degree of activity.

The compound powder of ſcammony in the laſt edition of the London pharmacopœia differed conſiderable from the preſent: For there, the only addition was calcined hartſhorn, intended merely for the diviſion of the ſcammony. This purpoſe is ſtill better anſwered by the cryſtals of tartar, which at the ſame time conſpire with the operation of the ſcammony as a purgative. But the addition of jalap and ginger, according to the preſent formula of the London pharmacopœia, gives not only a purgative conſiderably different, but increaſes alſo the heating quality of the medicine, while the cream of tartar has an evident refrigerant power. Both may on occaſions be uſeful, but we think that in moſt caſes the Edinburgh formula will be found preferable.

In editions of our pharmacopœias of ſtill older date, this powder was prepared with another very active ingredient, diaphoretic antimony. It was much celebrated as diſtinguiſhed by the name of its inventor, being called from its firſt publiſher, *Cornachini's powder*. In a former edition of the Edinburgh pharmacopœia it was thus directed to be prepared:

Take of diaphoretic antimony, cream of tartar, ſcammony, each equal parts. Make them into a powder.

This may be given to the quantity of a dram or more. In other preſcriptions, the tartar and antimonial calx bear nearly the ſame proportion to the ſcammony as the calcined hartſhorn did in the London pharmacopœia. It appears probable that neither of theſe ingredients are of any farther uſe, than as they divide the texture of the ſcammony; though Cornachini ſuppoſes very conſiderable advantage from ſome deobſtruent quality in the tartar, whereby the veſſels ſhall be opened, and the noxious humours prepared for expulſion: and from the preparation of antimony, though it have no ſenſible operation, he expects ſome ſhare of the ſame ſucceſs which ſometimes attends the rougher preparations of that mineral.

Both the preſent formulæ may, however, be conſidered as poſſeſſing all the advantages of Cornachini's powder.

Powder of ſcammony with aloes. L.

544 Take of ſcammony, ſix drams; hard extract of jalap, ſocotorine aloes, of each an ounce and an half; ginger, half an ounce. Powder them ſeparately, and mix them.

In this formula, the combination of ſcammony, jalap, and aloes, furniſhes a very active purgative, which, with ſome intention at leaſt, may be preferable to either of the preceeding. Taken from five to ten grains, it will operate as a purgative even in caſes of obſtinate coſtiveneſs.

Powder of ſcammony with calomel. L.

545 Take of ſcammony, half an ounce; calomel, double-refined ſugar, of each two drams. Rub them ſeparately to a powder, and then mix them.

In this formula, we have the ſcammony in a more ſimple ſtate united with ſuch a proportion of calomel as muſt very conſiderably aid its purgative power. And accordingly it may be employed with advantage, both in caſes of obſtinate coſtiveneſs and in dropſical affections, where a conſiderable diſcharge is required from the ſyſtem.

Compound powder of ſenna. L.

546 Take ſenna, cryſtals of tartar, of each two ounces; ſcammony, half an ounce; ginger, two drams. Rub the ſcammony by itſelf, rub the reſt together into a powder, and then mix them all.

This powder is given as a cathartic, in the doſe of two ſcruples or a dram. The ſpice is added, not only to divide, but to warm the medicine, and make it ſit eaſier on the ſtomach. The ſcammony is uſed as a ſtimulus to the ſenna; the quantity of the latter neceſſary for a doſe, when not aſſiſted by ſome more powerful material, being too bulky to be conveniently taken in this form.

The compoſition of this medicine is now conſiderably ſimplified by the rejection both of cinnamon and cloves, as the ginger alone is found fully to anſwer the intention of the view.

Styptic powder. E.

547 Take of alum, an ounce and an half; gum-kino, three drams. Grind them together into a fine powder.

In former editions of our pharmacopœia, a powder of this kind was directed to be made with alum and dragon's blood, and was long in repute as an aſtringent, under the title of *Helvetius's ſtyptic powder*. The gum-kino is judiciouſly ſubſtituted for the dragon's blood, as being a much more powerful and certain aſtringent. The chief uſe of this powder is in hæmorrhagies, eſpecially of the uterus.

Compound powder of tragacanth. L.

548 Take of tragacanth powdered, gum-arabic, ſtarch, each an ounce and a half; double refined ſugar, three ounces. Rub them together into a powder.

This compoſition is ſomewhat ſimplified by the rejection of the marſhmallow, and liquorice root, which formerly entered it. But this has not probably produced any diminution of its medical properties. It operates as a mild emolient; and hence becomes ſerviceable in hectic caſes, tickling coughs, ſtrangury, ſome kinds of alvine fluxes, and other diſorders proceeding from a thin acrimonious ſtate of the humours, or an abraſion of the mucus of the inteſtines; they ſoften, and give a greater degree of conſiſtency to the former, and defend the latter from being irritated or excoriated by them. All the ingredients coincide in theſe general intentions. The doſe is from half a dram to two or three drams, which may be frequently repeated.

Anthelmintic powder. Gen.

549 Take of the flowers of tanſy, worm-ſeeds, each three drams; ſal martis, one dram. Mix them.

Both the tanſy and worm ſeed poſſeſs a conſiderable degree of anthelmintic power, which is not a little increaſed by the ſalt of ſteel. And from this combination more effect in the expulſion of worms, particularly of the lumbrici, may be expected, than from any of the articles taken by themſelves. This powder may be taken to the extent of half a dram or upwards for a doſe, proportioned to the age and circumſtances of the patient.

Powder againſt the bite of a mad-dog. Brun.

550 Taſte of aſh-coloured ground liverwort, two ounces; black pepper, one ounce. Beat them together into a powder.

The virtue for which this medicine has been celebrated, is expreſſed in its title: the doſe is a dram and a half, to be taken in the morning faſting, in half a pint of cows milk warm, for four mornings together.

At one period it was held, on the recommendation of Dr Mead and other eminent practitioners, in very high eſteem. Now, however, it has fallen into ſuch diſrepute, as to be baniſhed from moſt of the modern pharmacopœias.

Compound powder of arum. Suec.

551 Take of arum root, freſh dried, two drams; yellow water-flag roots, burnt ſaxifrage roots, each one dram; white canella, a dram; ſalt of wormwood, one ſcruple. Beat them into a powder, which is to be kept in a cloſe veſſel.

In former editions of the London pharmacopœia, one of the ingredients in this compoſition was called *acorus vulgi* or *vulgaris*; a name which has been applied, by different writers, both to *calamus aromaticus* and to *gladiolus luteus*, or common yellow water-flag. In this uncertainty, the compounders generally took the former. But as the medicine was firſt contrived by a German phyſician (Birkmann), and as in ſome of the German pharmacopœias, the *acoris vulgaris* is explained to be the water-flag, the Swediſh college have rather, in conformity to the original preſcription, than from any opinion of the virtues of the water-flag (which appears, when the root is dried and powdered, to be very inconſiderable), made choice of this laſt and expreſſed it by the name which more clearly diſtinguiſhes it from the other. The caution of keeping the powder in a cloſe veſſel is very neceſſary; for if it be expoſed to the air, the alkaline ſalt, imbibing moiſture, would run into a liquid ſtate. Two alkaline ſalts have been generally directed; but, as they differ from each other only in name, one of them is here juſtly omitted, and ſupplied by a proportional increaſe of the other. Crabs eyes were originally an article in this compoſition, but probably ſerved little other purpoſe than to increaſe its volume.

Agreeable to the above remark, the college of Edinburgh, in a reviſal of their pharmacopœia, had omitted the crabs-eyes, and continued the former practice of uſing calamus aromaticus for the *acoras vulgaris*. They had likewiſe exchanged the cinnamon for the white canella: and the alkaline ſalt for a neutral one, better ſuited to the form of a powder. Their formula was as follows:

Take of arum roots, newly dried, two ounces; calamus aromaticus, burnt ſaxifrage roots, each one ounce; white canella, ſix drams; vitriolated tartar, two drams. Mix and make them into a powder.

This article which had formerly a place alſo in the London pharmacopœia, is ſtill retained in ſome of the beſt foreign ones: But it is now altogether rejected from our pharmacopœias.

The compound powder of arum was originally intended as a ſtomachic; and in weakneſſes and relaxations of the ſtomach, accompanied with a ſurcharge of viſcid humours, it is doubtleſs a very uſeful medicine. It frequently has alſo good effects in rheumatic caſes: the doſe may be from a ſcruple to a dram, two or three times a day, in any convenient liquor. It ſhould be uſed as freſh as poſſible, for its virtue ſuffers greatly in keeping; the arum root in particular, its capital ingredient ſoon loſes the pungency in which its efficacy principally conſiſts.

Digeſtive powder. Suec.

Take of bitter purging ſalts, rhubarb, each equal parts. Mix them. 552

In this compoſition, the ſalt will briſken the operation of the rhubarb as a cathartic, and the aſtringency of the latter will tend to increaſe the tone of the ſtomach; hence, in conſequence of evacuating, and at the ſame time ſtrengthening the alimentary canal, it may be preſumed to have conſiderable influence in promoting digeſtion.

Dyſenteric powder. Dan.

Take of rhubarb, one ounce; calcined hartſhorn, half an ounce; gum arabic, three drams; caſcarilla bark, two drams. Mix them, and reduce them to a very fine powder. 553

Here the rhubarb is combined with an other powerful tonic, the caſcarilla; and while the calcined hartshorn ſerves to neutralize acid, the gum-arabic will operate as a demulcent. This compoſition therefore may be very uſeful in dyſenteric caſes, after the violence of the diſeaſe has been overcome, and when there remains a debilitated and abraded ſtate of the inteſtinal canal.

Fumigation powder. Roſſ.

Take of olibanum, amber, maſtich, each three parts; ſtorax, two parts: benzoin, labdanum, each one part. Mix them into a groſs powder. 554

This powder is intended for the purpoſe of fumigation: and when burnt it gives out a fragrant odour; hence it may be ſucceſsfully employed for combating diſagreeable ſmells, and counteracting putrid or other noxious vapours diffuſed in the atmoſphere.

Powder for infants. Suec.

Take of magneſia alba, one ounce, rhubarb, reduced to a very fine powder, one dram. Let them be mixed. 555

This powder is very uſeful for deſtroying acid, and at the ſame time reſtoring the diminiſhed tone of the alimentary canal: hence it is often advantageouſly employed in caſes of diarrhœa, which depend on theſe morbid conditions. And it is in general a circumſtance of conſiderable advantage, that it does not tend to check looſeneſs very ſuddenly. It is particularly uſeful with infants, and hence the origin of the name here affixed to it.

Nitrous powder. Suec.

556 Take of purified nitre, three ounces; ſalt of ſorrel, one ounce; double-refined ſugar, ten ounces. Let them be mixed.

This is a very convenient and agreeable form of exhibiting nitre: for while the ſugar ſerves not only to divide and diffuſe it, but alſo to correct its taſte, the ſalt of ſorrel adds to its refrigerant power.

Purging Peruvian powder Gen.

557 Take of the powder of Peruvian bark, one ounce; powder of rhubarb, powder of ſal ammoniac, each one dram and a half.

It has been imagined by many, that particular advantage reſulted from uniting the Peruvian bark with ſal ammoniac: and there can be no doubt, that in ſome caſes inconvenience reſults from the bark, in conſequence of its binding the belly. There are therefore circumſtances in which the combination here propoſed may perhaps be proper; but there is reaſon to believe that the benefit of the ſal ammoniac is more imaginary than real; and it not unfrequently happens, that we are diſappointed of the benefit which might otherwiſe be derived from the bark, in conſequence of its proving even of itſelf a purgative. Hence, in perhaps a majority of caſes, the exhibiting it with the additions here propoſed will be rather prejudicial than otherwiſe.

Thebaic powder. Suec.

558 Take of opium, half a ſcruple; purified nitre, five ſcruples and a half; refined ſugar, one ounce. Mix them together into a powder.

In this powder thoſe inconveniences which ſometimes reſult from opium may with certain conſtitutions be corrected, in conſequence of the refrigerant power of nitre; and hence it may prove a very uſeful ſedative powder. The ſugar is intended merely to give form to the medicine; and in its ſtate of combination, each dram of it contains a grain of opium; ſo that a practitioner has it in his power eaſily to regulate the doſe according to circumſtances.

Sponge-powder. Gen.

559 Take of burnt ſponge, powdered, common ſalt, each three drams. Mix them, and divide into twelve powders.

We have formerly noticed the manner of burning ſponge. (ſee n° 98.) It is of very conſiderable ſervice in ſcrofulous affections, and particularly in the cure of the bronchocele. It has of late been highly celebrated for theſe purpoſes by Mr Wilmer, under the title of the *Coventry remedy*. There it was ſometimes employed merely in its pure ſtate, combined with a ſufficient quantity of honey, to form it into a bolus; ſometimes it was given united with calcined cork and pumice-ſtone. What advantage, however, it could have derived from theſe additions it is difficult to conceive; nor can we readily ſee how it will be improved by the addition of common ſea-ſalt here propoſed: for this may probably lead to new combinations, materially altering the qualities of thoſe ſalts which the ſponge itſelf contains; and on which its virtues, as far as it has any, muſt depend. At the ſame time, for any experience which we ourſelves have had, we are inclined to think that thoſe virtues which have been attributed to burnt ſponge are more imaginary than real.

CHAP. XXVI. *Troches.*

560 TROCHES and lozenges are compoſed of powders made up with glutinous ſubſtances into little cakes, and afterwards dried. This form is principally uſed for the more commodious exhibition of certain medicines, by fitting them to diſſolve ſlowly in the mouth, ſo as to paſs by degrees into the ſtomach; and hence theſe preparations have generally a conſiderable proportion of ſugar or other materials grateful to the palate. Some powders have likewiſe been reduced into troches, with a view to their preparation; though poſſibly for no very good reaſons; for the moiſtening and afterwards drying them in the air, muſt on this account be of greater injury than any advantage accruing from this form can counterbalance.

General Rules for making Troches.

1. The three firſt rules laid down for making powders, are alſo to be obſerved in the powders for troches.
2. If the maſs proves ſo glutinous as to ſtick to the fingers in making up, the hands may be anointed with any convenient ſweet or aromatic oil; or elſe ſprinkled with powder of ſtarch, or of liquorice, or with flour.
3. In order to thoroughly dry the troches, put them on an inverted ſieve, in a ſhady airy place, and frequently turn them.
4. Troches are to be kept in glaſs veſſels, or in earthen ones well glazed.

Troches of Starch. L.

561 Take of ſtarch, an ounce and an half; liquorice, ſix drams; florentine orris, half an ounce; doubt refined ſugar, one pound and a half. Rub theſe to powder, and, by the help of tragacanth, diſſolved in water, make troches. They may be made, if ſo choſen, without the orris.

White pectoral troches. E.

Take of pureſt ſugar. one pound; gum arabic, four ounces; ſtarch, one ounce; flowers of benzoin, half a dram. Having beat them all into a powder, make them into a proper maſs with roſe-water, ſo as to form troches.

Theſe compoſitions are very agreeable pectorals, and may be uſed at pleaſure. They are calculated for ſoftening acrimonious humours, and allaying the tickling in the throat which provokes coughing.

Although not only the name but the compoſition alſo in the London and Edinburgh pharmacopœias be ſomewhat different, yet their effects are very much the ſame.

Troches of liquorice. L.

562 Take of extract of liquorice, double-refined ſugar, each ten ounces; tragacanth, powdered, three ounces. Make troches by adding water.

Black pectoral troches. E.

Take of extract of liquorice, gum arabic, each four ounces; white ſugar, eight ounces. Diſſolve them in warm water, and ſtrain: then evaporate the mixture over a gentle fire till it be of a proper conſiſtence for being formed into troches.

Theſe compoſitions are deſigned for the ſame purpoſes as the white pectoral troches above deſcribed. In foreign pharmacopœias there are ſome other troches of this kind, under the titles of *Trochiſci bechici flavi* and *rubri;* the firſt are coloured with ſaffron, the latter with bole armenic. The diſſolving and ſtraining the extract of liquorice and gum arabic, as now ordered in the laſt of the above preſcriptions, is a conſiderable improvement; not only as they are by that means more uniformly mixed than they can well be by beating, but likewiſe as they are thereby purified from the heterogeneous matters, of which both thoſe drugs have commonly no ſmall admixture.

Pectoral troches with opium. E.

563 Take of pure opium, two drams; balſam of Peru, one dram; tincture of Tolu, three drams. Grind the opium with the balſam and tincture previouſly mixed, till it be thoroughly diſſolved; then add by degrees, of commmon ſyrup, eight ounces; extract of liquorice, ſoftened in warm water, five ounces. While beating them diligently, gradually ſprinkle upon the mixture five ounces of powdered gum arabic. Exſiccate ſo as to form troches, each weighing ten grains.

The directions for preparing the above troches are ſo full and particular, that no farther explanations are neceſſary. Six of the troches prepared in the manner here ordered, contain about one grain of opium. Theſe troches are medicines of approved efficacy in tickling coughs depending on an irritation of the fauces. Beſides the mechanical effect of the inviſcating matters and involving acrid humours, or lining and defending the tender membranes, the opium muſt, no doubt, have a conſiderable ſhare, by more immediately diminiſhing the irritability of the parts themſelves.

The compoſition of theſe troches, however, would perhaps be improved by the omiſſion of the balſam of Peru: for although here directed only in ſmall quantity, yet it gives a taſte to the troches which is to many people very diſagreeable; and it is at the ſame time probable that it adds very little, if any thing, to the efficacy of the medicine.

Troches of nitre.

564 Take of purified nitre, powdered, four ounces; double-refined ſugar, powdered, one pound; tragacanth, powdered, ſix ounces. With the addition of water, make troches. *L.*

Take of nitre, purified, three ounces; double-refined ſugar, nine ounces. Make them into troches with mucilage of gum tragacanth. *E.*

This is a very agreeable form for the exhibition of nitre; though, when the ſalt is thus taken without any liquid (if the quantity be conſiderable), it is apt to occaſion uneaſineſs about the ſtomach, which can only be prevented by large dilution with aqueous liquors. The troches of nitre have been ſaid to be employed with ſucceſs in ſome caſes of difficult deglutition.

Troches of ſulphur.

565 Take of waſhed flowers of ſulphur, two ounces; double-refined ſugar, four ounces. Rub them together; and, with the mucilage of quince-ſeeds, now and then added, make troches. *L.*

Take of flowers of ſulphur, two ounces; flowers of benzoin, one ſcruple; white ſugar, four ounces; factitious cinnabar, half a dram. Beat them together, and add mucilage of gum tragacanth as much as is ſufficient. Mix and make them into troches according to art. *E.*

Theſe compoſitions are to be conſidered only as agreeable forms for the exhibition of ſulphur, no alteration or addition being here made to its virtues; unleſs that, by the flowers of benzoin in the ſecond preſcription, the medicine is ſuppoſed to be rendered more efficacious as a pectoral.

The factitious cinnabar ſeems chiefly intended as a colouring ingredient.

Troches of chalk. L.

566 Take of chalk prepared, four ounces; crabs-claws, prepared, two ounces; cinnamon, half an ounce; double-refined ſugar, three ounces. Theſe being rubbed to powder, add mucilage of gum arabic, and make troches.

Troches of magneſia. L.

Take of burnt magneſia, four ounces; double refined ſugar, two ounces; ginger, powdered, one ſcruple. With the addition of mucilage of gum arabic, make troches.

Theſe compoſitions are calculated againſt that uneaſy ſenſation at the ſtomach, improperly called the *heartburn;* in which they often give immediate relief, by abſorbing and neutralizing the acid juices that occaſion this diſorder. The abſorbent powders here uſed are of the moſt powerful kind. The former has in general the effect of binding, the latter of opening, the belly; and from this circumſtance the practitioner will be determined in his choice, according to the nature of the caſe which he may have occaſion to treat.

Red lead troches. Dan.

567 Take of read lead, half an ounce; corroſive ſublimate mercury, one ounce; crumb of the fineſt bread four ounces. Make them up with roſe-water into oblong troches.

Theſe troches are employed only for external purpoſes as eſcarotics: they are powerfully ſuch, and require a good deal of caution in their uſe.

Troches of catechu. Brun.

568 Take of catechu, one ounce; white ſugarcandy, two ounces; ambergris, muſk, each ten grains; mucilage of gum tragacanth, as much as is ſufficient. Make them into troches.

This medicine has long been in eſteem as a ſlight reſtringent; and reſtringents thus gradually received into the ſtomach produce better effects than when an equal quantity is taken down at once. Theſe troches would be more palatable, and perhaps not leſs ſerviceable, were the muſk and ambergris omitted.

CHAP. XXVI. *Pills.*

569 To this form are peculiarly adapted thoſe drugs which operate in a ſmall doſe, and whoſe nauſeous and offenſive taſte or ſmell require them to be concealed from the palate.

Pills diſſolve the moſt difficultly in the ſtomach, and produce the moſt gradual and laſting effects of all the internal forms. This is in ſome caſes of great advantage, in others it is a quality not at all deſirable; and ſometimes may even be of dangerous conſequence, particularly with regard to emetics; which, if they paſs the ſtomach undiſſolved, and afterwards exert themſelves in the inteſtines, operate there as violent cathartics. Hence emetics are among us ſcarcely ever given in pills; and hence to the reſinous and difficultly ſoluble ſubſtances, ſaponaceous ones ought to be added, in order to promote their ſolution.

Gummy reſins, and inſpiſſated juices are ſometimes ſoft enough to be made into pills without addition: where any moiſture is requiſite, ſpirit of wine is more proper than ſyrups or conſerves, as it unites more readily with them, and does not ſenſibly increaſe their bulk. Light dry powders require ſyrup or mucilages; and the more ponderous, as the mercurial and other metallic preparations, thick honey, conſerve or extracts.

Light powders require about half their weight of ſyrup, of honey, about three-fourths their weight, to reduce them into a due conſiſtence for forming pills. Half a dram of the maſs will make ſix or ſeven pills of a moderate ſize.

General rules for making pills.

1. Gums and inſpiſſated juices are to be firſt ſoftened with the liquor preſcribed; then add the powders, and continue beating them all together till they be perfectly mixed.
2. The maſſes for pills are beſt kept in bladders, which ſhould be moiſtened now and then with ſome of the ſame kind of liquid that the maſs was made up with, or with ſome proper aromatic oil.

Ethiopic pills. E.

570 Take of quickſilver, ſix drams; golden ſulphur of antimony, reſin of guaiacum, honey, each half an ounce. Grind the quickſilver with the honey, in a glaſs mortar, until the mercurial globules entirely diſappear; then add the golden ſulphur and guaiacum, with as much mucilage of gum arabic as is ſufficient to make the mixture into a maſs of the proper conſiſtence for forming pills.

Theſe pills are much more efficacious than thoſe of a former edition; the ethiops mineral, there ordered, being exchanged for a more active compoſition. In their preſent form they reſemble Dr Plummer's pills. deſcribed in the Edinburgh Eſſays, and afterwards to be mentioned. To it they are preferable in one reſpect, that they are leſs apt to run off by ſtool. They are an uſeful alterative both in cutaneous and venereal diſorders. One fourth-part of the quantity above preſcribed may be made into ſixty pills; of which from one to four may be taken every night and morning, the patient keeping moderately warm during the whole time that this courſe is continued.

Pills of aloes. L.

Take of ſocotorine aloes, powdered, an ounce; extract of gentian, half an ounce; ſyrup of ginger, as much as is ſufficient. Beat them together. 571

Aloetic pills. E.

Take of ſocotorine aloes, in powder, thick extract of gentian, each two ounces; make them into a maſs with ſimple ſyrup.

Theſe pills were formerly directed to be made with Caſtile ſoap; from a notion which Boerhaave and ſome others were very fond of, that ſoap promoted the ſolution of reſinous and ſeveral other ſubſtances in the ſtomach. This, however, ſeems to be a miſtake; and, on the contrary, it is highly probable that the alkaline part of the ſoap is in moſt inſtances ſeparated from the oily by the acid in the ſtomach; by which decompoſition the ſoap may poſſibly retard inſtead of promoting the ſolution of the aloes. Theſe pills have been much uſed as warming and ſtomachic laxatives: they are very well ſuited for the coſtiveneſs ſo often attendant on people of ſedentary lives. Like other preparations of aloes, they are alſo uſed in jaundice, and in caſes of obſtructed menſes. They are ſeldom uſed for producing full purging; but if this be required, a ſcruple or half a dram of the maſs may be made into pills of a moderate ſize for one doſe.

Pills of aloes with myrrh. L.

Take of ſocotorine aloes, two ounces; myrrh, ſaffron, of each one ounce; ſyrup of ſaffron, as much as is ſufficient. Rub the aloes and myrrh ſeparately to powder; afterwards beat them all together. 572

The common pills, vulgarly called *Rufus's pills.* E.

Take of ſocotorine aloes, two ounces; myrrh, one ounce; ſaffron, half an ounce. Beat them into a maſs with a proper quantity of ſyrup.

Theſe pills have long continued in practice, without any other alteration than in the ſyrup with which the maſs is made up, and in the proportion of ſaffron. In our laſt pharmacopœia, the ſyrup of wormwood was ordered, which is here judiciouſly exchanged by the London college for that of ſaffron; this preſerving and improving the brightneſs of colour in the medicine, which is the characteriſtic of its goodneſs. The ſaffron, in the compoſition which is attributed to Rufus, is equal in quantity to the myrrh; and in theſe proportions the pill was received in our firſt pharmacopœia. As the diminution afterwards made in the ſaffron was grounded on very abſurd reaſons, viz. "leſt the former quantity ſhould occaſion a ſpaſmus cynicus,") the London college have now again increaſed it, and reſtored the pill to its original form. The virtues of this medicine may be eaſily underſtood from its ingredients. Theſe pills, given to the quantity of half a dram or two ſcruples, prove conſiderably cathartic, but they anſwer much better purpoſes in ſmaller doſes as laxatives or alteratives.

Colocynth pills with aloes, commonly called *Cocciæ*. E.

573 Take ſocotorine aloes, ſcammony, of each two ounces; ſal polychreſt, two drams; colocynth, one ounce; oil of cloves, two drams. Reduce the aloes and ſcammony into a powder with the ſalt; then let the colycinth beat into a very fine powder, and the oil be added; laſtly, make it into a proper maſs with mucilage of gum arabic.

In theſe pills we have a very uſeful and active purgative; and where the ſimple aloetic pill is not ſufficient for obviating coſtiveneſs, this will often effectually anſwer the purpoſe. Little of their activity can depend upon the ſalt which enters the compoſition; but it may aſſiſt in dividing the active parts of the other articles, particularly the aloes and ſcammony. Theſe pills often produce a copious diſcharge in caſes of obſtinate coſtiveneſs, when taken to the extent only of five or ten grains; but they may be employed in much larger doſes. They are, however, ſeldom uſed with the view of producing proper catharſis. Half a dram of the maſs contains about five grains of the colocynth, ten of the aloes, and ten of the ſcammony.

Copper pills. E.

574 Take of cuprum ammoniacum, ſixteen grains; crumb of bread, four ſcruples; ſpirit of ſal ammoniac, as much as is ſufficient to form them into a maſs, which is to be divided into thirty two equal pills.

Theſe pills had formerly the name of *Pilulæ ceruleæ*, but they are now with greater propriety denominated from the metal which is their baſis.

Each of theſe pills weighs about three grains, and contains ſomewhat more than half a grain of the cuprum amoniacum. The above pills ſeem to be the beſt form of exhibiting this medicine. See CUPRUM *ammoniacale*, and CHEMISTRY, nº 1034.

Gum pills.

575 Take of galbanum, opopanax, myrrh, ſagapenum, each one ounce: aſafœtida, half an ounce; ſyrup of ſaffron, as much as is ſufficient. Beat them together. *L.*

Take aſafœtida, galbanum, myrrh, each one ounce; rectified oil of amber, one dram. Beat them into a maſs with ſimple ſyrup. *E.*

The pills are deſigned for antihyſterics and emmenagogues, and are very well calculated for anſwering thoſe intentions; half a ſcruple, a ſcruple or more, may be taken every night or oftener. The fetid pills of our former pharmacopœia were conſiderably purgative; the purgative ingredients are now omitted, as the phyſician may eaſily, in extemporaneous preſcription, compound theſe pills with cathartic medicines, in ſuch proportions as particular caſes ſhall require.

Quickſilver pills.

576 Take purified quickſilver, extract of liquorice, having the conſiſtence of honey, of each two drams; liquorice, finely powdered one dram. Rub the quickſilver with the extract of liquorice until the globules diſappear: then, adding the liquorice-powder, mix them together.

Mercurial pills. E.

Take of quickſilver, honey, each one ounce; crumb of bread, two ounces. Grind the quickſilver with the honey in a glaſs mortar till the globules diſappear, adding occaſionally a little ſimple ſyrup; then add the crumb of bread, and beat the whole with water into a maſs, which is to be immediately divided into four hundred and eighty equal pills.

The quickſilver was formerly directed to be ground with reſin of guaiacum and Caſtile ſoap. The former was ſuppoſed to coincide with the virtues of the mercury, and the latter was uſed chiefly to divide the globules of mercury. For this laſt intention Dr Saunders found that honey, the ſubſtance here ordered by the Edinburgh college, is of all he tried the moſt effectual; but we would ſuppoſe with this gentleman, that ſomething farther is done in this proceſs than the mere diviſion of the mercurial globules, and that part of the quickſilver is as it were amalgamated with the honey, or brought to a ſtate ſimilar to that in Plenck's ſolution. The ſame effect will take place when the pills are prepared with extract of liquorice now directed by the London college.

The mercurial pill is one of the beſt preparations of mercury, and may in general ſuperſede moſt other forms of this medicine. It is neceſſary to form the maſs immediately into pills, as the crum ſoon becomes too hard for that purpoſe. Soap was undoubtedly a very improper medium for triturating the mercury; it is not only too hard for that purpoſe, but when the preparations entered the ſtomach, the alkaline part of the ſoap being engaged by the acid in that viſcus, the mercury would in all probability be immediately ſeparated. The honey and bread can only be changed by the natural powers of digeſtion, and can never oppreſs the ſtomach. The doſe of the pills is from two to four or ſix in the day, according to the effects we wiſh to produce.

Jalap pills. E.

577 Take of extract of jalap, two ounces; aromatic powder, half an ounce. Beat them into a maſs with ſimple ſyrup.

This is an uſeful and active purgative, either for evacuating the contents of the inteſtinal canal, or producing a diſcharge from the ſyſtem in general.

One of the ſame kind, with powdered jalap in ſubſtance inſtead of the extract, is uſed in ſome of our hoſpitals as a cheap and effectual purge.

Plummer's pill. E.

578 Take of ſweet mercury, precipitated ſulphur of antimony, each ſix drams; extract of gentian, white Spaniſh ſoap, each two drams. Let the mercury be triturated with the ſulphur till they be thoroughly mixed, then add the extract, and form a maſs with ſimple ſyrup.

Theſe pills were recommended to the addition of the publick about forty years ago by Dr Plummer, whoſe name they ſtill bear. He repreſented them in a paper which he publiſhed in the Edinburgh Medical Eſſays, as a very uſeful alterative; and on his authority they were at one time much employed; but they are now leſs extenſively uſed than formerly. And although they ſtill retain a place in the Edinburgh pharmacopœia, yet it is probable that every purpoſe to be anſwered by them may be more effectually obtained from the common mercurial pill, or from calomel in a more ſimple ſtate.

Opium pills. L.

579 Take of hard purified opium, powdered, two drams; extract of liquorice, one ounce. Beat them until they are perfectly united.

Thebaic, commonly called *Pacific pills.* E.

Take of opium, half an ounce; extract of liquorice, two ounces; Caſtile ſoap, an ounce and a half; Jamaica pepper, one ounce. Soften the opium and extract ſeparately with proof-ſpirit, and having beat them into a pulp, mix them; then add the ſoap, and the pepper beat into a powder; and laſtly having beat them well together, form the whole into a maſs.

Theſe two compoſitions, though differing in ſeveral particulars may yet be conſidered as fundamentally very much the ſame. The firſt is a ſimple opiate, in which every five grains of the maſs contains one of opium; and in the opium alone can we ſuppoſe that the activity of the medicine depends.

Although ſome of the articles contained in the latter compoſition may perhaps be ſuppoſed to operate as corrigentia, yet the former compoſition, which is the moſt ſimple, is in general preferable.

Pills ſimilar to the ſecond were contrived by a chemical empiric, Starkey, and communicated by him to Matthews, under, whoſe name they were ſome time ago greatly celebrated. The form here given differs conſiderably from the original, in omitting many ingredients of no great ſervice. Nor indeed are any of the ingredients of much conſequence, except the opium; their quantity being too inconſiderable to anſwer any uſeful purpoſe. Ten grains of the compoſition contain one of opium.

Squill-pills.

580 Take of freſh dried ſquills, powdered, one dram; ginger powdered, ſoap, of each three drams; ammoniacum, two drams; ſyrup of ginger, as much as is ſufficient. Beat them together. *L.*

Take of gum ammoniac, leſſer cardamom ſeeds, in powder, extract of liquorice, each one dram; dried root of ſquills, in fine powder, one ſcruple. Mix, and form them into a maſs with ſimple ſyrup. *E.*

Theſe are elegant and commodious forms for the exhibition of ſquills, whether for pomoting expectoration, or with the other intentions to which that medicine is applied. As the virtue of the compound is chiefly from the ſquills, the other ingredients are often varied in extemporaneous preſcription: and probably no material difference takes place in the two forms here propoſed excepting in the proportion of the ſquills, which in the former conſtitutes one ninth, in the latter one tenth, of the maſs.

Stomachic pills. E.

581 Take of rhubarb, one ounce; ſocotorine aloes, ſix drams; myrrh half an ounce; vitriolated tartar, one dram; eſſential oil of mint, half a dram; ſyrup of orange peel, a ſufficient quantity. Make them into a maſs.

This pill is intended for moderately warming and ſtrengthening the ſtomach, and evacuating crude viſcid humors. A ſcruple of the maſs may be taken twice a-day.

Bacher's pills. Gen.

582 Take of extract of black hellebore, purified myrrh, each one ounce; power of carduus benedictus, two ſcruples. Mix them into a maſs according to art, to be dried in the air till it be fit for the formation of pills, each weighing one grain.

Theſe pills have been ſtrongly recommended as a moſt effectual remedy in dropſical caſes, and have been alleged to unite an evacuant and tonic power. Hence they have been conſidered as particularly ſuited to thoſe caſes where remarkable weakneſs and laxity occur. Under the hands of Mr Bacher the inventor, they acquired ſo great reputation, that, after a trial in the military hoſpitals at Paris, the receipt was purchaſed by the French king, and publiſhed by authority. But like many other noſtrums ſince this publication, Bacher's pill has by no means ſupported the reputation which it had when kept a ſecret. The doſe is varied according to circumſtances, from one to thirty pills taken in the courſe of the day.

Pills of elaterium. Suec.

583 Take of the pureſt gum ammoniac, two ounces; ſocotorine aloes, gamboge, each two drams; elaterium, half a dram. Mix them, by means of bitter tincture, into a maſs, and let pills be formed, each weighing two grains.

This, as well as the former, is alſo a pill celebrated for the cure of dropſical affections. And the elaterium from which it derives its name, is one of the moſt powerful evacuants in the way of catharſis. Here, however, it is united with ſuch active articles, particularly the gamboge, as muſt make its effect ſomewhat doubtful. And we are inclined to think that a preferable formula for making the pills of elaterium, is to form it into a maſs, with the extract of gentian. This is imagined to have ſome influence as correcting its effect, in exciting ſickneſs. And when each pill is made to contain half a grain of the elaterium, the doſe may be eaſily accommodated to the circumſtances of the patient, one or two pills being taken every hour till they begin to operate.

The elaterium, whether under the form above-mentioned, or in the more ſimple ſtate which has now been ſuggeſted, operates as a very powerful cathartic, often inducing the diſcharge of ſtagnant ſerum, when other remedies are found ineffectual. But it can be exhibited only in thoſe caſes where the patient ſtill retains a conſiderable degree of ſtrength.

Fetid pills. Suec.

584 Take of aſafœtida, caſtor, each a dram and a half; ſalt of amber, half a dram; oil of hartſhorn, half a ſcruple. Make them into a maſs, with tincture of myrrh, to be divided into pills of two grains each.

Theſe, like the gum-pills formerly mentioned, are chiefly uſed as an antihyſteric and antiſpaſmodic medicine; and they are particularly uſeful in counteracting ſpaſmodic affections of the alimentary canal, eſpecially thoſe connected with flatulence. But the aſafœtida is no leſs ſucceſsful when exhibited in a more ſimple ſtate, particularly when formed into pills with an equal quantity of ſoap, by the aid of ſimple ſyrup.

Gamboge pills. Dan.

585 Take of ſocotorine aloes, extract of black hellebore, ſweet mercury, gamboge, each two drams; diſtilled oil of juniper, half a dram; ſyrup of buckthorn, as much as is ſufficient for forming a maſs of pills.

From the ingredients of which theſe pills are conſtituted, we need hardly remark, that they muſt prove a very powerful purgative. The gamboge, from which they derive their name is unqueſtionably a very active purge. But is not more ſo than the ſweet mercury; and perhaps from an union of theſe two, as much might be expected as from the more compounded formula here adopted. Yet it is not improbable that the eſſential oil of juniper may in ſome degree operate as a corrigent.

Pills of corroſive ſublimate mercury. Suec.

586 Take of corroſive ſublimate, purified ſal ammoniac, each one ſcruple; diſtilled water, as much as is ſufficient to diſſolve them; powder of the root of althea, ſixteen ſcruples; honey, two drams. Mix them into a maſs for the formation of pills, each weighing three grains.

Corroſive ſublimate in ſubſtance was long conſidered as being ſo violent in its effects, that it could not with ſafety be taken internally; but for a conſiderable time it has been uſed with advantage under the form of ſolution, either in water or ſpirits. But to both theſe a conſiderable objection occurs from their diſagreeable braſſy taſte. This objection is however entirely obviated, by reducing the ſolution, after it is formed, to a ſolid maſs, by means of crumb of bread, or any proper powder: and by the aid of a little ſal ammoniac, the ſolution may be made in a very ſmall quantity of water; ſo that leſs of any ſolid intermedium will be ſufficient to bring it to the form of pills. The formula here directed ſeems well ſuited for the purpoſe intended. Each of the pills contains about an eighth of a grain of the corroſive; thus the doſe may be eaſily regulated according to the intention in view. And theſe pills are not unfrequently employed with advantage, both in combating venereal and cutaneous affections, and for the expulſion of worms from the alimentary canal. With the latter of theſe intentions, a ſimilar pill was particularly recommended by Dr Gardener, in a paper publiſhed in the Edinburgh Phyſical and Literary Eſſays: and although not received into our pharmacopœia, it has been frequently uſed at Edinburgh.

Tar pills. Dan.

Take any quantity of tar, and mix with it as much powdered elecampane root as will reduce it to a proper thickneſs for being formed into pills. 587

The powder here mixed with the tar, though of no great virtue, is nevertheleſs a very uſeful addition, not only for procuring it a due conſiſtence, but likewiſe as it divides the reſinous texture of the tar, and thus contributes to promote its ſolution by the animal juices. In the Edinburgh infirmary, half a dram of the maſs, made into middle ſized pills, is given every morning and evening in diſorders of the breaſt, ſcurvies, &c.

Soap pills. Suec.

Take of hard white ſoap, two ounces; extract of birch, one ounce. Let them be formed into a maſs, to be divided into pills, each containing three grains. 588

Although many virtues have been attributed to the birch, yet we are inclined to think, that it here ſerves little other purpoſe than to give the form of pills to the ſoap. And this article, even when taken in ſmall quantity with ſome conſtitutions, operates as a gentle laxative. But beſides this, it has alſo been ſuppoſed to be highly uſeful both in caſes of jaundice and of calculus. There can, however, be little doubt, that the theories on which it has been inferred that it may be uſeful in ſuch complaints are not well founded; and we may perhaps add, that the uſe of it, even to a great extent, is by no means attended with thoſe conſequences which were once alleged to ariſe from it.

Storax pills. Suec.

Take of ſtrained ſtorax, five ſcruples; extract of liquorice, three drams; opium, one dram. Let the opium, diſſolved in wine, be added to the other ingredients, ſo as to form a maſs of proper conſiſtence, to be made into pills, each weighing three grains. 589

Theſe pills are principally active in conſequence of the opium which they contain. And they are chiefly meant with a view to a ſlow ſolution in the ſtomach, and conſequently producing more gradual and laſting effects. One grain of opium is contained in ſeventeen grains of the maſs.

Chap. XVIII. *Electuaries.*

Electuaries are compoſed chiefly of powders mixed up with ſyrups, &c. into ſuch a conſiſtence that 590 the powders may not ſeparate in keeping, that a doſe may be eaſily taken upon the point of a knife, and not prove too ſtiff to ſwallow.

Electuaries receive chiefly the milder alterative medicines, and ſuch as are not ungrateful to the palate. The more powerful drugs, as cathartics, emetics, opiates, and the like except in officinal electuaries to be diſpenſed by weight), are ſeldom truſted in this form, on account of the uncertainty of the doſe; diſguſtful ones, acrids, bitters, fetids, cannot be conveniently taken in it; nor is the form of an electuary well fitted for the more ponderous ſubſtances, as mercurials, theſe being apt to ſubſide in keeping, unleſs the compoſition be made very ſtiff.

The lighter powders require thrice their weight of honey, or ſyrup boiled to the thickneſs of honey, to make them into the conſiſtence of an electuary; of ſyrups of the common conſiſtence, twice the weight of the powder is ſufficient.

Where the common ſyrups are employed, it is neceſſary to add likewiſe a little conſerve, to prevent the compound from drying too ſoon; electuaries of Peruvian bark, for inſtance, made up with ſyrup alone, will often in a day or two grow too dry for taking.

Some powders, eſpecially thoſe of the leſs grateful kind, are more conveniently made up with mucilage than with ſyrup, honey, or conſerve. The three latter ſtick about the mouth and fauces, and thus occaſion the taſte of the medicine to remain for a conſiderable time; while mucilages paſs freely, without leaving any taſte in the mouth. A little ſoft extract of liquorice, joined to the mucilage, renders the compoſition ſufficiently grateful, without the inconveniences of the more adheſive ſweets.

The quantity of an electuary, directed at a time, in extemporaneous preſcription, varies much according to its conſtituent parts, but it is rarely leſs than the ſize of a nutmeg, or more than two or three ounces.

General rules for making electuaries.

I. The rules already laid down for decoctions and powders in general, are likewiſe to be obſerved in making decoctions and powders for electuaries.

II. Gums, inſpiſſated juices, and ſuch other ſubſtances as are not pulverizable, ſhould be diſſolved in the liquor preſcribed: then add the powders by little and little, and keep the whole briſkly ſtirring, ſo as to make an equable and uniform mixture.

III. Aſtringent electuaries, and ſuch as have pulps of fruit in their compoſition, ſhould be prepared only in ſmall quantities at a time: for aſtringent medicines loſe much of their virtue in being kept in this form, and the pulps of fruits are apt to become ſour.

IV. The ſuperfluous moiſture of the pulps ſhould be exhaled over a gentle fire, before the other ingredients are added to them.

V. Electuaries, if they grow dry in keeping, are to be reduced to a due conſiſtence, with the addition of a little canary wine, and not with ſyrup or honey: by this means the doſe will be the leaſt uncertain; a circumſtance deſerving particular regard, in thoſe eſpecially which are made up with ſyrup, and contain a proportion of opium.

Electuary of caſſia. L.

591 Take of the freſh extracted pulp of caſſia, half a pound; manna, two ounces; pulp of tamarinds, one ounce; roſe ſyrup, half a pound. Beat the manna, and diſſolve it over a ſlow fire in the roſe-ſyrup; then add the pulps; and with a continued heat evaporate the whole to the proper thickneſs of an electuary.

Electuary of caſſia, commonly called *diacaſſia.* E.

Take of pulp of caſſia fiſtularis, ſix ounces; pulp of tamarinds, manna, each an ounce and a half; ſyrup of pale roſes, ſix ounces. Having beat the manna in a mortar, diſſolve it with a gentle heat in the ſyrup; then add the pulps, and evaporate them with a regularly continued heat to the conſiſtence of an electuary.

Theſe compoſitions are very convenient officinals, to ſerve as a baſis for purgative electuaries and other ſimilar purpoſes; as the pulping a ſmall quantity of the fruits, for extemporaneous preſcription, is very troubleſome. The tamarinds give them a pleaſant taſte, and do not ſubject them, as might be expected, to turn ſour. After ſtanding for four months, the compoſition has been found no ſourer than when firſt made. This electuary is likewiſe uſefully taken by itſelf, to the quantity of two or three drams occaſionally, for gently looſening the belly in coſtive habits.

Electuary of ſcammony. L.

592 Take of ſcammony, in powder, one ounce and an half; cloves, ginger, of each ſix drams; eſſential oil of caraway, half a dram; ſyrup of roſes, as much as is ſufficient. Mix the ſpices, powdered together, with the ſyrup; then add the ſcammony, and laſtly the oil of caraway.

This electuary is a warm briſk purgative. It is a reform of the *electuarium caryocoſtinum* of our preceding diſpenſatories; a compoſition which was greatly complained of, as being inconvenient to take on account of the largeneſs of its doſe. A dram and a half of this, which contains fifteen grains of ſcammony, is equivalent to half an ounce of the other.

Electuary of ſenna. L.

593 Take of ſenna, eight ounces; figs, one pound; pulp of tamarinds, of caſſia, of prunes, each half a pound; coriander ſeeds, four ounces; liquorice, three ounces; double-refined ſugar, two pounds and an half. Powder the ſenna with the coriander ſeeds, and ſiſt out ten ounces of the mixed powder. Boil the remainder with the figs and liquorice, in four pints of diſtilled water, to one half; then preſs out and ſtrain the liquor. Evaporate this ſtrained liquor to the weight of about a pound and an half; then add the ſugar, and make a ſyrup; add this ſyrup by degrees to the pulps, and laſtly mix in the powder.

Lenitive electuary. E.

Take of pulp of French prunes, one pound; pulp of caſſia, pulp of tamarinds, each two ounces and a half; black ſyrup of ſugar, commonly called *molaſſes,* one pound and a half; ſenna leaves, in fine powder, four ounces; coriander ſeeds, in fine powder, half an ounce. Having boiled the pulps with the ſyrup to the conſiſtence of honey, add the powders, and beat the whole into an electuary.

This electuary, the name of which is with propriety changed by the London college, is now freed from ſome ſuperfluous ingredients which were left in it at former reviſals, *viz.* polypody root, French mercury leaves, fenugreek ſeeds, and linſeed. Molaſſes is preferable to either honey or ſugar, as it coincides with the intention, and is not only of itſelf inapt to ferment, but likewiſe prevents ſuch ſubſtances as are this way diſpoſed from running into fermentation.

It is a very convenient laxative, and has long been in common uſe among practitioners. Taken to the quantity of a nutmeg or more, as occaſion may require, it is an excellent laxative for looſening the belly in coſtive habits.

Japonic electuary, commonly called *Japonic confection.* E.

594 Take of Japan earth, four ounces; gum-kino, three ounces; cinnamon, nutmeg, each one ounce; opium diffuſed in a ſufficient quantity of Spaniſh white wine, one dram and a half; ſyrup of dried roſes, boiled to the conſiſtence of honey, two pounds and a quarter. Mix and form them into an electuary.

The ingredients in this electuary ſeem extremely well choſen, and are ſo proportioned to one another, that the quantity of opium is the ſame as in the diaſcordium of the former pharmacopœias of Edinburgh, *viz.* one grain in ten ſcruples. The gum-kino, now ſubſtituted for the tormentil root, is an excellent improvement in the formula.

Tin electuary. Brun.

595 Take of pure tin, quickſilver, each one ounce. Let them be formed into an amalgam; oyſter ſhells, prepared one ounce. Reduce the whole to a powder. Take of this powder, conſerve of wormwood, each one ounce, and form an electuary with ſyrup of mint.

Tin, as we have already had occaſion to obſerve above (n° 312.), has long been celebrated for the expulſion of tænia; and it is alſo well known, that in mercury we have one of the moſt powerful anthelmintics. Such a combination as the preſent, then, might be ſuppoſed well ſuited for the removal of that animal from the alimentary canal; and accordingly it has been alleged, that this electuary has ſometimes ſucceeded after other remedies have failed. It may be taken twice a day, to the extent of two or three drams for a doſe.

Electuary for the gums. Suec.

596 Take of powdered myrrh, three drams; cream of tartar, cochineal, each a dram and a half. Grind them together in a glaſs mortar; then add melted honey, four ounces; cloves, in powder, one dram.

Myrrh, particularly under the form of tincture, has long been a favourite application to the gums, when in a ſpongy or ulcerated ſtate. But the ſpirituous menſtruum there employed, although ſometimes favouring the intention in view, in other inſtances occurs as an objection to its uſe. In theſe caſes, the benefit to be derived from the myrrh may be obtained from this electuary, which may always be applied with ſafety, and ſometimes with advantage.

Electuary of manna. Suec.

597 Take of manna, refined ſugar pounded, fennel-water, each two ounces. Strain the mixture, uſing expreſſion; then add fine powder of the root of florentine orris, one dram; freſh drawn almond oil, one ounce.

In this electuary we have a gently emollient laxative, which is very uſeful in thoſe caſes where obſtipation either ariſes from indurated feces, or is ſupported by that cauſe. But its cathartic powers are by no means conſiderable.

Nitrous electuary. Gen.

598 Take of purified nitre, half an ounce; conſerve of roſes, four ounces. Mix them.

Under this formula nitre may be introduced to a conſiderable extent, without giving uneaſineſs at ſtomach, while at the ſame time the refrigerant power is combined with the aſtringency of the roſes. From theſe circumſtances it may be advantageouſly employed in different caſes, but particularly in inſtances of hæmoptyſis.

Terebinthinate electuary. Suec.

599 Take of ſpirit of turpentine, half an ounce; honey, one ounce; powder of liquorice, as much as is ſufficient for the formation of an electuary.

Under this form, the oil of turpentine may be introduced with leſs uneaſineſs than perhaps under almoſt any other. And it may thus be employed for different purpoſes, but particularly with a view to its diuretic power. But it has been eſpecially celebrated for the cure of obſtinate rheumatiſms, and above all, for that modification of rheumatiſm which has the name of *iſchias,* and which is found in many inſtances obſtinately to reſiſt other modes of cure.

Lenient linctus. Suec.

600 Take of gum-arabic, bruiſed, two drams; cherry-water, half an ounce. By trituration in a mortar, mix with them almond oil, freſh drawn, ſyrup of almonds, each ſeven ounces.

In this we have a very agreeable emollient linctus, highly uſeful in recent catarrhal affections, for lubricating the throat and fauces. It may be taken at pleaſure to any extent that the ſtomach may eaſily bear.

CHAP. XXIX. *Confections.*

601 ALTHOUGH the London college have ſeparated theſe from electuaries, yet they differ ſo little, that in moſt pharmacopœias they are ranked under the ſame head. And in that of Edinburgh, there are ſeveral articles which have promiſcuouſly the name either of *confection* or *electuary.* But as no inconvenience ariſes from the ſeparation, and as we have followed the order of the London pharmacopœia in other particulars, it would be improper to deviate from it in this.

Aromatic confection. L.

602 Take of zedoary, in coarſe powder, ſaffron, of each half a pound; diſtilled water, three pints. Macerate for twenty-four hours; then preſs and ſtrain. Reduce the ſtrained liquor, by evaporation, to a pint and a half, to which add the following, rubbed to a very fine powder; compound powder of crabs-claws, ſixteen ounces; cinnamon, nutmegs, of each two ounces; cloves, one ounce; ſmaller cardamom-ſeeds, huſked, half an ounce; double-refined ſugar, two pounds. Make a confection.

This confection is compoſed of the more unexceptionable ingredients of a compoſition formerly held in great eſteem, and which was called, from its author, *conſectio, Raleighana.* The original confection was compoſed of no leſs than five and twenty particulars; each of which were examined apart, except one, moorgraſs, the flower of which is too ſmall to be gathered in ſufficient quantity for the general uſe of the medicine, and the plant is poſſeſſed of hurtful qualities, as is experienced in cattle that feed where it grows. In this examination, many of the extracts came out ſo very nauſeous, that it was impoſſible to retain them, conſiſtent with any regard to the taſte of the compoſition. But ſome few, of equal efficacy with any of the reſt, being of a tolerable taſte and flavour, were compounded in different proportions; and when, after many trials, a compoſition was approved, the quantity of each material, that would yield the proportion of extract which entered that compoſition, was calculated, and from thence the proportions were collected as now ſet down: after which the compound extract was made, and found to anſwer expectation. The London college, in the preſent edition of their pharmacopœia, have ſtill farther ſimplified this formula, by rejecting the roſemary, juniper, and cardamoms, which formerly entered it.

The confection, as now reformed, is a ſufficiently grateful and moderately warm cordial; and frequently given with that intention, from eight or ten grains to a ſcruple or upwards, in boluſes or draughts. The formula might perhaps be ſtill more ſimplified without any loſs. The crabs claw powder does not appear to be very neceſſary, and is inſerted rather in compliance with the original formula, than from its contributing any thing to the intention of the medicine; and the following formula of the Edinburgh pharmacopœia ſeems to us preferable to that of the London, even in its preſent improved ſtate.

Cordial electuary, commonly called *cordial confection.* E.

603 Take of conſerve of orange-peel, three ounces; preſerved nutmegs, an ounce and a half; preſerved ginger, ſix drams; cinnamon, in fine powder, half an ounce; ſyrup of orange peel, as much as will form the whole into an electuary.

In the above ſimple and elegant formula, a number of trifling ingredients are rejected, and thoſe ſubſtituted in their place are medicines of approved efficacy. We therefore conſider this preparation as an uſeful remedy for the purpoſes expreſſed in its title.

Confection of opium. L.

604 Take of hard purified opium, powdered, ſix drams; long pepper, ginger, caraway-ſeeds, of each two ounces; ſyrup of white poppy, boiled to the conſiſtence of honey, three times the weight of the whole. Mix the purified opium carefully with ſyrup gently heated; then add the reſt, rubbed to powder.

Thebaic electuary. E.

Take of aromatic powder, ſix ounces; Viginian ſnake-root, in fine powder, three ounces; opium diffuſed in a ſufficient quantity of Spaniſh white wine, three drams; clarified honey, thrice the weight of the powders. Mix them, and form an electuary.

Theſe compoſitions conſiſt of very powerful ingredients, and are doubtleſs capable of anſwering every end that can be reaſonably expected from the more voluminous *Theriaca* of Andromachus. The London college alſo had formerly their *Theriaca* compoſed of the leſs exceptionable ingredients of Andromachus's. But as theſe medicines have for a long time been chiefly employed for external purpoſes, by the way of cataplaſm, the London theriaca is now omitted, and its place ſupplied by a cataplaſm compoſed of a few well-choſen articles, under the name of *cataplaſm of cummin;* of which hereafter. For internal uſe, none of the theriacas are at preſent ſo much regarded as they have been heretofore; practitioners having introduced in their room extemporaneous boluſes of Virginan ſnake-root, camphor, contrayerva, and the like; which anſwer all their intentions, with this advantage, that they may be given either with or without opium; an ingredient which renders the others prejudicial in caſes where they might otherwiſe be proper.

With regard to the quantity of opium in the foregoing compoſitions, one grain thereof is contained in thirty-ſix grains of the confection of opium, and in five ſcruples of the thebaic electuary. The proportion of opium will vary a little, according to the time that they have been kept: their moiſture by degrees exhaling, ſo as to leave the remainder ſtronger of the opium than an equal weight was at firſt. A change of this kind is taken notice of by many writers, but falſely attributed to an imaginary fermentative quality of the ingredients; by which they were ſuppoſed, from their multiplicity and contrariety, to be continually exalting and improving the virtues of each other.

A good deal of care is requiſite in making theſe compoſitions, to prevent the waſte which is apt to happen in the pounding, and which would render the proportion of opium to the other ingredients precarious. The intention of diſſolving the opium in wine, for theſe and other electuaries, is, that it may be more uniformly mixed with the reſt.

Theſe compoſitions fully ſupply the place of two articles, which, though long baniſhed from the ſhops, we ſhall here ſubjoin, as examples of the amazing height to which compoſition in medicine had at one time proceeded.

Mithridate, or the *confection of Democrates.*

605 Take of cinnamon, fourteen drams; myrrh, eleven drams; agaric, Indian nard, ginger, ſaffron, ſeeds of mithridate muſtard, frankincenſe, chio turpentine, each ten drams; camels hay, coſtus, or in its ſtead zedoary, Indian leaf, or in its ſtead mace, ſtechas

long pepper, hartwort ſeeds, hypociſtis, ſtorax ſtrained, opoponax, galbanum ſtrained, opobalſam, or in its ſtead expreſſed oil of nutmegs, Ruſſian caſtor, each one ounce; Poley mountain, ſcordium, carpobalſam, or in its ſtead cubebs, white pepper, candy-carrot ſeed, bdellium ſtrained, each ſeven drams; Celtic nard, gentian root, dittany of Crete, red roſes, Macedonian parſley ſeed, leſſer cardamom ſeeds huſked, ſweet fennel ſeed, gum arabic, opium ſtrained, each five drams; calamus aromaticus, wild valerian root, aniſeed, ſagapenum ſtrained, each three drams; meum athamanticum, St John's wort, acacia, or in its ſtead terra Japonica, bellies of ſkinks, each two drams and a half; clarified honey, thrice the weight of all the other ingredients. Warm the honey, and mix with it the opium diſſolved in wine; melt the ſtorax, galbanum, turpentine, and opobalſam (or expreſſed oil of nutmegs), together in another veſſel, continually ſtirring them about, to prevent their burning; with theſe ſo melted, mix the hot honey, at firſt by ſpoonfuls, and afterwards in larger quantities at a time; when the whole is grown almoſt cold, add by degrees the other ſpices reduced into powder.

Theriaca of Andromachus, Venice treacle.

Take of troches of ſquills, half a pound; long pepper, opium ſtrained, vipers dried, each three ounces; cinnamon, opobalſam, or in its ſtead expreſſed oil of nutmegs, each two ounces; agaric, Florence orris root, ſcordium, red roſes, navew ſeeds, extract of liquorice, each an ounce and a half; Indian nard, ſaffron, amomum, myrrh, coſtus, or in its ſtead zedoary, camel's hay, each one ounce; cinquefoil root, rhubarb, ginger, Indian leaf, or in its ſtead mace, dittany of Crete, horehound leaves, calamint leaves, ſtechas, black pepper, Macedonian parſley ſeed, olibanum, chio turpentine, wild valerian root, each ſix drams; gentian root, Celtic nard, ſpignel, leaves of Poley mountain, of St John's wort, and of groundpine, germander tops with the ſeed, carpobalſam, or in its ſtead cubebs, aniſeed, ſweet fennel ſeed, leſſer cardamom ſeeds, huſked, ſeeds of biſhop's weed, of hartwort, and of treacle muſtard, hypociſtis, acacia, or in its ſtead Japan earth, gum arabic, ſtorax ſtrained, ſagapenum ſtrained, terra Lemnia, or in its ſtead bole armenic, or French bole, green vitriol calcined, each half an ounce; ſmall (or in its ſtead the long) birthwort root, leſſer centuary tops, candy-carrot ſeed, opopanax, galbanum, ſtrained, Ruſſia caſtor, Jews pitch, or in its ſtead white amber prepared, calamus aromaticus, each two drams; clarified honey, thrice the weight of all the other ingredients. Let theſe ingredients be mixed together, after the ſame manner as directed in making the mithridate.

Theſe celebrated electuaries are often mentioned by medical writers, and may ſerve as examples of the wild exuberance of compoſition which the ſuperſtition of former ages brought into vogue. The theriaca is a formation of mithridate made by Andromachus phyſician to Nero. The mithridate itſelf is ſaid to have been found in the cabinet of Mithridates king of Pontus. The firſt publiſhers of this pompous arcanum were very extravagant in their commendations of its virtues; the principal of which was made to conſiſt in its being a moſt powerful preſervative againſt all kinds of venom; whoever took a proper quantity in the morning was inſured from being poiſoned during that whole day. This was confirmed by the example of its ſuppoſed inventor, who, as Celſus informs us, was by its conſtant uſe ſo fortified agaiſt the commonly reputed poiſons, that none of them would have any effect upon him when he wanted their aſſiſtance. But the notions of poiſons which prevailed in thoſe ruder ages were manifeſtly erroneous. Before experience had furniſhed mankind with a competent knowledge of the powers of ſimples, they were under perpetual alarms from an apprehenſion of poiſons, and buſied themſelves in contriving compoſitions which ſhould counteract their effects, accumulating together all thoſe ſubſtances which they imagined to be poſſeſſed of any degree of alexipharmic power. Hence proceed the voluminous antidotes which we meet with in the writings of the ancient phyſicians; yet it does not appear that they were acquainted with any real poiſon except the cicuta, aconitum, and bites of venomous animals; and for theſe they knew of no antidote whatever. Even admitting the reality of the poiſons, and the efficacy of the ſeveral antidotes ſeperately, the compoſitions could no more anſwer the purpoſes expected from them, than the accumulating of all the medicinal ſimples into one form could make a remedy againſt all diſeaſes.

Yet notwithſtanding the abſurdity in the original intention of theſe medicines, and their enormity in point of compoſition, as they contain ſeveral powerful materials, whoſe virtues, though greatly prejudiced, yet are not deſtroyed, by their multiplicity and contrariety; the compounds have been found, from repeated experience, to produce very conſiderable effects as warm opiate diaphoretics.

Theſe compoſitions might without doubt be lopt of numerous ſuperfluities without any diminution of their virtues; yet as the effects of them, in their preſent form, are ſo well known, ſo much regard has been paid to ancient authority as not to attempt a reformation of that kind. Although theſe forms were originally complex, yet ſubſequent additions had crept into them. Neither the deſcription in verſe of the elder Andromachus, nor the proſe explanation of the younger, make any mention of the white pepper afterwards added to the theriaca; and the orris root, in the mithridate of our former pharmacopœias, is alſo a ſupernumerary ingredient, not warranted by the original: theſe therefore are rejected. Nor is the aſarum in the mithridate grounded on any good authority: the verſe it is taken from is mutilated and corrupt; and the word which ſome, on conjecture only, ſuppoſe to have been aſarum, others, alſo on conjecture, chooſe to read differently. Till ſome emendation ſhall be better founded than merely on critical gueſſes, this ſingle ſpecies may be ſafely paſſed over without any prejudice to the medicine. None of the ancient deſcriptions afford any other light in this particular: for they either omit this ingredient, and others alſo, or abound with additions.

Another innovation on both theſe medicines alſo took place. In each of theſe compoſitions were found both cinnamon and caſſia lignea; and it is very evident, from ſeveral parts of Galen's works, that the latter was uſed by the ancients only on account of the great difficulty of procuring the other; ſo that to retain the caſſia, now that cinnamon is ſo common, is a blind following of theſe writers, without any attention to their meaning: the caſſia therefore is now rejected, and half the quantity of cinnamon put in its room; which is the proportion that Galen directs to be obſerved in ſubſtituting the one for the other. It is probable that the caſe is the ſame with regard to the Celtic and the Indian nard; that the firſt had a place in theſe compoſitions on account of the difficulty of procuring the Indian, for Galen expreſsly prefers the latter.

There is a material error in regard to the theriaca, which has paſſed through ſeveral editions of our pharmacopœia: this is the ſubſtituting the Roman vitriol for the ancient chalcitis, now not certainly known; and, in the catalogue of ſimples, deſcribing the Roman to be a blue vitriol whereas the Italian writers are unanimous it is a green vitriol; and were it not, it would not anſwer to the effects of the chalcitis, which was certainly a chalybeate, and gives the medicine its black colour. What has chiefly occaſioned chalcitis to be ſuppoſed a cupreous vitriol ſeems to be its name, derived from χαλκος, *copper*: but it is to be obſerved that all vitriols were formerly imagined to proceed from copper, and were named accordingly: the green or martial vitriols are ſtill called by the Germans *kupffer waſſer*, and by us *copperas*. It is probable that the ancient chalcitis was no other than a native martial vitriol, calcined by the heat of thoſe warm climates to a degree of yellowiſh red or coppery colour; and therefore the common green vitriol, thus calcined by art, very properly ſupplies its place.

The preparation of theſe medicines has been ſomewhat facilitated by omitting the *trochiſci cypheos* uſed in the mithridate, and the *hedychroi* and *viperini* for the theriaca; and inſerting their ingredients, after Zwelffer's manner, in the compoſitions they are intended for. This is done in the theriaca very commodiouſly; the ingredients in theſe troches uniting with thoſe in the theriaca itſelf into unbroken numbers. But to render the numbers equally ſimple in the mithridate, it was neceſſary to retrench a few odd grains from ſome of the articles, and make a ſmall addition to ſome others. The proportions of the ingredients in the *trochiſci cypheos* are adjuſted from the original deſcription in Galen, the numbers in our former pharmacopœia being very erroneous.

Both the London and Edinburgh colleges ventured at length to diſcard theſe venerable relics. The Edinburgh college at firſt ſubſtituted in their room an elegant and ſimple form, equivalent to them both in efficacy, under the title of *theriaca Edinenſis*, Edinburgh theriaca. In later editions, however, they have entirely baniſhed the name of theriaca from their book, and have put in its place the more elegant compoſition already mentioned, the *thebaic electuary*.

CHAP. XXX. *Medicated Waters.*

606 WE have already taken notice of many articles which are either diſſolved in water, or communicate their virtues to it; and in one ſenſe of the word theſe may be called *medicated waters*. Sometimes this impregnation is effected by the aid of heat, ſometimes without it; and thus are formed decoctions, infuſions, and the like. But among thoſe articles referred to in this chapter, there takes place mere watery ſolution only, and they are uſed ſolely with the intention of acting topically in the way of lotion, injection, or at the utmoſt of gargariſm.

Compound alum-water. L.

Take of alum, vitriolated zinc, each half an ounce; boiling diſtilled water, two pints. Pour the water on the ſalts in a glaſs veſſel, and ſtrain. 607

This water was long known in our ſhops under the title of *aqua aluminoſa Bateana*.

Bates directed the ſalts to be firſt powdered and melted over the fire: but this is needleſs trouble, ſince the melting only evaporates the aqueous parts, which are reſtored again on the addition of the water. This liquor is uſed for cleanſing and healing ulcers and wounds; and for removing cutaneous eruptions, the part being bathed with it hot three or four times a-day. It is ſometimes likewiſe employed as a collyrium; and as an injection in the gonorrhœa and fluor albus when not accompanied with virulence.

Styptic water. E.

Take of blue vitriol, alum, each three ounces; water, two pounds. Boil them until the ſalts be diſſolved; then filter the liquor, and add an ounce and an half of vitriolic acid. 608

This water, though made with the blue in place of the white vitriol, cannot be conſidered as differing very much from the former. It is formed on the ſtyptic recommended by Sydenham for ſtopping bleeding at the noſe, and other external hemorrhagies; for this purpoſe cloths or doſſils are to be dipt in the liquor, and applied to the part.

Water of ammoniated copper. L.

Take of lime-water, one pint; ſal ammoniac, one dram. Let them ſtand together, in a copper veſſel, till the ammoniac be ſaturated. 609

Sapphire-coloured water. E.

Take of lime-water, newly made, eight ounces; ſal ammoniac, two ſcruples; verdegris, powdered, four grains. Mix them, and after 24 hours ſtrain the liquor.

This is a much more elegant and convenient method than the preceding.

This water is at preſent pretty much in uſe as a detergent of foul and obſtinate ulcers, and for taking away ſpecks or films in the eyes. The copper contributes more to its colour than to its medicinal efficacy; for the quantity of the metal diſſolved is extremely ſmall.

Compound water of acetated litharge. L.

Take of acetated water of litharge, two drams; diſtilled water, two pints; proof-ſpirit, two drams. Mix the ſpirit with the acetated water of litharge; then add the diſtilled water. 610

This liquor is of the ſame nature with ſolutions of ſugar of lead, and is analogous to the vegeto-mineral water of Mr Goulard. It is only uſed externally as a coſmetic againſt cutaneous eruptions, redneſs, inflammation, &c. But even here it is alleged that it is not altogether void of danger, and that there are examples of its continued employment having occaſioned ſundry ill conſequences. But at the ſame time the very frequent uſe that is made of it with perfect impunity would lead us to conclude that in theſe obſervations there muſt be ſome miſtake.

Water of vitriolated zinc with camphor. L.

611 Take of vitriolated zinc, half an ounce; camphorated ſpirit, half an ounce; boiling water, two pints. Mix, and filter through paper.

This is an improved method of forming the vitriolic camphorated water of the former editions of the London pharmacopœia. It is uſed externally as a lotion for ſome ulcers, particularly thoſe in which it is neceſſary to reſtrain a great diſcharge. It is alſo not unfrequently employed as a collyrium in ſome caſes of ophthalmia, where a large diſcharge of watery fluid takes place from the eyes, with but little inflammation. But when it is to be applied to this tender organ, it ought, at firſt at leaſt, to be diluted by the addition of more water.

Vitriolic water. E.

612 Take of white vitriol, ſixteen grains; water, eight ounces; weak vitriolic acid, ſixteen drops. Diſſolve the vitriol in the water, and then adding the acid, ſtrain through paper.

Where the eyes are watery or inflamed, this ſolution of white vitriol is a very uſeful application. The ſlighter inflammations will frequently yield to this medicine without any other aſſiſtance; in the more violent ones, veneſection and cathartics are to be premiſed to its uſe.

CHAP. XXXI. *Plaſters.*

613 PLASTERS are compoſed chiefly of oily and unctuous ſubſtances, united with powders into ſuch a conſiſtence that the compound may remain firm in the cold without ſticking to the fingers; that it may be ſoft and pliable in a low degree of heat, and that by the warmth of the human body it be ſo tenacious as readily to adhere both to the part on which it is applied and to the ſubſtance on which it is ſpread.

There is, however, a difference in the conſiſtence of plaſters, according to the purpoſes they are to be applied to: thus, ſuch as are intended for the breaſt and ſtomach ſhould be very ſoft and yielding, while thoſe deſigned for the limbs are made firmer and more adheſive. An ounce of expreſſed oil, an ounce of yellow wax, and half an ounce of any proper powder, will make a plaſter of the firſt conſiſtence: for a hard one, an ounce more of wax, and half an ounce more of powder, may be added. Plaſters may likewiſe be made of reſins, gummy reſins, &c. without wax, eſpecially in extemporaneous preſcription: for officinals theſe compoſitions are leſs proper, as they ſoon grow too ſoft in keeping, and fall flat in a warm air.

It has been ſuppoſed, that plaſters might be impregnated with the ſpecific virtues of different vegetables, by boiling the recent vegetable with the oil employed for the compoſition of the plaſter. The coction was continued till the herb was almoſt criſp, with care to prevent the matter from contracting a black colour: after which the liquid was ſtrained off, and ſet on the fire again, till all the aqueous moiſture had exhaled. We have already obſerved, that this treatment does not communicate to the oils any very valuable qualities, even relative to their uſe in a fluid ſtate: much leſs can plaſters, made with ſuch oils, receive any conſiderable efficacy from the herbs.

Calces of lead, boiled with oils, unite with them into a plaſter of an excellent conſiſtence, and which makes a proper baſis for ſeveral other plaſters.

In the boiling of theſe compoſitions, a quantity of water muſt be added, to prevent the plaſter from burning and growing black. Such water, as it may be neceſſary to add during the boiling, muſt be previouſly made hot, for cold liquor would not only prolong the proceſs, but likewiſe occaſion the matter to explode, and be thrown about with violence, to the great danger of the operator: this accident will equally happen on the addition of hot water, if the plaſter be extremely hot.

Ammoniacum plaſter with quickſilver. L.

614 Take of ſtrained ammoniacum, one pound; purified quickſilver, three ounces; ſulphurated oil, one dram, or what is ſufficient. Rub the quickſilver with the ſulphurated oil until the globules diſappear; then add, by little at a time, the melted ammoniacum, and mix them.

This is a very well contrived mercurial plaſter. The ammoniacum in general affords a good baſis for the application of the mercury. In ſome caſes, however, it is not ſufficiently adheſive. But this inconvenience, when it does occur, may be readily remedied by the addition of a ſmall quantity of turpentine.

Plaſter of Spaniſh flies. L.

615 Take of Spaniſh flies, one pound; wax plaſter, two pounds; prepared hog's lard, half a pound. Having melted the plaſter and lard, a little before they coagulate ſprinkle in the flies, reduced to a very fine powder.

Bliſtering plaſter, or epiſpaſtic plaſter. E.

Take of hog's lard, yellow wax, white reſin, cantharides, each equal weights. Beat the cantharides into a fine powder, and add them to the other ingredients, previouſly melted, and removed from the fire.

Both theſe formulæ are very well ſuited to anſwer the intention in view, that of exciting bliſters; for both are of a proper conſiſtence, and ſufficient degree of tenacity, which are here the only requiſites. Cantharides of good quality, duly applied to the ſkin, never fail of producing bliſters. When, therefore, the deſired effect does not take place, it is to be aſcribed to the flies either being faulty at firſt, or having their activity afterwards deſtroyed by ſome accidental circumſtance; ſuch as too great heat in forming, in ſpreading the plaſter, or the like. And when due attention is paid to theſe particulars, the ſimple compoſitions now introduced anſwer the purpoſe better than thoſe compound plaſters with muſtard-ſeed, black pepper, vinegar, verdegris, and the like, which had formerly a place in our pharmacopœias. It is not however improbable, that the pain of bliſtering-plaſters might be conſiderably diminiſhed by the addition of a portion of opium, without preventing the good effects otherwiſe to be derived from them.

Wax-plaſter.

616 Take of yellow wax, prepared mutton-ſuet, each three pounds; yellow reſin, one pound. Melt them together, and ſtrain the mixture whilſt it is fluid. *L.*

Take of yellow wax, three parts; mutton-ſuet, white reſin, two parts. Melt them together into a plaſter; which ſupplies the place of melilot plaſter. *E.*

This plaſter had formerly the title of *drawing-plaſter*, and was chiefly employed as a dreſſing after bliſters, to ſupport ſome diſcharge.

It is a very well contrived plaſter for that purpoſe. It is calculated to ſupply the place of melilot plaſter; whoſe great irritation, when employed for the dreſſing of bliſters, has been continually complained of. This was owing to the large quantity of reſin it contained, which is here on that account retrenched. It would ſeem that, when deſigned only for dreſſing bliſters, the reſin ought to be entirely omitted, unleſs where a continuance of the pain and irritation, excited by the veſicatory, is required. Indeed plaſters of any kind are not very proper for this purpoſe: their conſiſtence makes them ſit uneaſy, and their adheſiveneſs renders the taking them off painful. Cerates, which are ſofter and leſs adheſive, appear much more eligible; the cerate of ſpermaceti will ſerve for general uſe; and for ſome particular purpoſes, the cerate of yellow reſin may be applied.

Cummin-plaſter. L.

617 Take of the ſeeds of cummin, ſeeds of caraway, bay-berries, each three ounces; Burgundy-pitch, three pounds; yellow wax, three ounces. Mix, with the melted pitch and wax, the reſt of the ingredients, powdered, and make a plaſter.

This plaſter ſtands recommended as a moderately warm diſcutient; and is directed by ſome to be applied to the hypogaſtric region, for ſtrengthening the viſcera, and expelling flatulencies: but it is a matter of great doubt, whether it derives any virtue either from the article from which it is named, or from the caraway or bay-berries which enter its compoſition.

Fetid, commonly called *antihyſteric*, *plaſter*. E.

618 Take of common plaſter, aſafœtida, ſtrained, each two parts; yellow wax, ſtrained galbanum, each one part. Mix, and make them into a plaſter.

This plaſter is applied to the umbilical region, or over the whole abdomen, in hyſteric caſes; and ſometimes with good effect; but probably more from its giving an additional degree of heat to the part, than from any influence derived from the fetid gums. It has indeed been alleged that from the application of this plaſter to the abdomen, the taſte of aſafœtida can be diſtinctly perceived in the mouth; and it is not improbable, that ſome abſorption of its active parts may take place by the lymphatic veſſels of the ſurface; while, at the ſame time, the aſafœtida thus applied muſt conſtantly, in ſome degree, act on the nerves of the noſe. But, in both theſe ways, its influence can be inconſiderable only; and much more effect may be obtained from a very ſmall quantity taken internally. And we are on the whole inclined to think, that the addition of the fetid gums to the common plaſter is here more diſagreeable than uſeful

Ladanum plaſter. L.

619 Take of ladanum, three ounces; frankincenſe, one ounce; cinnamon powdered, expreſſed oil, called *oil of mace*, of each half an ounce; eſſential oil of ſpearmint, one dram. To the melted frankincenſe add firſt the ladanum, ſoftened by heat; then the oil of mace. Mix theſe afterwards with the cinnamon and oil of mint, and beat them together in a warm mortar into a plaſter. Let it be kept in a cloſe veſſel.

This has been conſidered as a very elegant ſtomach plaſter. It is contrived ſo as to be eaſily made occaſionally (for theſe kinds of compoſitions, on account of their volatile ingredients, are not fit for keeping), and to be but moderately adheſive, ſo as not to offend the ſkin, and that it may without difficulty be frequently taken off and renewed; which theſe ſorts of applications, in order to their producing any conſiderable effect, require to be. But after all, it probably acts more from the mere covering which it gives to the ſtomach, than from any of the articles abounding with eſſential oil which it contains.

Litharge-plaſter. L.

620 Take of litharge, in very fine powder, five pounds; olive-oil, a gallon. Boil them with a ſlow fire, in about two pints of water, conſtantly ſtirring until the oil and litharge unite, and have the conſiſtence of a plaſter. But it will be proper to add more boiling water, if the water that was firſt added be nearly conſumed before the end of the proceſs.

Common plaſter. E.

Take of litharge, one part; olive-oil, two parts; boil them, adding water, and conſtantly ſtirring the mixture till the oil and litharge be formed into a plaſter.

The heat in theſe proceſſes ſhould be gentle, and the matter kept conſtantly ſtirring, otherwiſe it ſwells up, and is apt to run over the veſſel. If the compoſition proves diſcoloured, the addition of a little white lead and oil will improve the colour.

Theſe plaſters, which have long been known under the name of *Diachylon*, are the common application in excoriations of the ſkin, ſlight fleſh wounds, and the like. They keep the part ſoft, and ſomewhat warm, and defend it from the air, which is all that can be expected in theſe caſes from any plaſter. Some of our induſtrious medicine-makers have thought theſe purpoſes might be anſwered by a cheaper compoſition, and accordingly have added a large quantity of common whitening and hogs lard: this, however, is by no means allowable, not only as is does not ſtick ſo well, but likewiſe as the lard is apt to grow rancid and acrimonious. The counterfeit is diſtinguiſhable by the eye.

Litharge plaſter with gum. L.

621 Take of litharge-plaſter, three pounds; ſtrained galbanum, eight ounces; turpentine, ten drams; frank incenſe three ounces. The galbanum and turpentine being melted with a ſlow fire, mix with them the powdered frankincenſe, and afterwards the litharge-plaſter melted with a very ſlow fire, and make a plaſter.

Gum-plaſter. E.

Take of common plaſter, eight parts; gum-ammoniacum ſtrained, ſtrained galbanum, yellow wax, each one part. Make them into a plaſter according to art.

Both theſe plaſters are uſed as digeſtives and ſuppuratives; particularly in abſceſſes, after a part of the matter has been maturated and diſcharged, for ſuppurating or diſcuſſing the remaining hard part; but it is very doubtful whether they derive any advantage from the gums entering their compoſition.

Litharge-plaſter with quickſilver. L.

622 Take of litharge-plaſter, one pound; purified quickſilver, three ounces; ſulphurated oil, one dram, or what is ſufficient. Make the plaſter in the ſame manner as the ammoniacum-plaſter with quickſilver.

Mercurial or blue plaſter. E.

Take of olive-oil, white reſin, each one part; quickſilver, three parts; common plaſter, ſix parts. Melt the oil and reſin together, and when this mixture is cold, let the quickſilver be rubbed with it till the globules diſappear; then add by degrees the common plaſter, melted, and let the whole be accurately mixed.

Theſe mercurial plaſters are looked on as powerful reſolvents and diſcutients, acting with much greater certainty for theſe intentions than any compoſition of vegetable ſubſtances alone; the mercury exerting itſelf in a conſiderable degree, and being ſometimes introduced into the habit in ſuch quantity as to affect the mouth. Pains in the joints and limbs from a venereal cauſe, nodes, tophi, and beginning indurations of the glands, are ſaid ſometimes to yield to them.

Litharge plaſter with reſin. L.

623 Take of litharge-plaſter, three pounds; yellow reſin, half a pound. Mix the powdered reſin, with litharge plaſter, melted with a very ſlow fire, and make a plaſter.

Sticking plaſter. E.

Take of common plaſter, five parts; white reſin, one part. Melt them together ſo as to make a plaſter.

Theſe plaſters are uſed chiefly as adheſives for keeping on other dreſſings, &c.

Plaſter of Burgundy pitch. L.

624 Take of Burgundy pitch, two pounds; ladanum, one pound; yellow reſin, yellow wax, of each four ounces; the expreſſed oil, commonly called the *oil of mace*, one ounce. To the pitch, reſin, and wax, melted together, add firſt the ladanum, and then the oil of mace.

This plaſter was at one time much celebrated under the title of *cephalic plaſter*, the name which it formerly held in our pharmacopœias. It was applied in weakneſs or pains of the head, to the temples, forehead, &c. and ſometimes likewiſe to the feet. Schulze relates, that an inveterate rheumatiſm in the temples, which at times extended to the teeth, and occaſioned intolerable pain, was completely cured in two days by a plaſter of this kind (with the addition of a little opium) applied to the part, after many other remedies had been tried in vain. He adds, that a large quantity of liquid matter exuded under the plaſter in drops, which were ſo acrid as to corrode the cuticle: but it is probable, that this was much more the effect of the Burgundy pitch than of any other part of the compoſition; for when applied to a very tender ſkin, it often produces even veſication, and in moſt inſtances operates as rubefacient or hot plaſter: and as far as it has any good effect in headach, it is probable that its influence is to be explained on this ground.

Soap-plaſter. L.

625 Take of ſoap, half a pound; litharge-plaſter, three pounds; mix the ſoap with the melted litharge plaſter, and boil them to the thickneſs of a plaſter.

Saponaceous plaſter. E.

Take of common plaſter, four parts; gum-plaſter, two parts; Caſtile ſoap, ſcraped, one part. To the plaſters, melted together, add the ſoap; then boil for a little, ſo as to form a plaſter.

Theſe plaſters have been ſuppoſed to derive a reſolvent power from the ſoap; and in the laſt, the addition of the gums is ſuppoſed to promote the reſolvent virtue of the ſoap: but it is a matter of great doubt, whether they derive any material advantage from either addition.

Frankincenſe plaſter. L.

626 Take of frankincenſe, half a pound; dragon's blood, three ounces; litharge-plaſter two pounds. To the melted litharge-plaſter add the reſt, powdered.

This plaſter had formerly in the London pharmacopœia the title of *ſtrengthening plaſter*, and is a reformation of the complicated and injudicious compoſition deſcribed in the former pharmacopœias, under the title of *Emplaſtrum ad herniam*. Though for the moſt elegant and ſimple, it is as effectual for that purpoſe as any of the medicines of this kind. If conſtantly worn with a proper bandage, it, in children, frequently does ſervice; thought, perhaps, not ſo much from any ſtrengthening quality of the ingredients, as from its being a ſoft, cloſe, and adheſive covering. It has been ſuppoſed that plaſters compoſed of ſtyptic medicines conſtringe and ſtrengthen the part to which they are applied, but on no very juſt foundation; for plaſters in general relax rather than aſtringe, the unctuous ingredients neceſſary in their compoſition counteracting and deſtroying the effect of the others.

Defenſive or ſtrengthening plaſter. E.

627 Take of common plaſter, twenty-four parts; white reſin, ſix parts; yellow-wax, oil olive, each three parts; colcothar of vitriol, eight parts. Grind the colcothar with the oil, and then add it to the other ingredients previouſly melted.

This plaſter is laid round the lips of wounds and ulcers over the other dreſſings, for defending them from inflammation and a fluxion of humours; which, however, as Mr Sharp very juſtly obſerves, on account of their conſiſtence, tend rather to bring on than to prevent. It is alſo uſed in weakneſſes of the large muſcles, as of the loins; and its effects ſeem to proceed from the artificial mechanical ſupport given to the part, which may alſo be done by any other plaſter that adheres with equal firmneſs.

Deadly night-ſhade plaſter. Brun.

628 Take of the juice of the recent herb of belladonna, linſeed oil, each nine ounces; yellow-wax, ſix ounces; Venice turpentine, ſix drams; powder of the herb of belladonna, two ounces. Let them be formed into a plaſter according to art.

There can be no doubt that the belladonna, externally applied, has a very powerful influence, both on the nerves and blood veſſels of the part; and thus it has very conſiderable effect both on the circulation and ſtate of ſenſibility of the part; and when applied under the form of this plaſter, eſpecially in affections of the mammæ and ſcrotum, it has been ſaid to have very powerful influence in alleviating pain, in diſcuſſing tumors, and in promoting a favourable ſuppuration. It has however been but little employed in this country; and we can ſay nothing of it from our own experience.

Corn-plaſter. Dan.

629 Take of galbanum, diſſolved in vinegar, and again inſpiſſated, one ounce; pitch, half an ounce; diachylon, or common plaſter, two drams. Let them be melted together; and then mix with them verdegris powdered, ſal ammoniac, each one ſcruple; and make them into a plaſter.

Of this plaſter, as well as the former, we can ſay nothing from our own experience. It has been celebrated for the removal of corns, and for alleviating the pain which they occaſion; and it is not improbable that it may ſometimes have a good effect from the corroſive articles which it contains: but in other caſes, from this very circumſtance, it may tend to aggravate the pain, particularly in the firſt inſtance.

Hemlock plaſter. Suec.

630 Take of yellow wax, half a pound; oil olive, four ounces; gum ammoniacum, half an ounce; after they are melted together, mix with them powdered herb of hemlock, half a pound.

This correſponds very nearly with the Emplaſtrum de cicuta cum ammoniaco, which had formerly a place in our pharmacopœias, and was ſuppoſed to be a powerful cooler and diſcutient, and to be particularly ſerviceable againſt ſwellings of the ſpleen and diſtenſions of the hypochondres. For ſome time paſt, it has been among us entirely neglected; but the high reſolvent power which Dr Stoerk has diſcovered in hemlock, and which he found it to exert in this as well as in other forms, intitle it to further trials. The plaſter appears very well contrived, and the additional ingredients well choſen for aſſiſting the efficacy of the hemlock.

Corroſive plaſter. Gen.

631 Take of corroſive ſublimate mercury half a dram; hog's lard, half an ounce: yellow wax, two drams. Mix them together according to art.

There can be no doubt that the muriated mercury here employed is a very powerful corroſive; and there may be ſome caſes in which it is preferable to other articles of the tribe of cauſtics: but this would ſeem to be a very uneconomical mode of applying it, as but a very ſmall portion of what enters the plaſter can act; and even that portion muſt have its action much reſtrained by the unctous matters with which it is combined.

Plaſter of fenugreek or of *mucilages.* Gen.

632 Take of fenugreek-ſeed, two ounces; linſeed-oil, warm, half a pound. Infuſe them according to art, and ſtrain; then take of yellow wax, two pounds and an half; gum ammoniac, ſtrained, ſix ounces; turpentine two ounces. Melt the gum ammoniac with the turpentine, and by degrees add the oil and wax, melted in another veſſel, ſo as to form a plaſter.

This plaſter had formerly a place in our pharmacopœias, but was rejected; and although ſtill held in eſteem by ſome, it is probably of no great value; at leaſt it would ſeem to derive but little either from the fenugreek ſeed, with which it is now made, or from the oil and mucilages which formerly entered into its compoſition.

Henbane plaſter. Suec.

633 This is directed to be prepared in the ſame manner as the emplaſtrum e conio, or hemlock-plaſter.

From the well-known ſedative power of this plant, as affecting the nervous energy of the part to which it is applied, we might reaſonably conclude that good effects might be obtained from it when uſed under the form of plaſter: and accordingly it has been with advantage employed in this manner, for allaying pain, and reſolving ſwelling, in caſes of ſcirrhus and cancer.

Pitch plaſter. Roſſ.

634 Take of white reſin, ſix ounces; ſhip-pitch, ſeven ounces; yellow wax, five ounces. Melt them and form them into a plaſter.

Pitch, applied externally, has been ſuppoſed to act on two principles, by its warmth and by its adheſive quality,

quality. In the former way it may have ſome effect; but it has much more influence in the latter; and particularly it has thus been found to produce a cure in caſes of tinea capitis. When a pitch plaſter is applied to the affected part of the hairy ſcalp, and allowed to remain there for a few days, it becomes ſo attached to the parts, that it cannot be removed without bringing with it the bulbs of the hair in which the diſeaſe is ſeated: and by this means a radical cure is not unfrequently obtained, after every other remedy has been tried in vain. But the cure is a painful one, and not without danger: for in ſome inſtances, inflammations, even of an alarming nature, have been excited by the injury thus done to the parts. Hence this mode of cure is rarely had recourſe to till others have been tried without effect; and when it is employed, if the diſeaſe be extenſive, prudent practitioner's direct its application only to a ſmall portion at a time, the ſize of a crown piece or ſo: and after one part is fully cured, by application to another in ſucceſſion, the affection may be ſoon completely overcome. With this intention it is moſt common to employ the pitch in its pure ſtate: but the plaſter here directed, while it is no leſs adheſive, is more manageable and flexible.

Chap. XXXII. *Ointments and Liniments.*

635 Ointments and liniments differ from plaſters little otherwiſe than in conſiſtence. Any of the officinal plaſters, diluted with ſo much oil as will reduce it to the thickneſs of ſtiff honey, forms an ointment: by farther increaſing the oil, it becomes a liniment.

In making theſe preparations, the Edinburgh college direct, that fat and reſinous ſubſtances are to be melted with a gentle heat; then to be conſtantly ſtirred, ſprinkling in at the ſame time the dry ingredients, if any ſuch are ordered, in the form of a very fine powder, till the mixture on diminiſhing the heat becomes ſtiff.

It is to be underſtood that the above general directions are meant to apply to each particular compoſition contained in the preſent edition of the Edinburgh pharmacopœia. It is alſo to be obſerved, that where any compoſitions are ordered, as baſes or ingredients of others, the college always refer to thoſe made according to their own formula.

Ointment of hog's lard. L.

636 Take of prepared hog's lard, two pounds; roſe water, three ounces. Beat the lard with the roſe-water until they be mixed; then melt the mixture with a ſlow fire, and ſet it apart that the water may ſubſide; after which pour off the lard from the water, conſtantly ſtirring until it be cold:

In the laſt edition of London pharmacopœia, this was ſtyled *Unguentum ſimplex*, the name given by the Edinburgh college to the following.

Simple ointment. E.

Take of olive oil, five parts; white wax, two parts.

Both thoſe ointments may be uſed for ſoftening the ſkin and healing chaps. The laſt is, however, preferable, on account of its being of one uniform, conſiſtence. For the ſame reaſon it is alſo to be preferred as the baſis of other more compounded ointments.

Ointment of verdegris. E.

637 Take of baſilicon ointment, fifteen parts; verdegris, one part.

This ointmen is uſed for cleanſing ſores, and keeping down fungous fleſh. Where ulcers continue to run from a weakneſs in the veſſels of the part, the tonic powers of copper promiſe conſiderable advantage.

It is alſo frequently uſed with advantage in caſes of ophthalmia, depending on ſcrofula, where the palpebræ are principally affected, but when it is to be thus applied it is in general requiſite that it ſhould be ſomewhat weakened by the addition of a proportion of ſimple ointment or hog's lard. An ointment ſimilar to the above, and celebrated for the cure of ſuch inſtances of ophthalmia, has long been ſold under the name of *Smellon's eye-ſalve.*

Ointment of the white calx of quickſilver. L.

638 Take of the white calx of quickſilver, one dram; ointment of hog's lard, one ounce and a half. Mix, and make an ointment.

This is a very elegant mercurial ointment, and frequently uſed in the cure of obſtinate and cutaneous affections. It is an improvement of the ointment of precipitated mercury of the laſt London pharmacopœia; the precipitated ſulphur being thrown out of the compoſition, and the quantity of mercury increaſed.

Ointment of calx of zinc. E.

639 Take of ſimple liniment, ſix parts; calx of zinc, one part.

This ointment is chiefly uſed in affections of the eyes, particularly in thoſe caſes where redneſs ariſes rather from relaxation than from active inflammation.

Ointment of Spaniſh flies. L.

640 Take of Spaniſh flies, powdered, two ounces; diſtilled water eight ounces, ointment of yellow reſin, eight ounces. Boil the water with the Spaniſh flies to one half, and ſtrain. To the ſtrained liquor add the ointment of yellow reſin. Evaporate this mixture in a water-bath, ſaturated with ſea-ſalt, to the thickneſs of an ointment.

Epiſpaſtic ointment from infuſion of cantharides. E.

Take of cantharides, white reſin, yellow wax, each one ounce; hog's lard, Venice turpentine, each two ounces; boiling water, four ounces. Infuſe the cantharides in the water, in a cloſe veſſel, for a night; then ſtrongly preſs out and ſtrain the liquor, and boil it with the lard till the water be conſumed; then add the reſin, wax, and turpentine, and make the whole into an ointment.

Theſe ointments, containing the ſoluble parts of the cantharides uniformly blended with the other ingredients, are more commodious, in general occaſion leſs pain, and are no leſs effectual in ſome caſes, than the compoſitions with the fly in ſubſtance. This, however, does not uniformly hold; and accordingly the Edinburgh college, with propriety, ſtill retain an ointment containing the flies in ſubſtance.

Epiſpaſtic ointment, from powder of cantharides. E.

641 Take of baſilicum ointment, ſeven parts; powdered cantharides, one part.

This ointment is employed in the dreſſings for bliſters, intended to be made *perpetual*, as they are called, or to be kept running for a conſidarable time, which in many chronic, and ſome acute caſes, is of great ſervice. Particular care ſhould be taken, that the cantharides employed in theſe compoſitions be reduced to a very fine powder, and that the mixture be made as equal and uniform as poſſible. But with theſe precautions, there are ſome particular habits in which this ointment operates with even leſs pain than the former, while at the ſame time it is generally more effectual.

Wax ointment. L.

642 Take of white wax, four ounces; ſpermaceti, three ounces; olive-oil, one pint. Stir them, after being melted with a ſlow fire, conſtantly and briſkly, until cold.

This ointment had formerly the title of *unguentum album* in the London pharmacopœia. It differs very little from the ſimple ointment of the Edinburgh pharmacopœia, and in nothing from the ointment of ſpermaceti of the London pharmacopœia, excepting that in this ointment the proportion of ſpermaceti is ſomewhat leſs. It is an uſeful cooling ointment for excoriations and other frettings of the ſkin.

Ointment of acetated ceruſe. L.

643 Take of acetated ceruſe, two drams; white wax, two ounces; olive-oil, half a pint. Rub the acetated ceruſe, previouſly powdered, with ſome part of the olive oil; then add it to the wax, melted with the remaining oil. Stir the mixture until it be cold.

Saturnine ointment. E.

Take of ſimple ointment, twenty parts; ſugar of lead, one part.

Both theſe ointments are uſeful coolers and deſiccatives; much ſuperior both in elegance and efficacy to the *nutritum* or *tripharmacum*, at one time very much celebrated.

Ointment of ceruſe, commonly called *white ointment*. E.

644 Take of ſimple ointment, five parts; ceruſe, one part.

This is an uſeful, cooling emollient ointment, of great ſervice in excoriations and other ſimilar frettings of the ſkin. The ceruſe has been objected to by ſome, on a ſuſpicion that it might produce ſome ill effects, when applied, as theſe unguents frequently are, to the tender bodies of children. Though there does not ſeem to be much danger in this external uſe of ceruſe, the addition of it is the leſs neceſſary here, as we have another ointment containing a more active preparation of the ſame metal, the ſaturnine ointment juſt mentioned; which may be occaſionally mixed with this, or employed by itſelf, in caſes where ſaturnine applications are wanted.

Ointment of elemi. L.

Take of elemi, one pound; turpentine, ten ounces; mutton-ſuet, prepared, two pounds; olive-oil, two ounces. Melt the elemi with the ſuet; and having removed it from the fire, mix it immediately with the turpentine and oil, after which ſtrain the mixture. 645

This ointment, perhaps beſt known by the name of *linimentum arcei* has long been in uſe for digeſting cleanſing, and incarnating; and for theſe purpoſes is preferred by ſome to all the other compoſitions of this kind.

Theſe however, are much more proceſſes of nature than of art: and it is much to be doubted whether it has in reality any influence.

Ointment of white hellebore. L.

Take of the root of white hellebore, powdered, one ounce; ointment of hog's lard, four ounces; eſſence of lemons, half a ſcruple. Mix them, and make an ointment. 646

White hellebore externally applied has long been celebrated in the cure of cutaneous affections; and this is perhaps one of the beſt formulæ under which it can be applied, the hog's lard ointment ſerving as an excellent baſis for it, while the eſſence of lemons communicates to it a very agreeable ſmell.

Stronger ointment of quickſilver. L.

Take of purified quickſilver, two pounds; hog's lard, prepared, twenty-three ounces; mutton-ſuet, prepared, one ounce. Firſt rub the quickſilver with the ſuet and a little of the hog's lard, until the globules diſappear; then add what remains of the lard, and make an ointment. 647

Weaker ointment of quickſilver. L.

Take of the ſtronger ointment of quickſilver, one part: hog's lard, prepared, two parts. Mix them.

Quickſilver or *blue ointment.* E.

Take of quickſilver, mutton ſuet, each one part; hog's lard, three parts. Rub them carefully in a mortar till the globules entirely diſappear.

This ointment may alſo be made with double or triple the quantity of quickſilver.

Theſe ointments are principally employed, not with a view to their topical action, but with the intention of introducing mercury in an active ſtate into the circulating ſyſtem. And this may be effected by gentle friction on the ſound ſkin of any part, particularly on the inſide of the thighs or legs. For this purpoſe, theſe ſimple ointments are much better ſuited than the more compounded ones with turpentine and the like, formerly employed. For by any acrid ſubſtance topical inflammation is apt to be excited, preventing farther friction, and giving much uneaſineſs. To avoid this it is neceſſary, even with the mildeſt and weakeſt ointment, ſomewhat to change the place at which the friction is performed. But by theſe ointments properly managed, mercury may in ſome inſtances be as advantageouſly introduced, either for eradicating ſyphilis

lis, or combating other obſtinate diſeaſes as under any form whatever. But to obtain theſe effects, it is requiſite that the ointment ſhould be prepared with very great care; for upon the degree of triture which has been employed, the activity of the mercury muſt entirely depend. The addition of the mutton-ſuet, now adopted by both colleges, as an advantage to the ointment, as it prevents it from running into the ſtate of oil, which the hog's lard alone in warm weather, or in a warm chamber, is ſometimes apt to do, and which is followed by a ſeparation of parts. We are even inclined to think, that the proportion of ſuet directed by the London college is too ſmall for this purpoſe, and indeed ſeems to be principally intended for the more effectual triture of the mercury: But it is much more to be regretted, that, in a medicine of activity, the two colleges ſhould not have directed the ſame proportion of mercury to the fatty matter. For although both have directed ointments of different ſtrength, neither the weakeſt nor the ſtrongeſt agree in the proportion of mercury which they contain.

Ointment of nitrated quickſilver.

648 Take of purified quickſilver, one ounce; nitrous acid, two ounces; hogs lard, prepared, one pound. Diſſolve the quickſilver in the nitrous acid; and, while it is yet hot, mix it with the hog's lard, previouſly melted, and juſt growing cold.

Yellow ointment. E.

Take of quickſilver, one ounce; ſpirit of nitre, two ounces; hog's lard, one pound. Diſſolve the quickſilver in the ſpirit of nitre, by digeſtion in a ſand-heat: and, while the ſolution is very hot, mix with it the lard, previouſly melted by itſelf, and juſt beginning to grow ſtiff. Stir them briſkly together, in a marble mortar, ſo as to form the whole into an ointment.

Theſe ointments differ only in name; and that employed by the London college is certainly the preferable appellation: For here the quickſilver, previous to its union with the lard, is brought to a ſaline ſtate by means of the nitrous acid. And although its activity be very conſiderably moderated by the animal fat with which it is afterwards united, yet it ſtill affords us a very active ointment; and as ſuch it is frequently employed with ſucceſs in cutaneous and other topical affections. In this condition, however, the mercury does not ſo readily enter the ſyſtem as in the preceding form. Hence it may even be employed in ſome caſes with more freedom; but in other inſtances it is apt to excoriate and inflame the parts. On this account a reduction of its ſtrength is ſometimes requiſite; and it is often alſo neceſſary, from the hard conſiſtence which it acquires, in conſequence of the action of acid on the lard.

Tar ointment.

649 Take of tar, mutton ſuet prepared, each half a pound. Melt them together and ſtrain. L.

Take of tar, five parts; yellow wax two parts. E.

Theſe compoſitions, though the one beformed into an ointment by means of ſuet, the other by wax, cannot be conſidered as differing eſſentially from each other. As far as they have any peculiar activity, this entirely depends on the tar. And this article, from the empyreumatic oil and ſaline matters which it contains, is undoubtedly, as well as turpentine, of ſome activity. Accordingly, it has been ſucceſsfully employed againſt ſome cutaneous affections, particularly thoſe of domeſtic animals. At one time, as well as the black baſilicon, it was a good deal employed as a dreſſing even for recent wounds. But although it ſtill retains a place in our pharmacopœias, it is at preſent little uſed with any intention.

Ointment of yellow reſin. L.

Take of yellow reſin, yellow wax, each one pound; olive oil, one pint. Melt the reſin and wax with a ſlow fire: then add the oil, and ſtrain the mixture while hot. 650

Baſilicon ointment. E.

Take of hog's lard, eight parts; white reſin, five parts; yellow wax, two parts.

Theſe are commonly employed in dreſſings, for digeſting, cleanſing, and incarnating wounds and ulcers. They differ very little, if at all, in their effects, from the *linimentum arcæi*, or ointment of elemi, as it is now more properly ſtyled. But it is probable that no great effect is to be attributed to either: For there can be no doubt that the ſuppurative and adheſive inflammations are proceſſes of nature, which will occur without the aid of any ointment.

Elder ointment. L.

Take of elder flowers, four pounds; mutton-ſuet, prepared, three pounds; olive-oil, one pint. Boil the flowers in the ſuet and oil, firſt melted together, till they be almoſt criſp; then ſtrain with expreſſion. 651

This ointment does not ſeem ſuperior to ſome others, which are much neater, and leſs expenſive. It can ſcarcely be ſuppoſed to receive any conſiderable virtue from the ingredient from which it takes its name. And accordingly it is not without propriety that it is rejected from the pharmacopœia of the Edinburgh college.

Ointment of ſpermaceti. L.

Take of ſpermaceti, ſix drams; white wax, two drams; olive-oil, three ounces. Melt them together over a ſlow fire, ſtirring them conſtantly and briſkly until they be cold. 652

This had formerly the name of *white liniment*, and it is perhaps only in conſiſtence that it can be conſidered as differing from the ſimple ointment already mentioned, or the ſimple cerate afterwards to be noticed.

Sulphur ointment. L.

Take of ointment of hog's lard, half a pound; flowers of ſulphur, four ounces. Mix them, and make an ointment. 653

Ointment of ſulphur, or *antipſoric ointment.* E.

Take of hogs lard, four parts; ſulphur, beat into a very fine powder, one part. To each pound of this ointment add eſſence of lemons, or oil of lavender, half a dram.

Sulphur is a certain remedy for the itch, and ſafer than mercury. Sir John Pringle obſerves, that unleſs a mercurial unction was to touch every part of the ſkin, there can be no certainty of ſucceſs: whereas from a ſulphureous one, a cure may be obtained by only partial unction; the animalcula, which are ſuppoſed to occaſion this diſorder being like other inſects, killed by the ſulphureous ſteams which exhale by the heat of the body. As to the internal uſe of mercury, which ſome have accounted a ſpecific, there are ſeveral inſtances of men undergoing a complete ſalivation for the cure of the lues venerea, without being freed from the itch; but there are alſo a multitude of inſtances of men undergoing a long courſe of ſulphur without effect, and who were afterward readily cured by mercury.

The quantity of ointment, above directed, ſerves for four unctions: the patient is to be rubbed every night; but to prevent any diſorder that might ariſe from ſtopping too many pores at once, a fourth part of the body is to be rubbed at one time. Though the itch may thus be cured by one pot of ointment, it will be proper to renew the application, and to touch the parts moſt affected for a few nights longer, till a ſecond quantity alſo be exhauſted: and in the worſt caſes, to ſubjoin the internal uſe of ſulphur, not with a view to purify the blood, but to diffuſe the ſteams more certainly through the ſkin: there being reaſon to believe, that the animalcula may ſometimes lie too deep to be thoroughly deſtroyed by external applications.

Tutty ointment.

654 Take of prepared tutty one dram; ointment of ſpermaceti, what is ſufficient. Mix them ſo as to make a ſoft ointment. L.

Take of ſimple liniment, five parts; prepared tutty, one part. *E.*

Theſe ointments have long been celebrated, and are ſtill much employed againſt affections of the eyes. But they cannot, we imagine, be eſteemed elegant.

Both calamine and tutty act only by means of the zinc they contain, and calamine appears to contain the moſt of the two, and likewiſe to be the leaſt variable in its contents. But the pure flowers prepared from zinc itſelf are doubtleſs preferable to either. Hence the ointment of tutty may be conſidered as inferior to both the ointment of calamine and to the ointment of the calx of zinc, which have alſo a place in our pharmacopœia.

Simple liniment. L.

655 Take of olive oil, four parts; white wax, one part.

This conſiſts of the ſame articles which form the ſimple ointment of the Edinburgh pharmacopœia, but merely in a different proportion, ſo as to give a thinner conſiſtence; and where a thin conſiſtence is requiſite, this may be conſidered as a very elegant and uſeful application.

Liniment of ammonia.

656 Take of water of ammonia, half an ounce; olive-oil, one ounce and a half. Shake them together in a phial till they are mixed.

This has long been known in the ſhops under the title of *volatile liniment*, but is now more properly denominated from the principal active article, which enters its compoſition. It has been much employed in practice, particularly on the recommendation of Sir John Pringle in his Obſervations on the Diſeaſes of the Army. He obſerves, that, in the inflammatory quinſey, or ſtrangulation of the fauces, a piece of flannel, moiſtened with this mixture, applied to the throat, and renewed every four or five hours, is one of the moſt efficacious remedies. By means of this warm ſtimulating application, the neck, and ſometimes the whole body is put into a ſweat, which after bleeding either carries off or leſſens the inflammation. Where the ſkin cannot bear the acrimony of this mixture, a larger proportion of oil may be uſed.

Stronger liniment of ammonia.

Take of water of pure ammonia, one ounce; olive oil, two ounces. Shake them together in a phial. 657

This article differs from the foregoing in ſtrength only. This ariſes both from its being formed of a more acrid ſpirit, and from its containing that ſpirit in a larger proportion to the oil. It is uſed to ſupply the place of the *epithema et emplaſtrum volatile* of our former pharmacopœias, and is a very acrid ſtimulating compoſition. When largely applied, if often excites inflammation, and even veſication, on tender ſkin. It is often however ſucceſsfully employed againſt obſtinate rheumatic and iſchiadic pains.

Camphor liniment. L.

Take of camphor, two ounces; water of ammonia, ſix ounces; ſimple ſpirit of lavender, ſixteen ounces. Mix the water of ammonia with the ſpirit, and diſtil from a glaſs retort, with a ſlow fire, ſixteen ounces. Then diſſolve the camphor in the diſtilled liquor. 658

This formula, which has now for the firſt time a place in the London pharmacopœia, approaches to the volatile eſſence of that celebrated empyric the late Dr Ward: But the above is a more elegant and active formula than either of the receipts publiſhed by Mr Page, from Dr Ward's book of receipts; and there is no reaſon to doubt that it will be equally effectual in removing ſome local pains, ſuch as particular kinds of headach, in conſequence of external appplication.

Soap liniment. L.

Take of ſoap, three ounces; camphor, one ounce; ſpirit of roſemary, one pint. Digeſt the ſoap in the ſpirit of roſemary until it be diſſolved, and add to it the camphor. 659

This is the ſoap liniment of the former edition of the London pharmacopœia, without any alteration; and it differs very little from the ſoap-balſam of the Edinburgh college already mentioned. Though a leſs active and penetrating application than the preceding, it is perhaps no leſs uſeful: and it is often ſucceſsfully employed for external purpoſes againſt rheumatic pains, ſprains bruiſes, and ſimilar complaints.

Egyptian ointment. Gen.

660 Take of honey, one pound: ſtrong vinegar half a pound; verdegris, powdered, five ounces. Let the ingredients be boiled together till the verdegris be diſſolved, ſo that the ointment may have a due degree of thickneſs and a purple colour.

This preparation had formerly a place in our pharmacopœias under the title of *Egyptian honey*: and a ſimilar preparation has now a place under the title of *oxymel of verdegris*. But in that formula, the proportion is much leſs than in the above. It may juſtly be conſidered as a very powerful application for cleanſing and deterging foul ulcers, as well as for keeping down fungous fleſh. But theſe purpoſes may in general be anſwered by articles leſs acid, and exciting leſs pain. Beſides this, the above preparation is alſo liable to conſiderable uncertainty with reſpect to ſtrength; for a large proportion of the verdegris will in a ſhort time ſubſide to the bottom; thus, what is in the top of the pot is much leſs active than that in the bottom.

Anodyne ointment. Gen.

661 Take of olive-oil, ten drams; yellow wax, half an ounce; crude opium, one dram. Mix them according to art, ſo as to form an ointment.

Opium thus externally applied, will in ſome degree be productive of the ſame effect as when uſed under the form of the anodyne balſam. In that ſtate it produces its effects more immediately; but under the preſent form its effects are more permanent. Beſides this, the preſent ointment furniſhes us with an uſeful dreſſing for ſores attended with ſevere pain: to which opium when diſſolved in ſpirit cannot be applied. Hence the preſent, or ſome analagous formula, is well intitled to a place in our pharmacopœias.

Ointment for an ulcerated cancer. Brun.

662 Take of the recently expreſſed juice of the ricinus, one pound: let it be expoſed to the rays of the ſun in a leaden veſſel till it acquire the conſiſtence of an oil; then to one pound of this inſpiſſated juice add calcined lead, white precipitate mercury, each one pound. Let them be properly mixed.

This acrid application muſt poſſeſs a conſiderable degree of corroſive power. And in ſome caſes of cancer, by the proper application of corroſives much benefit may be done: But where the diſeaſe has made any conſiderable progreſs, theſe will in general have the effect rather of haſtening its progreſs than of removing it; particularly if there be a large indolent tumor below the ulcer.

Digeſtive ointment. Roſſ.

663 Take of Venice turpentine, one pound; the yolks of eight eggs. Mix them together according to art.

This warm ſtimulating application is well ſuited to promote the ſupurative inflammation, and may be advantageouſly had recourſe to, where it is neceſſary to encourage a large diſcharge of pus.

Hæmorrhoidal ointment.

664 Take of ſaturnine ointment, ſix drams; oil of hyoſcyamus, obtained by boiling, two drams; camphor, powdered, two ſcruples; ſaffron one, ſcruple. Mix them into an ointment.

The name affixed to this ointment expreſſes the purpoſe for which it is applied. From the articles of which it conſiſts, it may be concluded, that it poſſeſſes a gently emollient and anodyne power; and may therefore afford conſiderable relief, where much pain ariſes from external hæmorrhoidal tumors.

Laurel ointment. Suec.

665 Take of prepared mutton-ſuet, eight ounces. After it is melted and removed from the fire, add to it oil of bays, one pound; ethereal oil of turpentine, one ounce: rectified oil of amber, half an ounce. Let them be mixed and rubbed together till they form an ointment.

This is an improved mode of forming an ointment which had formerly a place in our pharmacopœias under the title of *nervine ointment*. And it furniſhes a warm ſtimulating nervine application, which may in ſome degree reſtore ſenſe and motion to paralytic limbs. And while it at leaſt ſerves to lead to the careful uſe of friction, it may ſomewhat increaſe the benefit which would reſult from it.

Ointment of tobacco. Dan.

666 Take of the leaves of tobacco, three pounds; juice of tobacco, nine ounces; hog's lard, a pound and a half; reſin, three ounces. Let the cut leaves be macerated for the ſpace of a night, and then boiled over a gentle fire. Having ſtrained the fluid obtained by expreſſion, add to it yellow wax, half an ounce; powder of the root of birthwort, three ounces. Mix them into an ointment.

There can be no doubt that tobacco externally applied has very powerful effects on the human body; and that not merely from its topical action, but ſometimes even as affecting the ſyſtem in general. From this laſt circumſtance it requires to be uſed with great caution. It has, however, been found, under proper management, to afford an effectual cure in obſtinate cutaneous affections. But were it to be uſed with this intention, we would have a more elegant formula, by merely impregnating either hog's lard, or the ſimple ointment, with the active qualities extracted by the aid of heat from the leaves of the prepared tobacco in the ſtate in which it is uſually brought to us from America, than by having recourſe to the recent juice, and to the ariſtolochia and other additions here directed.

Ointment of ſtorax. Suec.

667 Take of olive oil, a pound and a half; white reſin, gum elemi, yellow wax, each ſeven ounces. After they are melted together and ſtrained, add liquid ſtorax, ſeven ounces. Mix them together, and agitate the mixture till it concretes into an uniform ointment.

An ointment ſuppoſed to derive its activity from the ſtorax, although it have no place in our pharmacopœias, is received into moſt of the foreign ones. And it has been much celebrated not only as a ſtrengthening application to weakly children, but even for the removal of affections of the bones, as in caſes of rachi-

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tis and the like. It is, however, very doubtful how far theſe properties depend on the ſtorax. If it have really any good effect, it is probable that this is more the conſequence of the friction merely, than of any of the articles which enter the compoſition of the ointment. But there is reaſon to believe that the virtues attributed to this ointment are more imaginary than real.

Onion ointment. Suec.

668 Take of yellow wax, reſin, each half a pound. To theſe melted, add onions roaſted under the aſhes, honey, each two pounds and a half; black ſoap, half a pound. Let them be gently boiled together till all the moiſture be conſumed, then ſtrain the liquor, expreſſing it from the materials, and afterwards agitate it with a wooden peſtle that it may unite into one uniform maſs.

This ointment is applied with the intention of promoting ſuppuration. And it has long been ſuppoſed, that the onion, eſpecially in its roaſted ſtate, has a remarkable influence in this way: but there is reaſon to think, that the powers attributed to it have been greatly over-rated. And there is even ground to preſume that theſe effects totally depend entirely on heat and moiſture. Hence no application is perhaps better ſuited for promoting ſuppuration than a poultice of bread and milk, applied as hot as can be borne with, and frequently repeated.

CHAP. XXXIII. *Cerates.*

669 CERATES are ſubſtances intended for external application, formed of nearly the ſame materials which conſtitute ointments and plaſters. And they differ principally from theſe in being merely of an intermediate conſiſtence between the two. Accordingly, they are ſeldom the ſubject of a ſeparate chapter by themſelves, but are claſſed either with the one or the other. In the Edinburgh pharmacopœia they are claſſed among the ointments; but as the London college have referred them to a ſeparate head, we ſhall here alſo conſider them by themſelves.

Simple cerate. E.

670 Take of olive oil, ſix parts; white wax, three parts; ſpermaceti, one part. Unite them according to art.

This differs from the ſimple ointment in containing a greater proportion of wax to the oil, and in the addition of the ſpermaceti. But by theſe means it obtains only a more firm conſiſtence, without any eſſential change of properties.

Cerate of cantharides, or *Spaniſh flies.* L.

671 Take of cerate of ſpermaceti, ſoftened with heat, ſix drams; Spaniſh flies, finely powdered, one dram. Mix them.

Under this form cantharides may be made to act to any extent that is requiſite. It may ſupply the place either of the bliſtering plaſter or ointment; and there are caſes in which it is preferable to either. It is particularly more convenient than the plaſter of cantharides, where the ſkin to which the bliſter is to be applied is previouſly much affected, as in caſes of ſmall-pox; and in ſupporting a drain under the form of iſſue, it is leſs apt to ſpread than the ſofter ointment.

Calamine cerate. L.

672 Take of calamine prepared, yellow wax, each half a pound; olive oil, one pint. Melt the wax with the oil; and, as ſoon as the mixture begins to thicken, mix with it the calamine, and ſtir the cerate until it be cold.

Cerate of Calamine. E.

Take of ſimple cerate, five parts; calamine prepared, one part.

Theſe compoſitions are formed on the cerate which Turner ſtrongly recommends in cutaneous ulcerations and excoriations, and which has been uſually diſtinguiſhed by his name. They appear from experience to be excellent epulotics, and as ſuch are frequently uſed in practice.

Cerate of acetated litharge. L.

673 Take of water of acetated litharge, two ounces and a half; yellow wax, four ounces; olive oil, nine ounces; camphor, half a dram. Rub the camphor with a little of the oil. Melt the wax with the remaining oil; and as ſoon as the mixture begins to thicken, pour in by degrees the water of acetated litharge, and ſtir conſtantly until it be cold; then mix in the camphor before rubbed with oil.

This application has been rendered famous by the recommendations of Mr Goulard. It is unqueſtionably in many caſes very uſeful. It cannot, however, be conſidered as varying eſſentially from the ſatumiſle ointment, or ointment of acetated ceruſe, formerly mentioned. It is employed with nearly the ſame intentions, and differs from it chiefly in conſiſtence.

Cerate of yellow reſin. L.

674 Take of ointment of yellow reſin, half a pound; yellow wax, one ounce. Melt them together, and make a cerate.

This had formerly the name of *lemon-ointment*. It is no otherwiſe different from the yellow baſilicum, or ointment of yellow reſin, than being of a ſtiffer conſiſtence, which renders it for ſome purpoſes more commodious.

Soap cerate. L.

675 Take of ſoap eight ounces: yellow wax, ten ounces; litharge, powdered, one pound; olive oil, one pint; vinegar, one gallon; boil the vinegar with the litharge over a ſlow fire, conſtantly ſtirring until the mixture unites and thickens; then mix in the other articles, and make a cerate.

This, notwithſtanding the name, may rather be conſidered as another ſaturnine application; its activity depending very little on the ſoap; and it may be held as varying in little elſe but conſiſtence from the plaſter of litharge. It can hardly be thought to differ in its properties from the cerate of acetated litharge juſt mentioned; for neither the ſmall proportion of camphor which enters the compoſition of the one, nor the ſoap which gives name to the other, can be conſidered as having much influence.

Cerate of ſpermaceti. L.

676 Take of ſpermaceti, half an ounce; white wax, two ounces; olive oil, four ounces. Melt them together, and ſtir until the cerate be cold.

This had formerly the name of *white cerate*, and it differs in nothing from the ointment of ſpermaceti, or white liniment, as it was formerly called, excepting in conſiſtence, both the wax and the ſpermaceti bearing a greater proportion to the oil.

Lip ſalve. Roſſ.

677 Take of olive oil, eighteen ounces; white wax, one pound; ſpermaceti, an ounce and a half; oil of rhodium, half a dram. Form a cerate, tinging it with alkanet, ſo as to give a red colour.

The name affixed to this cerate points out the uſe for which it is intended. It is chiefly employed againſt thoſe chops and excoriations of the lips, which are often the conſequence of cold weather; and it is very well ſuited for removing affections of that kind. But excepting in the colour and ſmell which it derives from the alkanet and rhodium, it differs in nothing from the cerate of ſpermaceti, and cannot be conſidered as more effectually anſwering the intention in view.

Bougies. Suec.

678 Take of yellow wax, melted one pound; ſpermaceti, three drams; vinegar of litharge, two drams. Mix them, and upon removal from the fire immerſe into the mixture ſlips of linen, of which bougies are to be formed according to the rules of art. Theſe may alſo be made with double, triple, or quadruple, the quantity of the vinegar.

It is perhaps rather ſurpriſing, that no formula for the preparation of bougies has a place in our pharmacopœias: for there can be no doubt, that although the preparation of them has hitherto been principally truſted to empirics; yet in the hand of the ſkilful practitioner they are of great ſervice in combating obſtinate affections. Although it has been pretended by ſome that their influence is to be aſcribed to certain impregnations; yet it is on better grounds contended, that they act entirely on mechanical principles. The great object is therefore to obtain the union of a proper degree of firmneſs and flexibility. Theſe qualities the above compoſition poſſeſſes; and it does not probably derive any material benefit from being prepared with an additional proportion of the vinegar of litharge.

CHAP. XXXIV. *Epithems.*

679 By epithems or cataplaſms are in general underſtood thoſe external applications which are brought to a due conſiſtence or form for being properly applied, not by means of oily or fatty matters, but by water or watery fluids. Of theſe not a few are had recourſe to in actual practice; but they are ſeldom prepared in the ſhops of the apothecaries; and in ſome of the beſt modern pharmacopœias no formulæ of this kind are introduced. The London college, however, although they have abridged the number of epithems, ſtill retain a few. And it is not without ſome advantage that there are fixed forms for the preparation of them.

Cataplaſm of cummin. L.

680 Take of cummin-ſeed, one pound; bay-berries, dry leaves of water-germander, or ſcordium, Virginian ſnake-root, of each three ounces; cloves, one ounce. Rub them all together; and, with the addition of three times the weight of honey, make a cataplaſm.

This is adopted into the preſent edition of the London pharmacopœia with a very little alteration from the laſt. It was then intended as a reformation of the *theriaca Londinenſis*, which for ſome time paſt has been ſcarcely otherwiſe uſed than as a warm cataplaſm. In place of the numerous articles which formerly entered that compoſition, only ſuch of its ingredients are retained as contribute moſt to this intention: but even the article from which it now derives its name, as well as ſeveral others which ſtill enter it, probably contribute very little to any medical properties it may poſſeſs.

Muſtard-cataplaſm. L.

681 Take of muſtard ſeed, powdered, crumb of bread, each half a pound; vinegar, as much as is ſufficient. Mix, and make a cataplaſm.

Epithems of this kind are commonly known by the name of *ſinapiſms*. They were formerly not unfrequently prepared in a more complicated ſtate, containing garlic, black-ſoap, and other ſimilar articles; but the above ſimple form will anſwer every purpoſe which they are capable of accompliſhing. They are employed only as ſtimulants: they often inflame the part and raiſe bliſters, but not ſo perfectly as cantharides. They are frequently applied to the ſoles of the feet in the low ſtate of acute diſeaſes, for raiſing the pulſe and relieving the head. The chief advantage they have depends on the ſuddenneſs of their action.

Alum-curd. L.

682 Take the whites of two eggs; ſhake them with a piece of alum till they be coagulated.

This preparation is taken from Riverius. It is an uſeful aſtringent epithem for ſore, moiſt eyes, and excellently cools and repreſſes thin defluctions. Slighter inflammations of the eyes, occaſioned by duſt, expoſure to the ſun, or other ſimilar cauſes, are generally removed by fomenting them with warm milk and water, and waſhing them with ſolutions of white vitriol. Where the complaint is more violent, this preparation, after the inflammation has yielded a little to bleeding, is one of the beſt external remedies. It is to be ſpread on lint, and applied at bed-time.

A TABLE, *ſhowing in what Proportions* MERCURY *or* OPIUM *enter different Formulæ.*

683 PULVIS *e creta compoſitus cum opio.* L. In about forty-four grains, one grain of opium is contained.

Pulvis ipecacuanhæ compoſitus. L. In ten grains, one grain of opium.

Pulvis ſudorificus. E. In eleven grains, one grain of opium.

Pulvis opiatus. L. In ten grains, one grain of opium.

Pulvis e ſcammonio cum calomelane. L. In four grains, one grain of calomel.

Pilula ex opio. L. In five grains, one grain of opium.

Pilulæ thebaicæ. E. In ten grains, one grain of opium.

Pilulæ ex hydrargyro. L. In two grains and a half, one grain of mercury.

Pilulæ ex hydrargyro. E. In four grains, one grain of mercury.

Pilulæ plummeri. E. In two grains and two-thirds, one grain of calomel.

Confectio opiata. L. In thirty-six grains, one grain of opium.

Electuarium Japonicum. E. In about one hundred and ninety-three grains, one grain of opium.

Electuarium Thebaicum. E. In ninety-ſeven grains, one grain of opium.

Trochiſci bechici cum opio. E. In fifty-five grains, one grain of opium.

Theſe trochiſci are not unfrequently ordered *cum duplice opio*, and under this form are kept in many ſhops.

Emplaſtrum ammoniacum cum hydrargyro. L. In five ounces, one ounce of mercury.

Emplaſtrum lythargyri cum hydrargyro. L. In five ounces, one ounce of mercury.

Emplaſtrum e hydrargyro. E. In three ounces and two-thirds, one ounce of mercury.

Unguentum hydrargyri fortius. L. In two drams, one dram of mercury.

Unguentum hydrargyri mitius. L. In five drams, one dram of mercury.

Unguentum ex hydrargyro. E. In five drams, one dram of mercury.

Unguentum hydrargyri nitrati. L. In one dram, four grains of nitrated quickſilver.

Unguentum citrinum. E. In one dram, four grains of nitrated quickſilver.

Unguentum calcis hydrargyri albæ. L. In one dram, four grains and two-thirds of the calx hydrargyri alba.

Tinctura opii (L.) is made with opium, in the proportion of one grain to about thirteen of the menſtruum.

Tinctura Thebaica (E.) is made with opium, in the proportion of one grain to twelve of the menſtruum.

Tinctura opii camphorata (L.) is made with opium, in the proportion of one grain to two hundred and ſixty of the menſtruum.

Elixir paregoricum (E.) is made with opium, in the proportion of one grain to ſixty-eight of the menſtruum.

Balſamum anodynum (E.) is made with opium, in the proportion of one grain to about thirty of the menſtruum.

INDEX.

ACETATED litharge, compound water of, n° 610. Cerate of, 673. Ointment of acetated ceruſe, 643.
Acetous fermentation, 16, 17. Acid, 202.
Aerated water, 205.
Aethiops martial, 281. Mineral, 300.
Acid, carbonic, 12. Account of the various acids, 53. As menſtrua, 71. On various acids, 196—205. Acid julep, 490. Of ſyrup, 513.
Affinities, tables of, p. 290—294.
Air, fixed, nature of, n° 54.
Alcohol, 15. The menſtruum of eſſential oils and reſins of vegetables, 73.
Alexiterial water, 333.
Alkali, fixed vegetable, 24. Acetated fixed vegetable, 235. Tartarized vegetable, fixed, 239.
Alkaline ſalts and earths, &c. diſſolved by acids, 75. Lixivia diſſolve oils, &c. 76. Fixed vegetable purified, 211. Fixed foſſil *alkaline* ſalts, &c. 220. Syrup, 514.
All-ſpice water, 328. Spirit of, 362.
Almonds, oil of, n° 152. Milk 482. Syrup of, 516.
Aloes, watery extract of, 148. Wine of, 408. Tincture of, 421. Compound do. 422. Vitriolic elixir of do. 423. Elixir of, 458. Pills of, 571. Do. with myrrh, 572.
Aloetic wine, 408. Powder, 530. Do. with iron, 531. Do. with guaiacum, 532.
Alum, purification of, 242. Burnt, 243. Compound, water of, 607.
Amalgama of tin, 313.
Amber, oil and ſalt of, 178, 206. Purified ſalt of, 207. Tincture of, 478. Julep, 492.
Ammonia, prepared, 221. Water of, 222. Do. of pure, 225. Water of, acetated, 236 Spirit of, 352. Fetid ſpirit of, 353. Compound ſpirit of, 486. Succinated do. 487. Liniment of, 656. Stronger do. of, 657.
Ammoniac, volatile ſal, 223. Spirit of ſal, 224. Do. with quick-lime, 226. Prepared, 221. Vinous ſpirit of ſal, 352. Iron, 274. Copper, 318.
Ammoniacum, gum purification of, n° 95. Milk, 484. Plaſter with quick-ſilver, 614.
Ammoniated copper, water of, 609.
Andromachus, theriaca of, 605.
Animal oil, 176, 177.
Animals, analogy between them and vegetables, 3. Nature of the ſubſtance of, 45. Fluid parts, 46. Oils and fats of, 47. Miſcellaneous obſervations on ſeveral ſubſtances of, 48. Earths of, 51.
Aniſe, eſſential oil of, 158, 159.
Aniſeed, eſſential oil of, 159, 161. Compound ſpirit of, 354.
Anodyne liniment or balſam, 470. Ointment, 661.
Anthelmintic powder, 549.
Anticteric ſpirit, 370.
Antihyſteric plaſter, 618.
Antimonial powder, 260. Wine, 410. Wine of tartar, 411.
Antimony, prepared, 91. Preparations of, 254—271. Wine of, 410. Wine of tartarized, 411. Tincture of, 472.
Antipthiſical tincture, 461.
Antipſoric ointment, 653.
Ardent ſpirit, n° 348.
Aroma, 35.
Aromatic ſpirit, 369. Vinegar, 400. Tincture, 424. Powder or ſpices, 533. Confection, 602.
Arſenic, mineral ſolution of, 494.
Arum, conſerve of, 114. Compound powder, 551.
Aſafœtida, tincture of, 425.
Aſarabacca, compound powder of, 534.
Aſh coloured powder of mercury, 287.
Attractions, elective, 55. Table of ſingle explained, 56. Table, p. 290, &c. Caſes of double, p. 294.
B.
Bacher's pills, 582.
Balm water, 342. Compound water of, 366.
Balſam of Peru, tincture of, 426; and of Tolu, 427. Traumatic, 428. Anodyne, 470. Saponaceous, 471. Of Tolu, ſyrup of, or balſamic ſyrup, 510.
Bark, extract of Peruvian, 138,
Barley-water, 382.
Barley, decoction of, 380. Compound do. 381.

Baſilicon ointment, n° 650.
Baths, 64.
Bay-berries, expreſſed oil of, 154.
Benzoin, 41. Flowers of, 208. Compound tincture of, 428.
Bitter infuſion, 392. Wine, 409. Tincture, 446.
Bitumens, 50.
Black currants, inſpiſſated juice of, 127. Cherry-water, 337.
Blue plaſter, 622.
Bliſtering plaſter, 615.
Borax, acid ſalt of, 246.
Bougies. 678.
Buckthorn, ſyrup of, 509.
Burgundy pitch, plaſter of, 624.
Burning of hartſhorn, 96. Of ſponge, 102.
Butter of antimony, 259.

C.

Calamine, prepared, 92. Cerate of, 672.
Calcination, 89.
Calcined zinc, 314.
Calomel, 292.
Camomile, eſſential oil of, 184. Flower-water, 338.
Camphor, 34. Water, 334. Liniment, 658.
Camphorated tincture of opium, 456. Spirit of wine, 469. Mixture, 479. Spirit, 488.
Cancer, ointment for an ulcerated, 662.
Cantharides, cerate of, 671.
Carbonic acid, 12.
Cardamom tincture, 430. Compound ditto, 431.
Carmelite water, 366.
Caraway ſpirit, or ſpirituous water, 355. Eſſential oil of, 158, 159. Seeds, 162.
Caſcarilla, extract of, 141. Tincture of, 432.
Caſſia water, 324. Electuary of, 591.
Caſtor oil, 153. Water, 335. Tincture, 433. Compound ditto, 434.
Cataplaſm of cummin, 680. Of muſtard, 681.
Catechu, decoction of, 406. Tincture of, 435. Troches of, 568.
Cathartic ſalt of Glauber, 232.
Cauſtic ley, 214. Strongeſt common, 216. Milder ditto, 218. Lunar, 272.
Cephalic or ſternutatory powder, 534.
Cerates, 669—679.
Ceruſe of antimony, 268; or white lead, 307. Acetated, 308. Powder of, 535. Ointment of acetated, n° 643. Ointment of, 644.
Chalk, prepared, 93. Julep, 374. Mixture or drink, 480. Compound powder of, &c. and combined with opium, 538. Troches of, 566.
Chervil, conſerve of, 111. Water, 336.
Chocolate nuts, oil of, 155.
Cinnamon, eſſential oil of, 185. Water, 323. Spirit of, or ſpirituous water, 356. Tincture of, 436. Compound ditto, 437. Syrup of, 517.
Cloves of julyflower, ſyrup of, 498. Eſſential oil of, 183.
Clyſter, decoction for, 376.
Coccia pills, 573.
Colcothar of vitriol, 280.
Colchicum, 403. Syrup of, 499.
Colocynth tincture, 473. Pills with aloes, 573.
Colomba, tincture of, 438.
Coloquintida compound extract of, 135.
Comminution, 87.
Common decoction, 378. Plaſter, 620.
Confection, japonic, 594. Of various kinds, 601—606.
Conſerves, 108—121.
Contrayerva, compound powder of, 537.
Copper, preparations of, and zinc, 314—319. Volatile tincture of, 474. Pills, 574. Water of ammoniated, 609.
Cordial electuary or confection, 603.
Corn plaſter, 629.
Corroſive ſublimate of mercury, 290. Solution of, 291. Red of, 296. Pills of, 586. Plaſter of, 631.
Coventry remedy, 559.
Crabs claws, compound powder of, 536.
Crocus of antimony, 257. Opening and aſtringent of iron, 282.
Cryſtallization, 80.
Cummin, catalapſam of, 680. Plaſter, 617.
Curd, alum, 682.
Currants, black inſpiſſated juice of, 127. Syrup of black, 502.

D.

Dandelion, extract of, 147.
Deadly nightſhade plaſter, 628.
Decoctions and infuſions, 371—407.
Defenſive plaſter, 627.
Democrates, confection of, 650.
Depuration, n° 79.
Diacaſſia, electuary of, 591.
Diacodium, 503.
Digeſtion, long, extracts by, 132.
Digeſtive powder, 552. Ointment, 663.
Dill or dill ſeed water, 322.
Diſtillation, 83. General rules for that of the officinal ſimple waters, 220.
Diſtilled water, 321. Spirits, 347.
Dover's powder, 539.
Drying of moiſt bodies, 86. Of herbs and flowers, 97. Of ſquills, 101.
Dyſenteric powder, 553.

E.

Earths, vegetable, animal, and mineral, 51. Alkaline, diſſolved by acids, 75.
Egg oil, 157.
Egyptian ointment, 660.
Elaterium, 136. Peels of, 583.
Elderberry, inſpiſſated juice of, 126.
Elder ointment 651. Flower water, 345.
Electuaries, 590—601. General rules for making, 590.
Elemi, ointment of, 645.
Elixir, vitriolic, of aloes, 423. Stomachic, 446. Of guaiacum, 447. Volatile of ditto, 448. Paregoric, 456. Of aloes and rhubarb, called *ſacred elixir*, 458. Of health, 462. Acid elixir of vitriol, 467. Sweet ditto, 468.
Elm, decoction of, 387.
Emetic ſyrup, 518.
Emulſion, common, 482. Arabic, 483. Simple oily, or volatile oily, 489.
Ens Veneris, 275.
Epiſpaſtic plaſter, 615. Ointment from infuſion of cantharides, 640. Ditto from powder of ditto, 641.
Epithems, 679—683.
Eſſential oils, 158—196.
Ether, vitriolic, ſpirit of, 349 and 350. Nitrous ſpirit of, 351. Compound ſpirit of vitriolic, 485. Julep, 491.
Ethiopic pills, 570.
Evaporation, 82.
Expreſſed, &c. oils, 151—158.
Expreſſion, 58.
Exſiccation, 86. Of herbs and flowers, 97. Of ſquills, 101.
Extraction, 77, 78.
Extraction of pulps, 100. Of mucilage, 107.
Extracts and reſins, 128—151.

F.

Farina, n° 42.
Fennel ſeeds, eſſential oil of, 186. Water, 325.
Fenugreek, plaſter of, 632.
Fermentation, 9. Different ſtages of, 10, 11. Vinous, product of, 14, 15. Acetous, 16, 17. Putrefactive, 18, 19.
Fetid tincture, 425. Pills, 584. Plaſter, 618.
Filings of iron purified, 104.
Fire, application of, important in pharmaceutical apparatus, 57.
Fixed air, nature of, 54.
Flowers and herbs, drying of, 97. Of benzoin, 208. Of zinc, 315.
Fluids, meaſures of the weights of, table of, 70.
Flies, tincture of Spaniſh, 429. Plaſter of, 615. Ointment of, 640. Cerate of, 671.
Fomentation, decoction for, 377.
Foſſil tar, oil of, 173. Fixed foſſile alkaline ſalt purified, 220.
Frankincenſe plaſter, 626.
Fumigation powder, 554.
Furnaces, 58, 59, 60, 61, 62, 63.
Fuſion, 88.

G.

Galbanum, tincture of, 445.
Gamboge pills, 585.
Garlic, ſyrup of, 515. Oxymel of, 527.
Gentian, compound tincture of, 446. Extract of, 134. Compound infuſion of, 392.
Ginger, ſyrup of, 512.
Glaſs veſſels, 65. Coated, 66. Of antimony, 266. Cerated glaſs of ditto, 267.
Glauber, cathartic ſalt of, 232.
Guaiacum, elixir of, 447.
Gum, 37. Ammoniacum, purification of, 95. Pills, 575. Plaſter, 621.
Gum-arabic, mucilage of, 389.
Gum-kino, tincture of, 451.
Gum-reſin, 38.
Gum-tragacanth, mucilage of, 390.
Gum-guaiacum, tincture of, 448.
Gums, electuary for the, 596.

H.

Hæmorrhoidal ointment, 664.
Hartſhorn, burning of, 96. Volatile liquor, ſalt and oil of, 227. Decoction of, 373.
Hellebore, decoction of, 379. Tincture of black, 449. Do. of

of White, 466. Ointment of white, 646.
Hemlock, inſpiſſated juice of, n° 126. Plaſter, 630.
Henbane plaſter, 633.
Hepar. See *Sulphur*, &c.
Herbs and flowers, drying of, 97.
Hips, conſerve of. 115,
Hogs lard and mutton-ſuet, preparation of, 94. Ointment of, 636.
Honeys, the purifying of, 98. Medicated, 520—529.
Horſe-radiſh, compound ſpirit of, 364.
Horns, rectified oil of, 177.
Hydrogene, 19.
Hyoſcyamus, oil of, 156.
Hyſſop water, 340.
I.
Jalap, extract of, 142. Tincture of, 450. Compound powder of, 540. Pills, 577.
Jamaica pepper, eſſential oil of, 160. 172. Spirituous water of, 362.
Japonic tincture, 435. Electuary or confection, 594.
Infants, powder for, 555.
Infuſions and decoctions, 371—407.
Inſpiſſated juices, 123—128.
Ipecacuanha, wine or tincture of, 413. Compound powder of, 539,
Iron, purified filings of, 104. Ruſt of, prepared, 105. Scales of purified, 106. Preparations of, 274—283. Wine of, 412. Tincture of, 443. Filings prepared, 276.
Juice, compound, of ſcurvy-graſs, 122. Inſpiſſated of the elder-berry, 124. Ditto of wolfs bane, 125. Ditto of hemlock, 126. Ditto of black currants and lemons, 127.
Juices, expreſſion of, 85. Nature of, and way of, obtaining, 121. Inſpiſſated, 123—128.
Julep acid, 490. Æther, 491. Amber, 492. Saline mixture, or julep, 493.
July-flower, ſyrup of, clove of, 498.
Juniper-berry, eſſential oil of, 159, 160, 169. Compound ſpirit of, or compound juniper-water, 357.
K.
Kali, prepared, 210. Water of, 212. Ditto of pure, 213. Pure, 215. Lime with, 217. Vitriolated, 228. Acetated 234. Tartarized, 238.
Kermes mineral, 269.
L.
Lac, tincture of, 476.
Ladanum plaſter, 619.
Lard, hog's, and mutton-ſuet, preparation of, 94. Ointment of, 636.
Laudanum, liquid, 455.
Lavender, eſſential oil of, 159. Ditto of the flowering tops of, 160. Ditto of flowers, 163. Simple ſpirit of, 358, Compound tincture of ſpirit of, 452.
Laurel ointment, 665.
Lead, preparations of, 305—311. Vinegar of, 402. Troches of red, 567.
Leaves of wood-ſorrel, conſerve of, 109. Of ſpearmint, conſerve of, 113.
Lemon-juice, ſyrup of, 502.
Lemons, inſpiſſated juice of, 127. Eſſence of, 182. Peel-water, 331.
Lenient linctus, 600.
Lenitive electuary, 593.
Ley, cauſtic, 214.
Lily-of-the-valley water, 341.
Lime with pure kali, 217.
Lime-water, 398.
Linctus, lenient, 600.
Liniments, anodyne, 470. Saponaceous, 471. And ointments, 635—669.
Lip-ſalve, 677.
Liquoric, refined, 150. Troches of, 562.
Litharge, acetated water of, 310. Compound ditto, 610. Plaſter, 620. Ditto with gum, 621. Ditto with quickſilver, 622. Ditto with reſin, 623. Cerate of, 673.
Logwood, extract of, 137.
Long digeſtion, on extracts by, 132.
Lunar cauſtic, 272. Pills, 273.
M.
Mace, expreſſed oil of, 154. Eſſential ditto, 188.
Mad-dog, powder to prevent the poiſon of the bite, 550.
Magneſia, 248—250. Troches, of, 566.
Manna, electuary of, 597.
Marjoram, eſſential oil of, 189.
Marſhmallows, decoction of, 372. Syrup of 497.
Martial flowers, 275. Æthiops, 281.
Meadow ſaffron, oxymel of, n° 524.
Meaſures in pharmacy, 69 Table of the weights of different fluid ones, 70.
Meconium, ſyrup of, 503.
Medicated wines, 407—419. Waters, 606—613. Honeys, 520—529.
Melampodium, tincture of, 449.
Menſtrua, principal, for ſolution, 72, &c.
Mercury, preparations of, 283—305. Pills of the corroſive ſublimate of, 586.
Mercurial pills, 576. Or blue paſte, 622.
Metallic ſubſtances diſſolved by acids, 75.
Metals, 52.
Milk, ſalt or ſugar of, 244. Almond, 482. Ammoniacum, 484.
Millipeds, preparation of, 99. Conſerve of, 119. Wine of, 414.
Mindererus, ſpirit of, 237.
Minerals, 49. Mineral earths, 51. Mineral kermes, 269. Mineral ſolution of arſenic, 494.
Minium. See *Lead*, &c.
Mint, garden, eſſential oil of the herbs of, 160. Ditto of leaves of common, 165.
Mithridate, 605.
Mixture, ſaline or julep, 493.
Mixtures of various kinds, 479—495.
Mucilage, extraction of, 103. Of ſtarch, 388. Of gum arabic, 389. Plaſter of, 632. Of gum tragacanth, 390. Of quince ſeed, 391.
Mulberry juice, ſyrup of, 502.
Muriated antimony, 258. Quickſilver, 289. Mild muriated ditto, 294.
Muriatic acid, 199.
Muſk, tincture of, 453. Mixture of, 481.
Muſtard, cataplaſm of, 681.
Mutton ſuet and hog's lard, preparation of, 90.
Myrrh, gummy extract of, 145. Tincture of, 454. Compound powder of, 541. Pills of aloes with, 572.
N.
Natron, 25. Prepared, 219. Vitriolated, 231. Tartarized, 240.
Night-ſhade, plaſter of deadly, 628.
Nitrated calx of antimony, 256. Silver, 271. Red quickſilver, 295. Ointment of quickſilver, 648.
Nitre, purified, 233 Vinous acid, or dulcified ſpirit of, 357. Troches of, 564.
Nitrous acid, 197. Weak, 198. Ether, ſpirit of, 351. Powder, 556. Electuary, 598.
Nutmegs, eſſential oil of, 190. Spirit of, or ſpirituous nutmeg-water, 361.
Nux vomica, tincture of, 477.
O.
Odorous principle of vegetables, 35.
Oil of almonds, 152. Of hartſhorn, 227.
Oils, groſs, 29. Eſſential, 31, 32, 33. Of vegetables, rectified ſpirit of wine a menſtruum for, 73. Of the mineral kingdom, 49. Diſſolve various ſubſtances, 74. Diſſolved by alkaline lixivia, 76. Expreſſed, &c. 151—158. Eſſential, &c. 158—196. Salt and oil of amber, 178. 206.
Ointments and liniments, 635—669.
Olives, expreſſed oil of, 154.
Onion ointment, 668.
Opiate powder, 542.
Opium, purified, 144. Extract of, prepared by long digeſtion, 145. Tincture of, 455. Camphorated tincture of, 456. Pills, 579. Confection of, 604.
Orange-peel, conſerve of the yellow rind of that of Seville, 112. Water, 332, 368. Tincture of, 439. Syrup of, 500.
Orange-ſkins, eſſential oil of, 182.
Origanum, eſſential oil of, 159. Ditto of leaves of, 166.
Oxymel of verdegriſe, 523. Of meadow ſaffron, 524. Of ſquills, 525. Simple, 526. Of garlic, 527. Pectoral, 528.
P.
Pabulum of vegetables, 4.
Pacific pills, 579.
Palm, expreſſed oil of, 154.
Panacea of antimony, 270.
Paregoric elixir, 456.
Pectoral oxymel, 528. White troches, 561. Black ditto 562. Troches with opium, 563.
Pennyroyal, eſſential oil of, 159. Ditto

Ditto of leaves of, 167. Water, 329. Spirit of, 363.
Peppermint, eſſential oil of, 159, 160. Ditto of leaves, 164. Water, 326. Spirit of, or ſpirituous water, 359.
Peru, tincture of the balſam of, 426.
Peruvian bark, extract of, 138, 140. Ditto with reſin, 139. Decoction of, 375. Infuſion of, 404. Tincture of, 440. Compound ditto, 441. Purging powder, 557.
Pharmacy defined, 1. Objects of, 2.
Pills, lunar, 273. Of various kinds, and general rules for making, 569—590.
Pimento, or all-ſpice, ſpirit of, 362; or ſpirituous Jamaica pepper water, *ibid.*
Pitch, plaſter of Burgundy, 624. Plaſter, 634.
Plants, differ in the different periods of their growth, 6. Different parts of the ſame plant of different qualities, 7.
Plaſters, 613—635.
Poppy, ſyrup of white, 503. Ditto of red, 504.
Potaſh, 23.
Powder, antimonial, 260. Aſh-coloured of mercury, 287.
Powders, manner of making, and various kinds of, 529—560.
Powdered tin, 312.
Precipitation, 81.
Preparation of ſubſtances not ſoluble in water, 90, &c. Of hog's lard and mutton-ſuet, 94. Of millipeds, 99.
Prepared antimony, 91. Calamine, 92. Chalk, 93. Ruſt or ſhavings of iron, 105. Kali, 210. Natron, 219. Ammonia, 221.
Preſs, uſe of, in expreſſing juices, 85.
Pulps extraction, 100.
Purging Peruvian powder, 557.
Purification of gum ammoniac, 95. Of honey, 98. Of ſtorax, 103. Of alum, 242.
Purified filings of iron, 104. Scales of iron, 106. Opium, 144. Fixed foſſile alkaline ſalt, 220. Nitre, 233. Sal ammoniac, 247.
Putrefactive fermentation, 18, 19.

Q.

Quaſſia, tincture of, 475.
Quickſilver, purified, 284. Acetated, 285. Calcined, 286. With chalk, 288. Muriated, 289. Mild muriated, 294. Red nitrated, 295. White calx of, 297. With ſulphur, 299. Red ſulphurated, 301. Vitriolated, 302. Syrup of, 519. Pills, 576. Ointment of the white calx of, 638, Stronger ditto, 647. Weaker ditto, *ibid*; or blue ointment, *ibid*. Ointment of nitrated, 648.
Quince-ſeed, mucilage of, 391.

R.

Raſpberry juice, ſyrup of, 502.
Rectified ſpirit of wine, a menſtruum for eſſential oils and reſins of vegetables, 73. On extracts with, 130. Oil of turpentine, 175. Oil of horns, 177. Oil of amber, 179.
Red nitrated quickſilver, 295. Corroſive or precipitated mercury, 296. Lead, 306. Poppy ſyrup, 504.
Refined liquorice, 150.
Reſins, 36. Extracts, &c. 128—151. Reſinous ſubſtances diſſolved by alkaline lixivia, 76. Extract of Peruvian bark with, 139. Ointment of yellow, 650. Cerate of ditto, 674.
Rhodium, eſſential oil of, 187.
Rhubarb, infuſion of, 397. Wine of, 415. Various tinctures of, 457. Elixir of, 458.
Rochel ſalt, 237.
Rob, or inſpiſſated juice of elder berries, 124.
Roſes, infuſion of, 396. Conſerve of the buds of red, 111. Vitriolated conſerve of, 120. Tincture of, 396. Vinegar of, 401. Syrup of pale, 505. Of dry, 506. Honey of, 521. Water, 330.
Roſemary, eſſential oil of, 159. Ditto of tops of, 160, 168. Spirit of 365.
Rue, eſſential oil of, 191. Water, 343.
Rufus pills, 572.
Ruſt of iron, prepared, 105. 276.

S.

Saffron, tincture of, 442. Syrup of, 501. Oxymel of meadow, 524.
Sage water, 346.
Sal ammoniac, volatile, 223. Spirit of, 224. Ditto with quicklime, 226.
Saline mixture or julep, 493.
Salt and oil of amber, 178, 206. Purified ditto of amber, 207. Of tartar, 209. Fixed vegetable alkaline, 211. Fixed foſſile alkalized, purified, 220. Of hartſhorn, 227. Of many virtues, 230. Cathartic of Glauber, 232. Rochel, 241. Or ſugar of milk, 244. Of ſorrel, 245. Acid of borax, 246. Ammoniac, purified, 247. Of ſilver, 272. Of ſteel, 279, &c.
Salts, and ſaline preparations of vegetables, p. 273, n° 39, 40, 41. Alkaline, diſſolved by acids, 75. Chapter on, &c. 196—248.
Salve for lips, 677.
Sap of vegetables, 28.
Sapphire-coloured water, 609.
Saponaceous balſam or liniment, 471. Plaſter, 625.
Sarſaparilla, decoction of, 384. Compound ditto, 385.
Saſſafras root, eſſential oil of, 159, and 170.
Saturnine ointment, 643.
Savin, eſſential oil of, 160. Ditto of leaves of, 171. Water, 344. Compound tincture of, 459.
Savory, eſſential oil of, 192.
Scales of iron purified, 106.
Scammony, compound powder of, 543. Ditto with aloes, 544. Ditto with colomel, 545. Electuary of, 592.
Scurvy-graſs, ſpirit of, 367.
Sabaceous matter, 30.
Seneka, decoction of, 386.
Senna, extract of, 143. Simple infuſion of, 393. Tartarized ditto, 394. Infuſion of tamarinds with, 395. Tincture of, 462. Compound powder of, 546. Electuary of, 593.
Seville orange-peel, conſerve of the yellow rind of, 112.
Shavings of ruſt of iron, prepared, 105.
Silver, preparations of, 271—274.
Simple ointment, 636. Liniment, 655. Cerate, 670.
Sloes, conſerve of, 116.
Snake root, tincture of, 463.
Soap pills, 588. Plaſter, 625. Liniment, 659. Cerate, 675.
Soda, 25. Vitriolated, 232. Tartarized, 241.
Solids, ſublimation of, 84.
Solution, in the humid and dry way, 71. Principal menſtrua for, 72. Simple mercurial, 304. Mineral of arſenic, 494.
Soot, tincture of, 444.
Sorrel, ſalt of, 245.
Spaniſh flies, tincture of, 429. Plaſter of, 615. Ointment of, 640. Cerate of, 671.
Spearmint, conſerve of the leaves of, 113 Eſſential oil of, 159. Water, 327. Spirit of, 360.
Spermaceti, ointment of, 652. Cerate of, 676.
Spices, aromatic, 533.
Spirit of wine rectified, a menſtruum for eſſential oils or reſins of vegetables, 73. On extracts with, 130. On extracts with and water, 131. Spirit of ſal ammoniac, 224. Ditto with quicklime, 226. Of Mindererus, 237. Camphorated of wine, 469. Compound of vitriolic ether, 485. Ditto of ammonia, 486. Succinated ditto of ammonia, 487. Volatile aromatic, &c. 486. Camphorated, 488.
Spirits, diſtilled, 347—371.
Sponge, burning of, 102. Powder, 559.
Squills, drying of, 101. Conſerve of, 117. Vinegar of, 399. Wine of, 417. Tincture of, 460. Syrup of, 507. Honey of, 522. Oxymel of, 525. Pills, 580.
Starch, mucilage of, 388. Troches of, 561.
Steel, ſalt of, 279.
Sternutatory or cephalic powder, 534.
Sticking plaſter, 623.
Stomachic elixir, 446. Pills, 581.
Storax, purification of, 103. Pills, 589. Ointment of, 667.
Strawberry water, 339.
Strengthening plaſter 627.
Styptic powder, 547.
Sublimate corroſive of mercury, 290. Solution of it, 291. Pills of, 586.
Sublimation, 84.
Subſtances not ſoluble in water, preparation of, 90, &c.
Suet, mutton and hog's lard, preparation of, 94.
Sudorific powder, 539.
Sugar, or ſalt of milk, 244; or ſalt of lead, 309.
Sulphur diſſolved by alkaline lixivia, 76. Preparations of 250, &c. Precipitated of antimony, 261. Golden of antimony, 262. With quickſilver, 299. Troches of, 565. Ointment, 653.

Sweet mercury, n° 293.

Syrup, ſimple or common, 508.

Syrups of various ſorts, 495—520.

T.

Table of affinities, p. 290—294. Of the weights of ſome fluid meaſures, n° 70. Of quantity of eſſential oil obtained from various vegetables 195, p. 331, &c. Of quantity of opium and mercury in the different compoſitions of the London and Edinburgh colleges, 683.

Tamarinds, infuſion of, with ſenna, 395.

Tanſy, eſſential oil of, 193.

Tar, oil of foſſile, 173. Pills, 587. Ointment, 649.

Tar-water, 405.

Tartar, cryſtallized acid of, 203. Diſtilled ditto of, 204. Salt of, 209. Vitriolated, 229. Regenerated, 235. Soluble, 239. Emetic, 264. Antimonial wine of, 411.

Tartarized kali, 238. Vegetable fixed alkali, 239. Natron, 240. Soda, 241. Antimony, 263. Iron, 277. Antimony, wine of, 411.

Terebenthinate electuary, 599.

Thebaic powder, 558. Pills, 579. Electuary, 604.

Theriaca of Andromachus, 605.

Tin, preparations of, 311—314. Electuary, 595.

Tincture, ſacred or aloetic wine, 408; or wine of ipecacuanha, 413.

Tinctures of various kinds, 419—479.

Tobacco wine, n° 416. Ointment of, 666.

Tolu, tincture of the balſam of, 427. Syrup of ditto, 510.

Tragacanth, compound powder, 548.

Traumatic balſam, 428.

Treacle, Venice, 605.

Troches, rules for making, and various kinds of, 560—569.

Troy weight, 68.

Turbith mineral, 303.

Turpentine, oil of, 174. Rectified ditto, 175.

Tutty ointment, 654.

V.

Valerian, tincture of, 464. Volatile ditto, 465.

Vegetables: analogy between them and animals, 3. Pabulum of, 4. Influence of ſoil, climate, light, and heat upon, 5. Obnoxious to diſeaſe and death, 8. Product of, by vinous fermentation, 14, 15. By acetous fermentation, 16, 17. By putrefaction, 18, 19. By fire, 20—42. Sap of, 28, Groſs oils of, 29. Eſſential oils of, 31. Sebaceous matter of, 30. Nature of the colouring matter of, 43. Practical obſervations on, 44. Earths of, 51.

Vegetable alkali, 24. Fixed vegetable alkaline ſalt, 211.

Venice treacle, 605.

Veratrum, tincture of, 466.

Verdigriſe, oxymel of, 523. Ointment of, 637.

Veſſels, glaſs, naked and coated, 65, 66. Cautions with reſpect to the matter of other veſſels, n° 67.

Vinegar, 17. Diſtilled, 200. Concentrated, 201. Of Squills, 399. Aromatic, 400. Of roſes, 401. Of lead, 402. Of colchicum, 403. Syrup of, 496.

Vinous fermentation, 11. Product of, 14, 15. Acid of nitre, 351. Spirit of ſal-ammoniac, 352.

Violets ſyrup of, 511.

Vitrified antimony, 265.

Vitriol of iron, 279. Colcothar of, 280. White, 316. Dulcified ſpirit of, 349. Acid elixir of, 467. Sweet ditto, 468.

Vitriolated conſerve of roſes, 120. Kali, 228. Tartar, 229. Natron, 231. Soda, 232. Purified zinc, water of,—zinc with camphor, 611.

Vitriolic acid, weak, 196. Ether ſpirit of, 349. Acid, vinous, *ib.* Ether, or ethereal liquor, 350. Elixir of aloes, 423. Ether, compound ſpirit of, 485. Water, 612.

Ulcerated cancer, ointment for, 662.

Volatile ſal ammoniac, 223. Liquor, ſalt, and oil of hartſhorn, 227. Elixir of guaiacum, 448.

Vomica, nux, tincture of, 477.

W.

Waters, ſimple diſtilled, 319—347. Medicated, 606—613.

Water, a principal menſtruum in pharmacy, 72. Subſtances not ſoluble in preparation of, n° 90. &c. Extracts with, 128. And rules for making extracts with, 129. Aerated, 205. Of kali, 212. Of pure ditto, 213. Of ammonia, 222. Of pure ammonia, 225. Of acetated litharge, 310.

Wax, oil of, 194. Plaſter 616. Ointment, 642.

Weights, two kinds of, uſed, 68. Table of the weights of different fluid meaſures, 70.

White precipitate of mercury, 298. Vitriol, 316. Lily-water, 341. Poppy, ſyrup of, 503. Ointment, 644.

Wine, various kinds of, 13. Rectified ſpirit of, a menſtruum for eſſential oils or reſins of vegetables, 73. Oil of, 180. Medicated, 407—419. Camphorated ſpirit of, 469.

Wolfsbane, inſpiſſated juice of, 125.

Wood-ſorrel, conſerve of the leaves of, 108.

Woods, decoction of, 383.

Wormwood, conſerve of the tops of ſea, 110. Extract of, 146. Eſſential oil of, 181. Tincture of, 420.

Y.

Yellow ointment, 648. Reſin, ointment of, 650. Cerate of ditto, 674.

Z.

Zedoary wine, 418.

Zinc, preparations of, and copper, 314—319. Water of, vitriolated, with camphor, 611. Ointment of the calx of, 639.

Pharos.

PHAROS, (Homer, Strabo, &c.), a ſmall oblong iſland, adjoining to the continent of Egypt, over-againſt Alexandria. On this iſland ſtood a cognominal light tower, of four ſides, each ſide a ſtadium in length: and the tower ſo high as to be ſeen 100 miles off. Some affirm, each of its four corners reſted on a large ſea-crab of glaſs or of hard tranſparent ſtone of Ethiopia or Memphis. Others imagine the crabs were only added externally to the baſe by way of ornament, or as emblematical of its ſituation and uſe. The architect was Soſtrates the Cnidian, as appears by an inſcription on the tower, under Ptolemy Philadelphus, who laid out 800 talents upon it. On account of the port of Alexandria, the entrance to which was difficult and dangerous, the Pharos was called *the key of the Egyptian ſea*, or even of Egypt itſelf (Lucan): and Pharos, from being a proper name, is become an appellative to denote all light houſes.

Pharos.

PHAROS, or *Phare*, a light-houſe; a pile raiſed near a port, where fire is kept burning in the night, to guide and direct veſſels near at hand. The pharos of Alexandria, built in the iſland of Pharos, at the mouth of the Nile, was anciently very famous, inſomuch as to communicate its name to all the reſt. This moſt magnificent tower conſiſted of ſeveral ſtories and galleries, with a lantern at top, in which a light being continually burning, might be ſeen for many leagues at ſea, and along the coaſt. It was accounted one of the ſeven wonders of the world. It was built by the famed architect Soſtratus, a native of Cnidos, or, according to ſome, by Deiphanes, the father of Soſtratus; and coſt Ptolemy Philadelphus 800 talents. The ſeveral ſtories were adorned with columns, balluſtrades, galleries of the fineſt marble and workmanſhip; to which ſome add, that the architect had contrived to faſten ſome looking-glaſſes, ſo artificially againſt the higheſt galleries, that one could ſee in them all the ſhips that ſailed on the ſea for a great way. Inſtead of which noble ſtructure, one ſees now only a kind of irregular caſtle, without ditches or outworks of any ſtrength, the whole being accommodated to the inequality of the ground on which it ſtands, and which it ſeems is no higher than that which it ſhould command. Out of the midſt of this clumſy building riſes a tower, which ſerves for a light-houſe, but which hath nothing of the beauty and grandeur of the old one. The Coloſſus of Rhodes alſo ſerved as a pharos.

PHARPAR, or Pharphar, is one of the rivers of Damaſcus, or rather it is an arm of the Barrady or Chryſorrhoas, which waters the city of Damaſcus and the country about it (2 Kings v. 12.) "Are not Abana and Pharpar, rivers of Damaſcus, better than all the waters of Iſrael?" The river of Damaſcus has its fountain in the mountains of Libanus. At its approach to the city it is divided into three arms, one of which paſſes through Damaſcus. The other two water the gardens round about, and then reuniting, they loſe themſelves at four or five leagues from the city, towards the north. See *Maundrell's Travels from Aleppo to Jeruſalem*; ſee alſo the articles Abana and Damascus.

PHARSALIA, Pharsalium, *Pharſalus*, or *Pharſalos*, (anc. geog.), a town of the Phthiotis, a diſtrict of Theſſaly, near Pheræ and Lariſſa, to which laſt place Pompey fled from the plains of Pharſalus; watered by the river Enipeus, which falls into the Apidanus, and both together into the Peneus. Between Pharſalus and Enipeus, Pompey drew up his men at the fatal battle of Pharſalia.

In this battle, the advantage with reſpect to numbers was greatly on the ſide of Pompey. That general himſelf was on the left with the two legions which Cæſar had returned to him at the beginning of the war. Scipio, Pompey's father-in-law, was in the centre, with the legions he had brought from Syria, and the reinforcements ſent by ſeveral kings and ſtates of Aſia. The Cilician legion, and ſome cohorts which had ſerved in Spain, were in the right, under the command of Afranius. As Pompey's right wing was covered by the Enipeus, he ſtrengthened the left with his ſlingers, archers, and the 7000 Roman horſe, on whom chiefly his party founded their hopes of victory. The whole army was drawn up in three lines, with very little ſpaces between them. In conformity to this diſpoſition, Cæſar's army was drawn up in the following order: The tenth legion, which had on all occaſions ſignalized themſelves above all the reſt, was placed in the right wing, and the ninth in the left; but as the latter had been conſiderably weakened in the action at Dyrrhachium, the eighth legion was poſted ſo near it as to be able to ſupport and reinforce it upon occaſion. The reſt of Cæſar's forces filled up the ſpace between the two wings. Marc Antony commanded the left wing, Sylla the right, and Cneius Domitius Calvinus the main body. As for Cæſar, he poſted himſelf in the right over-againſt Pompey, that he might have him always in his ſight.

Thus was the whole plain covered, from Pharſalia to the Enipeus, with two armies, dreſſed and armed after the ſame manner, and bearing the ſame enſigns, the Roman eagles. Pompey obſerving how well the enemy kept their ranks, expecting quietly the ſignal of battle, and on the contrary how impatient and unſteady his own men were, running up and down in great diſorder for want of experience, he began to be afraid leſt his ranks ſhould be broken upon the firſt onſet; and therefore commanded the foot in the front to keep their ground, and quietly wait for the enemy. The two armies, though within reach of each other, kept a mournful ſilence; but at length the trumpets ſounded the charge, and Cæſar's army advanced in good order to begin the attack, being encouraged by the example of one Caius Craſtinus, a centurion, who at the head of 120 men threw himſelf upon the enemy's firſt line with incredible fury. This he did to acquit himſelf of a promiſe he had ſolemnly made to Cæſar, who, meeting him as he was going out of his tent in the morning, aſked him, after ſome diſcourſe, *What his opinion was touching the event of the battle?* To which he, ſtretching out his hand, replied aloud, *Thine is the victory, Cæſar: thou ſhalt glorioußly conquer, and I myſelf this day will be the ſubject of thy praiſe either dead or alive.* In purſuance of this promiſe he broke out of his rank as ſoon as the trumpet ſounded; and, at the head of his company, ran in upon the enemy, and made a great ſlaughter of them. But while he was ſtill preſſing forward, forcing his way through the firſt line, one of Pompey's men ran him in at the mouth with ſuch violence, that the point of his ſword came out at the hind part of his neck. Upon his death Pompey's ſoldiers took courage, and with great bravery ſtood the enemy's onſet. While the foot were thus ſharply engaged in the centre, Pompey's horſe in the left wing marched up confidently; and having firſt widened their ranks, with a deſign to ſurround Cæſar's right wing, charged his cavalry, and forced them to give round. Hereupon Cæſar ordered his horſe to retreat a little, and give way to the ſix cohorts, which he had poſted in the rear as a body of reſerve. Theſe, upon a ſignal given, coming up, charged the enemy's horſe with that reſolution and good order which is peculiar to men who have ſpent all their lives in camps. They remembered their inſtructions, not ſtriking at the legs or thighs of the enemy, but aiming only at their faces. This unexpected and new manner of fighting had the deſired effect. For the young patricians, whom Cæſar contemptuouſly calls the *pretty young dancers*, not being able to bear the thoughts of having their faces deformed with ſcars, turned their backs, and, covering their faces with their hands, fled in the utmoſt confuſion, leaving the foot at the mercy of the enemy. Cæſar's men did not purſue the fugitives; but charging the foot of that wing, now naked and unguarded, ſurrounded them, and cut moſt of them in pieces.

Pompey was ſo tranſported with rage, in ſeeing the flower of his forces thus put to flight or cut in pieces, that he left his army, and retired ſlowly towards his camp, looking more like a man diſtracted and beſide himſelf than one who by his exploits had acquired the name of *the Great*. When he had reached the camp, he retired to his tent without ſpeaking a word to any; and continued there, like one diſtracted and out of his ſenſes, till his whole army was defeated. Cæſar no ſooner ſaw himſelf maſter of the field than he marched to attack the enemy's entrenchments, that Pompey might not have time to recollect himſelf. When Pompey was informed that his rival was advancing to attack his entrenchments, he then firſt ſeemed to have recovered his ſenſes, and cried out, *What, into my camp too!* He ſaid no more; but immediately laying aſide the marks of his dignity, and putting on ſuch a garment as might beſt favour his flight, he ſtole out at the decuman gate, and took the road to Lariſſa, which city had hitherto ſhown great attachment to him. In the mean time Cæſar began the attack on the enemy's camp, which was vigorouſly defended by the cohorts Pompey had left to guard it; but they were at length forced to yield. Cæſar was not a little ſurpriſed, when, after having forced the entrenchments, he found the enemy's tents and pavilions richly adorned with carpets and hangings, their couches ſtrewed with flowers, their tables ready ſpread, and ſideboards ſet out with abundance of plate, bowls, and glaſſes, and ſome of them even filled with wine. So great was the confidence of Pompey's party, that they made preparations before hand for pleaſures to be enjoyed after the victory, which they thought certain. In Pompey's tent, Cæſar found the box in which he kept his letters: but, with a moderation and magnanimity worthy of himſelf, he burnt them all, without reading one; ſaying, that he had rather be ignorant of crimes, than obliged to puniſh them.

The next day, when the dead were numbered, it appeared that Cæſar had ſcarce loſt 200 men; among whom were about 30 centurions, whom Cæſar cauſed to be buried with great ſolemnity. He did particular honours to the body of Craſtinus, who had begun the battle; and ordered his aſhes to be depoſited in a tomb, which he erected to his memory. On Pompey's ſide, the number of the dead amounted to 15,000 according to ſome, and to 25,000 according to others. Cæſar took 24,000 priſoners, eight eagles, and 180 enſigns.

Blair's Lectures.

PHARSALIA, an epic poem, compoſed by Lucan on the civil war between Pompey and Cæſar, and particularly on the victory of the latter over the former, of which we have given an account in the preceding article. It is a poem univerſally acknowledged to have great beauties and great defects; but we are the leſs capable of eſtimating its merit as a whole, that either time has deprived us of the laſt books, or its author has left it incomplete. "The ſubject of the Pharſalia (ſays an excellent critic) carries undoubtedly all the epic grandeur and dignity: neither does it want unity of object, viz. the triumph of Cæſar over the Roman liberty. In the choice of that ſubject, he thinks, however, that the author was not happy. The civil wars were too recent to admit in the deſcription of them the embelliſhments of fiction and machinery. The fables of the gods mixed with the exploits of Cæſar and Pompey, inſtead of raiſing, would have diminiſhed, the dignity of ſuch well known facts." Another objection to the ſubject, perhaps more forcible than this, ariſes from the ſucceſs of the war and the abilities of the generals. Lucan was a friend to liberty, and wiſhed to raiſe the character of Pompey and Cato; but in ſpite of his utmoſt efforts, they are always eclipſed by the ſuperior talents and conſequent ſucceſs of Cæſar. All his characters, however, are drawn with ſpirit, and with uncommon regard to truth; and ſome of the ſpeeches which he puts into the mouths of his heroes are equal for moral ſublimity to any thing that is to be found in all antiquity.

"There are in the Pharſalia (continues the critic already quoted) ſeveral very poetical and ſpirited deſcriptions. But the author's chief ſtrength does not lie either in narration or deſcription. His narration is often dry and harſh; his deſcriptions are often overwrought, and employed too upon diſagreeable objects. His principal merit conſiſts in his ſentiments, which are generally noble and ſtriking, and expreſſed in that glowing and ardent manner which peculiarly diſtinguiſhes him. Lucan is the moſt philoſophical and the moſt public-ſpirited poet of all antiquity. He was the nephew of the famous Seneca the philoſopher; was himſelf a Stoic; and the ſpirit of that philoſophy breathes throughout his poem. We muſt obſerve, too, that he is the only ancient epic poet whom the ſubject of his poem really and deeply intereſted. Lucan recounted no fiction. He was a Roman, and had felt all the direful effects of the Roman civil wars, and of that ſevere deſpotiſm which ſucceeded the loſs of liberty. His high and bold ſpirit made him enter deeply into this ſubject, and kindle, on many occaſions, into the moſt real warmth. Hence, he abounds in exclamations and apoſtrophes, which are almoſt always well timed, and ſupported with a vivacity and fire that do him no ſmall honour.

"But it is the fate of this poet, that his beauties can never be mentioned, without their ſuggeſting his blemiſhes alſo. As his principal excellency is a lively and glowing genius, which appears ſometimes in his deſcriptions, and very often in his ſentiments, his great defect in both is want of moderation. He carries every thing to an extreme. He knows not where to ſtop. From an effort to aggrandiſe his objects, he becomes tumid and unnatural: and it frequently happens, that where the ſecond line of one of his deſcriptions is ſublime, the third, in which he meant to riſe ſtill higher, is perfectly bombaſt. Lucan lived in an age when the ſchools of the declaimers had begun to corrupt the eloquence and taſte of Rome. He was not free from the infection; and too often, inſtead of ſhowing the genius of the poet, betrays the ſpirit of the declaimer; but he is, on the whole, an author of lively and original genius."

PHARUS, in botany: A genus of the hexandria order, belonging to the monœcia claſs of plants; and in the natural method ranking under the fourth order, *Gramina*. The male calyx is a bivalved uniflorous glume; the corolla, a bivalved glume; the female calyx the ſame with the male; the corolla an uniflorous, long, and wrapping glume. There is but one ſeed.

PHARYNX, in anatomy. See there, p. 708, 709.

PHASCUM, in botany: A genus of the order of muſci, belonging to the cryptogamia claſs of plants. The anthera is operculated, with a ciliated mouth; the calyptræ are minute.

PHASEOLUS, the KIDNEY BEAN; a genus of the decandria order, belonging to the diadelphia claſs of plants. There is only one ſpecies; but of this there are many varieties. Thoſe principally cultivated for the table are, 1. The common white, or Dutch kidney-bean. 2. The ſmaller kidney-bean, commonly called the *Batterſea kidney-bean.* And, 3. The upright ſort, called the *tree kidney-bean.*

1. The firſt ſort was ſome time ago propagated in England, and is ſtill in Holland; it grows very tall, and requires long ſtakes and poles to climb on, and its beans are conſiderably broad; this makes them leſs ſaleable in the markets, people ſuppoſing them to be old becauſe they are broad; and they are hence grown into diſuſe, though a much more valuable kind for eating than any other.

2. The ſecond ſort, or Batterſea bean, is what is more univerſally cultivated: it never grows very tall, nor rambles far, and the air can eaſily paſs between the rows, becauſe of its moderate growth; and this makes it bear plentifully, and ripen well for the table. It is the beſt taſted bean, except the laſt.

3. The third, or tree kidney-bean, is alſo a plentiful bearer, and never rambles, but grows up in form of a ſhrub; but its beans are broader than the Batterſea kind, and are not ſo well taſted.

They are well propagated from ſeeds, which are to be put into the ground in the latter end of March or beginning of April for an early crop: but theſe ſhould have a warm ſituation and a dry ſoil; they muſt alſo be planted in a dry ſeaſon. The manner of planting them is, to draw lines with a bough over the bed, at two feet and a half diſtance, into which the ſeeds are to be dropped out about two inches aſunder; and the earth is to be drawn over them with the head of a rake, to cover them about an inch deep. In a week after ſowing, the plants will appear, and the earth ſhould be drawn up about their ſtalks as they riſe up; for a few days after this they will require no further care, except to be kept clear from weeds, and, when the beans appear, to have them gathered twice a week, for if the beans are ſuffered to hang on too long, they not only become of no value, but they weaken the plant. The firſt crop of kidney-beans will continue a month in good order; and, to ſupply the table afterwards, there ſhould be freſh ſowings in March, April, May, and June; the laſt of which will continue till the froſts come to deſtroy them. Some raiſe their early crops on hot-beds; and this is to be done exactly in the ſame manner as the raiſing the early cucumbers.

A new ſpecies of phaſeolus, apparently a very uſeful one, has been diſcovered by M. Moraney, "an inhabitant of Morne Rouge, dependent on the Cape;" we ſuppoſe Cape Francois of the iſland of St Domingo. In his ſearch for plants, ſubſervient to his collection of inſects for the king's cabinet, he was overtaken by night, and he paſſed it in a cave, to which he had recourſe for ſhelter. At its extremity he found beds of foſſils, broken pieces of burnt earthen-ware, ſome tools and other things, which ſhowed that this cave had formerly been the habitation of the natives. Near it he ſaw a climbing plant attached to ſome trees, with cluſters of dry pods hanging from it. Theſe he gathered, and on his return ſowed the ſeed. Some months after, the plants grew tall and ſtrong: they appeared to reſemble a phaſeolus known at Perpignan by the name of *caraquoëla*, and in the ſuperb portfolios of the king by that of *phaſeolus indicus, cochleato flore*, which produced many roots, not unlike the manioc. On examining the root after the pods were ripe, he found from three to eight roots of this kind. The force of the vegetation was wonderful; but dreading the deleterious effects of recent manioc, he did not taſte them, but ſubjected them to a chemical analyſis, which proved nothing. After boiling them in water a little ſalted, he ventured to taſte them, and found them moiſt, unctuous, and ſaccharine, not unlike potatoes. He made, after ſome hours trial, very good caſſava with them, without being incommoded by the diſagreeable fibres which are met with in the manioc during this operation. Since that time, biſcuit and bread have been made from theſe roots by M. Lombart counſellor at the Cape. The plant has been found to be very common in the woods. It requires no peculiar management: its roots are in ſeaſon when the pods blacken, and its fibres run in every direction, ſearching for nouriſhment through the clefts of rocks, and receiving the impreſſion of the ſtrata without injury. If the principal root is left, the plant ſhoots again and flouriſhes as before; but it is not yet aſcertained whether it puts forth any new roots. The ſeeds are not alimentary when dreſſed, as if nature deſigned them only for propagating other plants. Every uſe which a farinaceous plant can ſupply, this new phaſeolus has ſucceſsfully anſwered; and the ſeeds in the hands of Meſſrs Heretier and Thouin will probably furniſh a ſufficient quantity for curioſity as well as uſe.

PHASES, in aſtronomy, from the Greek word φαινω, "to appear;" the ſeveral appearances or quantities of illumination of the moon, Venus, Mercury, and the other planets. See ASTRONOMY.

PHASGA, or PISGAH, (Moſes), a mountain on the other ſide Jordan, joined to Abarim and Nebo, and running ſouth to the mouth of the Arnon: from which Moſes had a view of the promiſed land, and where he died, having before appointed Joſhua his ſucceſſor. Wells takes Piſgah and Nebo to be different names of one and the ſame mountain, a part or branch of the mountains Abarim, (Deut. xxxii. 49. compared with Deut. xxxiv. 1.) Or that the top of Nebo was peculiarly called *Piſgah*; or ſome other part of it, cut out in ſteps, as the primitive word denotes: and thus it is rendered by Aquila, by a Greek word ſignifying *cut out* (Jerome). There was alſo a city of this name, *id.*; and the adjoining country was in like manner called *Piſgah*, id.

PHASIANUS, in ornithology, a genus belonging to the order of gallinæ. The cheeks are covered with a ſmooth naked ſkin.

Gibbons, in his Roman Hiſtory, tells us, that the name *Phaſianus* is derived from the river PHASIS, the banks of which is the native habitation of the pheaſant. See PHASIS.

Dung-hill cock.

1. The gallus, or common dunghill cock and hen, with a compreſſed caruncle or fleſhy comb on the top of the head, and a couple of caruncles or wattles under the chin. The ears are naked, and the tail is compreſſed and erected. Of all other birds, perhaps this ſpecies affords the greateſt number of varieties; there being ſcarce two to be found that exactly reſemble each other in plumage and form. The tail, which makes ſuch a beautiful figure in the generality of theſe birds, is yet found entirely wanting in others; and not only

the tail, but the rump alſo. The toes, which are uſually four in all animals of the poultry kind, yet in a ſpecies of the cock are found to amount to five. The feathers, which lie ſo ſleek and in ſuch beautiful order in moſt of thoſe we are acquainted with, are in a peculiar breed all inverted, and ſtand ſtaring the wrong way. Nay, there is a ſpecies that comes from Japan, which inſtead of feathers ſeems to be covered over with hair.

It is not well aſcertained when the cock was firſt made domeſtic in Europe; but it is generally agreed that we firſt had him in our weſtern world from the kingdom of Perſia. Ariſtophanes calls the cock the *Perſian bird;* and tells us he enjoyed that kingdom before ſome of its earlieſt monarchs. This animal was in fact known ſo early even in the moſt ſavage parts of Europe, that we are told the cock was one of the forbidden foods among the ancient Britons. Indeed, the domeſtic fowl ſeems to have baniſhed the wild one. Perſia itſelf, that firſt introduced it to our acquaintance, ſeems no longer to know it in its natural form: and if we did not find it wild in ſome of the woods of India, as well as thoſe of the iſlands in the Indian ocean, we might begin to doubt, as has been done with regard to ſheep, in what form it firſt exiſted in a ſtate of nature. But the cock is ſtill found in the iſlands of Tinian, in many others of the Indian ocean, and in the woods on the coaſt of Malabar, in its ancient ſtate of independence. In his wild condition, his plumage is black and yellow, and his comb and wattles yellow and purple. There is another peculiarity alſo in thoſe of the Indian woods; their bones, which, when boiled with us, are white, as every body knows, in thoſe are as black as ebony.

In their firſt propagation in Europe, there were diſtinctions then that now ſubſiſt no longer. The ancients eſteemed thoſe fowls whoſe plumage was reddiſh as invaluable; but as for the white, it was conſidered as utterly unfit for domeſtic purpoſes. Theſe they regarded as ſubject to become a prey to rapacious birds; and Ariſtotle thinks them leſs fruitful than the former. Indeed, his diviſion of thoſe birds ſeems taken from their culinary uſes; the one ſort he calls *generous and noble*, being remarkable for fecundity; the other ſort, *ignoble and uſeleſs*, from their ſterility. Theſe diſtinctions differ widely from our modern notions of generoſity in this animal; that which we call the *game-cock* being by no means ſo fruitful as the ungenerous dunghill cock, which we treat with contempt. The Athenians had their cock-matches as well as we; but it is probable they did not enter into our refinement of chooſing out the moſt barren of the ſpecies for the purpoſes of combat.

However this be, no animal in the world has greater courage than the cock when oppoſed to one of his own ſpecies; and in every part of the world where refinement and poliſhed manners have not entirely taken place, cock-fighting is a principal diverſion. In China, India, the Philippine iſlands, and all over the Eaſt, cock-fighting is the ſport and amuſement even of kings and princes. With us it is declining every day; and it is to be hoped it will in time become only the paſtime of the loweſt vulgar. See the article *Cock-pit*.

The cock claps his wings before he ſings or crows. His ſight is very piercing; and he never fails to cry in a peculiar manner, when he diſcovers any bird of prey in the air. His extraordinary courage is thought to proceed from his being the moſt ſalacious of all other birds whatſoever. A ſingle cock ſuffices for ten or a dozen hens; and it is ſaid of him that he is the only animal whoſe ſpirits are not abated by indulgence. But then he ſoon grows old; the radical moiſture is exhauſted; and in three or four years he becomes utterly unfit for the purpoſes of impregnation. "Hens alſo (to uſe the words of Willoughby), as they for the greateſt part of the year daily lay eggs, cannot ſuffice for ſo many births, but for the moſt part after three years become effete and barren: for when they have exhauſted all their ſeed-eggs, of which they had but a certain quantity from the beginning, they muſt neceſſarily ceaſe to lay, there being no new ones generated within."

Domeſtic hen.

The hen ſeldom clutches a brood of chickens above once a ſeaſon, though inſtances have been known in which they produced two. The number of eggs a domeſtic hen will lay in the year are above 200, provided ſhe be well fed and ſupplied with water and liberty. It matters not much whether ſhe be trodden by the cock or no; ſhe will continue to lay, although the eggs of this kind can never by hatching be brought to produce a living animal. Her neſt is made without any care, if left to herſelf: a hole ſcratched into the ground, among a few buſhes, is the only preparation ſhe makes for this ſeaſon of patient expectation. Nature, almoſt exhauſted by its own fecundity, ſeems to inform her of the proper time for hatching, which ſhe herſelf teſtifies by a clucking note, and by diſcontinuing to lay. The good houſewives, who often get more by their hens laying than by their chickens, often artificially protract this clucking ſeaſon, and ſometimes entirely remove it. As ſoon as a hen begins to cluck, they ſtint her in her proviſions; which, if that fails, they plunge her into cold water; this, for the time, effectually puts back her hatching; but then it often kills the poor bird, who takes cold and dies under the operation.

If left entirely to herſelf, the hen would ſeldom lay above 20 eggs in the ſame neſt, without attempting to hatch them: but in proportion as ſhe lays, her eggs are removed; and ſhe continues to lay, vainly hoping to increaſe the number. In the wild ſtate, the hen ſeldom lays above 15 eggs; but then her proviſion is more difficultly obtained, and ſhe is perhaps ſenſible of the difficulty of maintaining too numerous a family.

When the hen begins to ſit, nothing can exceed her perſeverance and patience; ſhe continues for ſome days immovable; and when forced away by the importunities of hunger, ſhe quickly returns. Sometimes alſo her eggs become too hot for her to bear, eſpecially if ſhe be furniſhed with too warm a neſt within doors, for then ſhe is obliged to leave them to cool a little: thus the warmth of the neſt only retards incubation, and often puts the brood a day or two back in the ſhell. While the hen ſits, ſhe carefully turns her eggs, and even removes them to different ſituations; till at length, in about three weeks, the young brood begin to give ſigns of a deſire to burſt their confinement. When by the repeated efforts of their bill, which ſerves like a pioneer on this occaſion, they have broke themſelves a paſſage through the ſhell, the hen ſtill continues to ſit

Phaſianus. till all are excluded. The ſtrongeſt and beſt chickens generally are the firſt candidates for liberty; the weakeſt come behind, and ſome even die in the ſhell. When all are produced, ſhe then leads them forth to provide for themſelves. Her affection and her pride ſeem then to alter her very nature, and correct her imperfections. No longer voracious or cowardly, ſhe abſtains from all food that her young can ſwallow, and flies boldly at every creature that ſhe thinks is likely to do them miſchief. Whatever the invading animal be, ſhe boldly attacks him; the horſe, the hog, or the maſtiff. When marching at the head of her little troop, ſhe acts the commander; and has a variety of notes to call her numerous train to their food, or to warn them of approaching danger. Upon one of theſe occaſions, the whole brood have been ſeen to run for ſecurity into the thickeſt part of an hedge, while the hen herſelf ventured boldly forth, and faced a fox that came for plunder.

Ten or twelve chickens are the greateſt number that a good hen can rear and clutch at a time; but as this bears no proportion to the number of her eggs, ſchemes have been imagined to clutch all the eggs of an hen, and thus turn her produce to the greateſt advantage. By theſe contrivances it has been obtained, that a hen that ordinarily produces but 12 chickens in the year, is found to produce as many chickens as eggs, and conſequently often above 200. This contrivance is the artificial method of HATCHING chickens in ſtoves, as is practiſed at Grand Cairo; or in a chemical elaboratory properly graduated, as has been effected by Mr Reaumur. At Grand Cairo, they thus produce 6000 or 7000 chickens at a time; where, as they are brought forth in their mild ſpring, which is warmer than our ſummer, the young ones thrive without clutching. But it is otherwiſe in our colder and unequal climate; the little animal may without much difficulty be hatched from the ſhell, but they almoſt all periſh when excluded. To remedy this, Reaumur has made uſe of a woollen hen, as he calls it; which was nothing more than putting the young ones in a warm baſket, and clapping over them a thick woollen canopy.

Capons may very eaſily be taught to clutch a freſh brood of chickens throughout the year; ſo that when one little colony is thus reared, another may be brought to ſucceed it. Nothing is more common than to ſee capons thus employed; and the manner of teaching them is this: Firſt the capon is made very tame, ſo as to feed from one's hand; then, about evening, they pluck the feathers off his breaſt, and rub the bare ſkin with nettles; they then put the chickens to him, which preſently run under his breaſt and belly, and probably rubbing his bare ſkin gently with their heads, allay the ſtinging pain which the nettles had juſt produced. This is repeated for two or three nights, till the animal takes an affection to the chickens that have thus given him relief, and continues to give them the protection they ſeek for: perhaps alſo the querulous voice of the chickens may be pleaſant to him in miſery, and invite him to ſuccour the diſtreſſed. He from that time brings up a brood of chickens like a hen, clutching them, feeding them, clucking, and performing all the functions of the tendereſt parent. A capon once accuſtomed to this ſervice, will not give over; but when one brood is grown up, he may have another nearly hatched put under him, which he will treat with the ſame tenderneſs he did the former.

The cock, from his ſalaciouſneſs, is allowed to be a ſhort-lived animal; but how long theſe birds live, if left to themſelves, is not yet well aſcertained by any hiſtorian. As they are kept only for profit, and in a few years become unfit for generation, there are few that, from mere motives of curioſity, will make the tedious experiment of maintaining a proper number till they die. Aldrovandus hints their age to be 10 years; and it is probable that this may be its extent. They are ſubject to ſome diſorders; and as for poiſons, beſides nux vomica, which is fatal to moſt animals except man, they are injured, as Linnæus aſſerts, by elderberries; of which they are not a little fond.

Latham's Synopſis. Of this ſpecies Mr Latham enumerates no leſs than 13 varieties, beginning with the wild cock, which is a third leſs in the body than the domeſtic cock. This variety he imagines to be the original ſtock from whence all our domeſtic varieties have ſprung. They appear to be natives of the foreſts of India. There are but few places, however, as Mr Latham goes on to obſerve, where the different voyagers have not met with cocks and hens, either wild or tame; and mention has been particularly made of finding them at St Jago, Pulo Condore, Iſle of Timor, Philippine and Molucca Iſles, Sumatra and Java, New Guinea, Tinian, and moſt of the Iſles of the South Seas.—Thoſe of Pulo Condore are very much like our own, but conſiderably leſs, being only of the ſize of a crow. The cocks crow like ours, but their voices are much more ſmall and ſhrill.—*Damp. Voy.* vol. i. p. 392.—Two wild ones were ſhot there by our laſt voyagers.—*Ellis's Narr.* ii. p. 340. Thoſe of Sumatra and Java are remarkably large, and are called the *St Jago breed.* The cock is ſo tall as to peck off a common dining-table. When fatigued, he ſits down on the firſt joint of the leg; and is then taller than the common fowls. *Hiſt. Sumatr.* p. 98. They are found in New Guinea, but not in great plenty.—*Forr. Voy.* p. 105. The fowls which were met with wild at Tinian "were run down without much trouble, as they could ſcarce fly farther than 100 yards at a flight."—*Anſon's Voy.* p. 416. Forſter obſerves, that they are plenty at Eaſter, Society, and Friendly Iſles: at the two laſt they are of a prodigious ſize. They are not uncommon at the Marqueſas, Hebrides, and New Caledonia; but the Low Iſles are quite deſtitute of them.—See *Obſ.* p. 193.——Ducks and poultry are numerous in the Sandwich Iſles.—*Cook's Journal*, p. 229. In reſpect to Europe, little need be ſaid, as varieties without end are everywhere ſeen, and their manners fully known to every one. It is obſerved, however, that they breed moſt freely in the warmer ſituations. In the very cold regions, though they will live and thrive, they ceaſe to multiply. They are not found to breed in the northern parts of Siberia; and in Groenland are only kept as rarities.—*Faun. Groen.* On the whole, it ſeems quite unneceſſary to enlarge further on a ſubject well known to every body. They are ſo common, that every one who wiſhes to become acquainted with their nature and manners, has the means of ſuch knowledge in his power. Thoſe who wiſh for minuter deſcriptions, we muſt refer to the authors

Phaſianus.

who have profeſſedly written on the ſubject; for the varieties which we have already mentioned, we refer to Mr Latham.

Pheaſants.

2. The motmot, or Guinea pheaſant, is browniſh, ſomewhat red below, with a wedge-like tail, and wants ſpurs. 3. The colchicus is red, with a blue head, a wedge-ſhaped tail, and papillous cheeks. It is a native of Africa and Aſia. 4. The argus is yellowiſh, with black ſpots, a red face, and a blue creſt on the back part of the head. It is found in Chineſe Tartary. 5. The pictus has a yellowiſh creſt, a red breaſt, and a wedge ſhaped tail. It is a native of China. 6. The nocthemerus is white, with a black creſt and belly, and a wedge-ſhaped tail. It is a native of China.

Mr Latham enumerates nine different ſpecies of pheaſants, and of the common pheaſant he reckons ſix varieties. The firſt which he deſcribes is the ſuperb pheaſant. This bird Linnæus deſcribed from the various repreſentations of it painted on paper-hangings and China ware; and farther confirmed by a figure and deſcription in a Chineſe book which came under his inſpection.

Latham's Synopſis.

"We have lately ſeen (ſays Latham) a drawing of the tail feather of a bird of the pheaſant kind, which meaſured above ſix feet in length, and which, it is probable, muſt have belonged to ſome bird not hitherto come to our knowledge. The drawing is in the poſſeſſion of Major Davies, who took it from the original feather; two of which were in the poſſeſſion of a gentleman of his acquaintance, and were brought from China. They are exactly in ſhape of the two middle feathers of the painted pheaſant; the general colour is that of a fine blue grey, margined on the ſides with a rufous cream colour, and marked on each ſide the ſhaft with numerous bars of black; between 70 and 80 bars in all; thoſe on the oppoſite ſides of the ſhaft ſeldom correſponding with each other.

"The argus, though it be a native of China, is very commonly found in the woods of Sumatra, where it is called *coo-ow*. It is found extremely difficult to be kept alive for any conſiderable time after catching it in the woods; never for more than a month. It ſeems to have an antipathy to the light, being quite inanimate in the open day; but when kept in a dark place, it appears perfectly at eaſe, and ſometimes makes its note or call, from which it takes its name; and which is rather plaintive, and not harſh like that of a peacock. The fleſh reſembles that of the common pheaſant."

Mr Latham obſerves, that the common pheaſant is now found in a ſtate of nature in almoſt the whole of the Old Continent. They ſometimes (he ſays) come into farm yards near woods, and produce croſs breeds with common hens. He then ſays, "M. Salerne remarks, that the hen-pheaſant, when done laying and ſitting, will get the plumage of the male, and after that become ſo little reſpected by him, as to be treated with the ſame incivility as he would ſhow to one of his own ſex. He mentions this as a new obſervation; but it is far more common than may be generally ſuppoſed, and had been long before mentioned by Edwards, who gave for example one kept in the menagery of the duke of Leeds; and remarks, that this change is moſt likely to happen when in a confined ſtate. The circumſtance of the hen acquiring the plumage of the cock after a certain time is not confined to the pheaſant: the inſtance of the pea-hen belonging to Lady Tynte, now in the Leverian Muſeum, evinces the contrary, which, after having many broods, got much of the fine plumage of the cock, with the addition even of the fine train feathers. The female alſo of the rock manakin is ſaid to get the plumage of the oppoſite ſex after a number of years; and perhaps, if obſerved hereafter, this may be found to be the caſe with many other ſpecies. A gentleman of my acquaintance (continues our author), dead long ſince, who uſed to keep theſe birds for his amuſement, obſerved the ſame to me: and the ingenious Mr J. Hunter has a well drawn up paper in the Philoſophical Tranſactions* to the ſame purport; but, in addition to this, I am well informed, that it does not always require mature age to give the hen-pheaſant the appearance of the male, as ſometimes young birds will be adorned with his fine plumage. I will not ſay how this happens, and whether it may be peculiar to this ſpecies to grow barren (if that be the reaſon) ſooner than any other of the gallinaceous tribe; but I am aſſured that ſeveral of theſe ſpurleſs, cock-like hens, have proved on eating to be young birds, from their juicineſs and delicacy of flavour."

Phaſianus.

One of the varieties which our author remarks under this ſpecies, he calls the *Hybridal pheaſant*, which is a mixed breed between the pheaſant and cock; one of which is in the Leverian Muſeum. The two laſt ſpecies which our author deſcribes, is the parraka and courier.

The parraka is about the ſize of a ſmall fowl, reſembling it in the bill, legs, and body. Its length is 23 inches. The colour of the bill is dark rufous; the eyes are brown, the general colour of the plumage is a deep brown on the back, and fulvous under the belly: the top of the head is fulvous, and the feathers are ſomewhat long, but not ſo much as to form a real creſt; the wings are ſhort; the webs of ſome of the quills are ſomewhat rufous; the tail conſiſts of 12 feathers, is even at the end, about a foot in length, and is, for the moſt part, carried pendant; the legs are of a dark rufous, inclining to black; the claws are like thoſe of a fowl.

"It is peculiar (ſays Mr Latham) in its internal ſtructure in reſpect to the windpipe; which, inſtead of entering directly the breaſt, as in moſt birds, paſſes over the ſide of the left clavicle, and on the outſide of the fleſhy part of the breaſt, being covered only by the ſkin, then taking a turn upwards, paſſes over the right clavicle into the breaſt, and is diſtributed through the lungs in the uſual way. The female has not this circumvolution of the windpipe. The hannequaw, mentioned by Bancroft, is probably the ſame bird. He ſays that it is black, rooſts in trees, and may be heard early in the morning, diſtinctly, but hoarſely, repeating the word *hannequaw* (eaſily miſtaken for parrequaw) very loud. Theſe are found in the unfrequented woods of the internal parts of Cayenne, Guiana, and many parts of South America. At ſun-riſe they ſet up a very loud cry, which is thought to be the loudeſt of all birds in the new world; at which time the eyes appear red, as does a ſmall ſkin under the breaſt, which is not at all ſeen, except when the bird makes ſuch exertions, or is angry. This cry is very like the word parraquaw; and is repeated many times together; and often many cry at once, or anſwer one another, but moſt in breeding-time, which, is twice in the year; at each time laying from four to ſix eggs; making the neſt in low branches or ſtumps of trees, and behaving with their chickens in the ſame manner as hens. They feed on grain, ſeeds, and herbs; but feed the young in the neſt with worms and ſmall inſects. Theſe, with many other birds, inhabit the woods by day, coming out into the open ſavannas morning and evening to feed; at which times they are chiefly killed by the natives and near inhabitants. They may be brought up tame; and their fleſh is much eſteemed.

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* Vol. lxx. p. 527.

"The courier pheaſant is but very imperfectly deſcribed by Fernandez; and is ſaid to be 18 inches long. The general colour of the plumage is white, inclined to fulvous; about the tail they are black, mixed with ſome ſpots of white; the tail itſelf is long, and of a green colour, reflecting in ſome lights like the feathers of a peacock: the wings are ſhort. This ſpecies inhabits the hotter parts of Mexico; flies ſlow; but is recorded to outrun the ſwifteſt horſe*."

* Hiſt. des oiſ.

Pheaſants were originally brought into Europe from the banks of the Phaſis, a river of Colchis, in Aſia Minor; and from whence they ſtill retain their name. Next to the peacock, they are the moſt beautiful of birds as well for the vivid colour of their plumes as for their happy mixtures and variety. It is far beyond the power of the pencil to draw any thing ſo gloſſy, ſo bright, or points ſo finely blending into each other. We are told, that when Crœſus, king of Lydia, was ſeated on his throne, adorned with royal magnificence and all the barbarous pomp of eaſtern ſplendor, he aſked Solon if he had ever beheld any thing ſo fine? The Greek philoſopher, no way moved by the objects before him, or taking a pride in his native ſimplicity, replied, That after having ſeen the beautiful plumage of the pheaſant, he could be aſtoniſhed at no other finery.

Theſe birds, tho' ſo beautiful to the eye, are not leſs delicate when ſerved up to the table. Their fleſh is conſidered as the greateſt dainty; and when the old phyſicians ſpoke of the wholeſomeneſs of any viands, they made their compariſon with the fleſh of the pheaſant. However, notwithſtanding all theſe perfections to tempt the curioſity or the plate, the pheaſant has multiplied in its wild ſtate.

A ſpirit of independence ſeems to attend the pheaſant even in captivity. In the woods, the hen-pheaſant lays from 18 to 20 eggs in a ſeaſon; but in a domeſtic ſtate, ſhe ſeldom lays above 10. In the ſame manner, when wild, ſhe hatches and leads up her brood with patience, vigilance, and courage; but when kept tame, ſhe never ſits well, ſo that a hen is generally her ſubſtitute upon ſuch occaſions: and as for leading her young to their food, ſhe is utterly ignorant of where it is to be found; and the young birds ſtarve, if left ſolely to her protection. The pheaſant, therefore, on every account, ſeems better left at large in the woods than reclaimed to captivity. Its fecundity when wild is ſufficient to ſtock the foreſt; its beautiful plumage adorns it; and its fleſh retains a higher flavour from its unlimited freedom.

However, it has been the aim of late to take theſe birds once more from the woods, and to keep them in places fitted for their reception. Like all others of the poultry kind, they have no great ſagacity, and ſuffer themſelves eaſily to be taken. At night they rooſt upon the higheſt trees of the wood; and by day they come down into the lower brakes and buſhes, where their food is chiefly found. They generally make a kind of flapping noiſe when they are with the females; and this often appriſes the ſportſman (A) of their retreats. At other times he traces them in the ſnow, and frequently takes them in ſprings. But of all birds they are ſhot moſt eaſily; as they always make a whirring noiſe when they riſe, by which they alarm the gunner, and being a large mark and flying very ſlow, there is ſcarce any miſſing them,

When theſe birds are taken young into keeping, they become as familiar as chickens: and when they are deſigned for breeding, they are put together in a yard,

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(A) Pheaſants may be taken in a variety of ways. One method is, to be well acquainted with their haunts and breeding places; which are generally young, thick, and well grown coppices, free from the diſturbances of cattle and without a path-way through them; for they are timorous birds. When their haunts are diſcovered, it will next be neceſſary to find out where the brood is. And here it is to remarked, that pheaſants come out of the wood three times a-day to feed in green corn, freſh paſtures, or ſuch like places. The times of coming out are in the morning ſoon after ſunriſe, at noon, and at ſunſet. The ſides of the wood where they may be ſuppoſed to come out ought then to be carefully watched, and the young ones will be ſeen following the females as a flock of chickens follow the hen. The wood ought alſo to be watched in the evenings, when the noiſe of the cock and hen calling the young ones together will ſoon be heard; and the ſportſman muſt then endeavour to get as near as he can to the place, and being very ſtill and ſilent, he may obſerve their numbers and diſpoſition, and learn how to ſpread his net ſo as moſt eaſily to take the whole brood; but if by the leaſt motion they diſcover him, they will all take to their legs, and run to a great diſtance; for they ſeldom riſe on the wing, except when very cloſe frightened. By practice ſome people have become able to imitate the voice of the old pheaſant, ſo as to be able to call the young ones together to any place that he pleaſes, when the haunts are once found out, and by this means they are eaſily led into the nets.—The beſt time for uſing this call is in the morning or evening; and the note imitated ſhould be that by which they are called out to feed; indeed, by learning to imitate the other notes, they may be brought together at any time of the day. The ſportſman who can make this call, muſt ſhelter himſelf in ſome cloſe place, and begin very ſoftly at firſt; then, if none are near enough to be within hearing, he is gradually to raiſe it louder and louder, and at length he will be anſwered as loud, if any are within hearing, though at a conſiderable diſtance;

yard, five hens to a cock; for this bird, like all of the poultry kind, is very ſalacious. In her natural ſtate the female makes her neſt of dry graſs and leaves: the ſame muſt be laid for her in the pheaſandry, and ſhe herſelf will ſometimes properly diſpoſe them. If ſhe refuſes to hatch her eggs, then a common hen muſt be got to ſupply her place, which taſk ſhe will perform with perſeverance and ſucceſs. The young ones are very difficult to be reared (B); and they muſt be ſupplied with ants-eggs, which is the food the old one leads them to gather when wild in the woods. To make theſe go the farther, they are to be chopped up with curds or other meat; and the young ones are to be fed with great exactneſs, both as to the quantity and the time of their ſupply. This food is ſometimes alſo to be varied; and wood-lice, earwigs, and other inſects, are to make a variety. The place where they are reared muſt be kept extremely clean; their water muſt be changed twice or thrice a-day; they muſt not be expoſed till the dew is off the ground in the morning, and they ſhould always be taken in before ſunſet. When they become adult, they very well can ſhift for themſelves; but they are particularly fond of oats and barley.

In order to increaſe the breed, and make it ſtill more valuable, Longolius teaches us a method that appears very peculiar. The pheaſant is a very bold bird when firſt brought into the yard among other poultry, not ſparing the peacock, nor even ſuch young cocks and hens as it can maſter; but after a time it will live tamely among them, and will at laſt be brought to couple with a common hen. The breed thus produced take much ſtronger after the pheaſant than the hen; and in a few ſucceſſions, if they be let to breed with the cock-pheaſant (for the mixture is not barren), there will be produced a ſpecies more tame, ſtronger, and more prolific; ſo that he adds, that it is ſtrange why moſt of our pheaſandries are not ſtocked with birds produced in this manner.

The pheaſant, when full grown, ſeems to feed indifferently upon every thing that offers. It is ſaid by a French writer, that one of the king's ſportſmen ſhooting at a parcel of crows that were gathered round a dead carcaſe, to his great ſurpriſe, upon coming up, found that he had killed as many pheaſants as crows. It is even aſſerted by ſome, that ſuch is the carnivorous diſpoſition of the bird, that when ſeveral of them are put together in the ſame yard, if one of them

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ſtance; whereas, if he ſhould ſet up the call too loud at firſt, and any of the birds ſhould happen to be very near, they would be frighted away.

When a pheaſant anſwers, the ſportſman is to creep nearer and nearer, ſtill calling, though not ſo loud; and he will ſtill be anſwered, till at length he will be led by the bird's voice within ſight of it. Then he is to ſpread his net, and to begin to call again, keeping in ſome cloſe and well ſheltered place behind the net, in this place he is to call till the bird approaches; and when he has drawn it under the net, he is to appear ſuddenly, and the bird, riſing up, will thus be caught.

There is another method of taking pheaſants much quicker than that we have juſt deſcribed, viz. the having a live cock-pheaſant to uſe as a ſtale: this bird is to be fixed under the net, and by his crowing he will ſoon entice others in. The ſportſman muſt lie concealed; and when another pheaſant comes in, he is to draw the net over him. Many people take pheaſants in ſpringes or horſe-hair ſnares: to ſucceed in this, it will be neceſſary to be careful in ſearching out their haunts, and the places by which they go out of the woods into the fields. When theſe are diſcovered, a peg muſt be fixed in the ground at each, and at each peg two ſpringes muſt be laid open; the one to take in the legs, and the other the head. When the ſpringes are ſet, the ſportſman muſt go into the woods, and get behind the birds in order to fright them with ſome little noiſe, ſuch as ſhall not be enough to raiſe them to the wing, but only to ſet them a-running. They will naturally make their way out of the wood, through their accuſtomed paſſes, and be then caught in the ſpringes.

There is another method of taking theſe birds in winter, provided there be no ſnow. This muſt be done with a net made in the form of a caſting net, but with wider meſhes; they may indeed be five inches wide. Some peas or wheat are to be taken out; and the path of the pheaſants being diſcovered, which may eaſily be done by their dung, a pint or thereabout of corn is to be thrown down in the path in a place marked, ſo that the ſportſman can come to it again. This muſt be done for ſome days, till at length the pheaſants will expect it every day regularly; and all of them that frequent the place are brought together to feed there, and then the net is to be fixed over the place, its top being tied up to ſome bough of a tree, and its bottom fixed down all around, except in one place, where the walk of the pheaſants lies. In this place it muſt be raiſed in the form of an arch, and the entrance muſt be lined with ſeveral rods of hazel; the thick ends of which are to be tied to the net, and the thin ones let into the ſpace covered by it; and thus the pheaſants will eaſily get in by parting the ſmall ends of the ſticks, as fiſh into a wheel, but they will not eaſily get out again. The nets are to be dyed of a ruſſet colour, by laying them in a tan-pit; and they muſt, when planted for this purpoſe, be covered with boughs, ſo that the birds do not diſcover them, and then they will eaſily run into them, and be all taken at once.

(B) The pheaſant is ſo nearly allied to our common poultry that this aſſertion may appear odd: it is neverthelesſ true; and the principal cauſe may be, that their proper food is not known, or not ſufficiently inquired into. They feed voraciouſly on ants and various other inſects; and it is ſaid, that when the muſtineſs of corn or want of cleanneſs in their apartments has made them ſick, a repaſt of ants has recovered them. When theſe fail, millepedes and earwigs together anſwer as an excellent medicine, along with their common food (corn,) which muſt be very ſweet and clean. Theſe birds are very ſullen, and when coupling time is over, they are ſeldom found more than one in a place.

them happens to fall ſick, or ſeems to be pining, all the reſt will fall upon, kill, and devour it. Such is the language of books; thoſe who have frequent opportunities of examining the manners of the bird itſelf, know what credit ought to be given to ſuch an account.

PHASIS, a river which falls into the Euxine ſea about 700 miles from Conſtantinople. "From the Iberian Caucaſus (ſays Gibbon), the moſt lofty and craggy mountains of Aſia, that river deſcends with ſuch oblique vehemence, that in a ſhort ſpace it is traverſed by 120 bridges. Nor does the ſtream become placid and navigable till it reaches the town of Sarapana, five days journey from the Cyrus, which flows from the ſame hills, but in a contrary direction, to the Caſpian lake. The proximity of theſe rivers has ſuggeſted the practice, or at leaſt the idea, of waſting the precious merchandiſe of India down the Oxus, over the Caſpian, up the Cyrus, and with the current of the Phaſis into the Euxine and Mediterranean ſeas. As it ſucceſſively collects the ſtreams of the plain of Colchos, the Phaſis moves with diminiſhed ſpeed, tho' accumulated weight. At the mouth it is 60 fathoms deep, and half a league broad; but a ſmall woody iſland is interpoſed in the midſt of the channel: the water, ſo ſoon as it has depoſited an earthy or metallic ſediment, floats on the ſurface of the waves, and is no longer ſuſceptible of corruption. In a courſe of 100 miles, 40 of which are navigable for large veſſels, the Phaſis divides the celebrated region of Colchos or Mingrelia, which, on three ſides, is fortified by the Iberian and Armenian mountains, and whoſe maritime coaſt extends about 200 miles, from the neighbourhood of Trebizond to Dioſcurias and the confines of Circaſſia. Both the ſoil and climate are relaxed by exceſſive moiſture: 28 rivers, beſides the Phaſis and his dependent ſtreams, convey their waters to the ſea; and the hollowneſs of the ground appears to indicate the ſubterraneous channels between the Euxine and the Caſpian."

Decline and Fall of the Roman Empire.

PHASMATA, in phyſiology, certain appearances ariſing from the various tinctures of the clouds by the rays of the heavenly bodies, eſpecially the ſun and moon. Theſe are infinitely diverſified by the different figures and ſituations of the clouds, and the appulſes of the rays of light; and, together with the occaſional flaſhings and ſhootings of different meteors, they have, no doubt, occaſioned thoſe prodiges of armies fighting in the air, &c. of which we have ſuch frequent accounts in moſt ſorts of writers. See 2 Maccab. xi. 8. Melancth. Meteor. 2. Shel. de Comet. ann. 1618.

Kircher and Schottus have erroneouſly attempted to explain the phenomenon from the reflection of terreſtrial objects made on opake and congealed clouds in the middle region of the air, which according to them, have the effect of a mirror. Thus, according to theſe authors, the armies pretended by ſeveral hiſtorians to have been ſeen in the ſkies, were no other than the reflection of the like armies placed on ſome part of the earth. See Hiſt. Acad. Roy. Scienc. ann. 1726, p. 405, & eſq.

PHASSACHATES, in natural hiſtory, the name of a ſpecies of agate, which the ancients, in its various appearances, ſometimes called *leucachates* and *perileucos*.

PHEASANT, in ornithology. See Phasianus.

Pheasant's-eye, or Bird's-eye. See Adonis.

PHEBE, a deaconeſs of the port of Corinth, called *Cenchrea.* St Paul had a particular eſteem for this holy woman; and Theodoret thinks the apoſtle lodged at her houſe for ſome time, while he continued in or near Corinth. It is thought ſhe brought to Rome the epiſtle he wrote to the Romans, wherein ſhe is commended and recommended in ſo advantageous a manner. He ſays (Rom. xvi. 1, 2.), "I commend unto you Phebe our ſiſter, which is a ſervant of the church which is at Cenchrea: that ye receive her in the Lord, as becometh ſaints, and that ye aſſiſt her in whatſoever buſineſs ſhe hath need of you; for ſhe hath been a ſuccourer of many, and of myſelf alſo." Some moderns have advanced a notion that Phebe was wife to St Paul; but none of the ancients have ſaid any thing like it. It is thought, in quality of deaconeſs, ſhe was employed by the church in ſome miniſtrations ſuitable to her ſex and condition: as to viſit and inſtruct the Chriſtian women, to attend them in their ſickneſs, and diſtribute alms to them.

PHEGOR, or Peor, a deity worſhipped at a very early period by the Midianites and Moabites, and probably by all the other tribes which then inhabited Syria. Much has been ſaid concerning the functions of this god, and the rank which he held among the Pagan divinities (ſee *Baal-Peor*); and many conjectures have been formed concerning the origin of his name. Moſt of theſe ſeem to have no better foundation than the ſenſeleſs dreams of the Jewiſh rabbies. Phegor, or Peor, is undoubtedly the ſame with the Hebrew word *pechor*, which ſignifies *aperuit*, and probably refers to the prophetic influence always attributed to the ſolar deity, by which he *opened* or *diſcovered* things to come. Accordingly we find Phegor or Peor generally joined to *Baal*, which was the Syrian and Chaldean name of the ſun after he became an object of worſhip; hence *Baal-Phegor* muſt have been the ſun worſhipped by ſome particular rites, or under ſome particular character. What theſe were, a reſolution of *Pechor* into its component parts may perhaps inform us. As this word, wherever it occurs in Scripture, has ſome relation to diſtending or opening the mouth wide, it is probably compounded of phah the *mouth* or *face*, and ehar *naked*. In thoſe countries we know that the women wore veils; but it would appear, that in celebrating the rites of this deity they were unveiled. It ſeems even not improbable, that on theſe occaſions the ſexes danced promiſcuouſly without their clothes; a practice which would naturally give birth to the licentious amours mentioned in the 25th chapter of the book of Numbers. If this be admitted, it will follow that *Phegor* was the ſun preſiding over the myſtyries of Venus.

PHELLANDRIUM, water-hemlock; a genus of the digynia order, belonging to the pentandria claſs of plants. There are two ſpecies, one of which, viz. the aquaticum, is a native of Britain. This grows in ditches and ponds, but is not very common. The ſtalk is remarkably thick and dichotomous, and grows in the water. It is a poiſon to horſes, bringing upon them, as Linnæus informs us, a kind of palſy; which, however, he ſuppoſes to be owing not ſo much to the noxious qualities of the plant itſelf, as to thoſe of an in-

inſect which feeds upon it, breeding within the ſtalks, and which he calls *curculio paraplecticus*. The Swedes give ſwine's dung for the cure. The ſeeds are ſometimes given in intermittent fevers, and the leaves are by ſome added to diſcutient cataplaſms. In the winter, the roots and ſtem, diſſected by the influence of the weather, afford a very curious ſkeleton or network. Horſes, ſheep, and goats, eat the plant; ſwine are not fond of it; cows refuſe it.

Hill's Hiſt. of foſſils, p. 490.

PHENGITES, among the ancients, the name of a beautiful ſpecies of alabaſter. It is a rude irregular maſs, very ſhattery and friable, but of a brightneſs ſuperior to that of moſt other marbles, and excelling them all in tranſparence. The colour is an agreeable pale, yellowiſh, white, or honey colour; the yellowiſh is more intenſe in ſome places than in others, and ſometime makes an obſcure reſemblance of veins. It is very weak and brittle in the maſs; and when reduced to ſmall pieces, may be eaſily crumbled between the fingers into looſe, but conſiderably large angular pieces, ſome perfect, others complex, irregular, or mutilated, and all approaching to a flat ſhape. The ancients were very fond of this ſpecies in public buildings; and the Temple of Fortune, built entirely of it, has long been celebrated. Its great beauty is its tranſparence, from which alone this temple was perfectly light when the doors were ſhut, though it was built without a window, and had no other light but what was tranſmitted through the ſtone its walls were built with. It was anciently found in Cappadocia, and is ſtill plentiful there: we have it alſo in Germany and France, and in Derbyſhire in Great Britain, and ſome other counties. It takes an excellent poliſh, and is very fit for ornamental works, where there is no great ſtrength required. See AMETHYST.

PHENICE, a port of the iſland of Crete, to the weſt of the iſland. St Paul having anchored at Phenice, when he was carried to Rome (Acts xxvii. 12.), adviſed the ſhip's-crew to ſpend the winter there, becauſe the ſeaſon was too far advanced.

PHENICIA. See PHOENICIA.

PHEONS, in heraldry, the barbed heads of darts, arrows, or other weapons.

PHEOS, in botany, a name which Theophraſtus, Dioſcorides, and others, give to a plant uſed by fullers in dreſſing their cloths, and of which there were two kinds, a ſmaller called ſimply *pheos*, and a larger called *hippopheos*. This plant is ſometimes called *phleos*; and is thus confounded with a kind of marſh cudweed, or *gnaphalium*, called alſo by that name; but it may always be diſcovered which of the two plants an author means, by obſerving the ſenſe in which the word is uſed, and the uſe to which the plant was put. The *phleos*, properly ſo called, that is, the cudweed, was uſed to ſtuff beds and other ſuch things, and to pack up with earthen veſſels to prevent their breaking; but the pheos, improperly called *phleos*, only about cloths: this was, however, alſo called *ſtæbe* and *cnaphon*.

PHERECRATES, a Greek comic poet, was contemporary with Plato and Ariſtophanes. After the example of the ancient comedians, who never introduced upon the theatre imaginary but living characters, he acted his contemporaries. But he did not abuſe the liberty which at that time prevailed upon the ſtage; and laid it down as a rule to himſelf never to deſtroy the reputation of any perſon. Twenty-one comedies are attributed to him, of which there now only remain ſome fragments collected by Hertelius and Grotius. From theſe fragments, however, it is eaſy to diſcern, that Pherecrates wrote the pureſt Greek, and poſſeſſed that ingenious and delicate raillery which is called *attic urbanity*. He was author of a kind of verſe called from his own name, *Pherecratick*. The three laſt feet were in hexameter verſe, and the firſt of thoſe three feet was always a ſpondee. This verſe of Horace (for example, *Quamvis pontica pinus*) is a Pherecratick verſe. We find in Plutarch a fragment of this poet upon the muſic of the Greeks, which has been critically examined by M. Burette of the academy of inſcriptions. See the 15th volume of the collection publiſhed by that learned ſociety.

PHERECYDES, a native of Scyros, flouriſhed about the year 560 before the Chriſtian era, and was diſciple of Pittacus, one of the ſeven wiſe men of Greece (ſee PITTACUS). He is ſaid to have been the firſt of all the philoſophers who has written on natural ſubjects and the eſſence of the gods. He was alſo the firſt, it is ſaid, who held the ridiculous opinion, "that animals are mere machines." He was Pythagoras's maſter, who loved him as his own father. This grateful ſcholar having heard that Pherecydes lay dangerouſly ill in the iſland of Delos, immediately repaired thither, in order to give every neceſſary aſſiſtance to the old man, and to take care that no means ſhould be left untried for the recovery of his health. His great age, however, and the violence of his diſeaſe, having rendered every preſcription ineffectual, his next care was to ſee him decently buried; and when he had paid the laſt duty to his remains, and erected a monument to his memory, he ſet out again for Italy. Other cauſes have been aſſigned for the death of Pherecydes; ſome ſay he was eaten up by lice, and others that he fell headlong from the top of Mount Corycius in his way to Delphos. He lived to the age of 85 years, and was one of the firſt proſe writers among the Greeks.

Enfield's Hiſtory of Philoſophy

"Marvellous circumſtances have been related of him, which only deſerve to be mentioned, in order to ſhow that what has been deemed ſupernatural by ignorant ſpectators may be eaſily conceived to have happened from natural cauſes. A ſhip in full ſail was at a diſtance approaching its harbour; Pherecydes predicted that it would never come into the haven, and it happened accordingly: for a ſtorm aroſe which ſunk the veſſel. After drinking water from a well, he predicted an earthquake, which happened three days afterwards. It is eaſy to ſuppoſe that theſe predictions might have been the reſult of a careful obſervation of thoſe phenomena which commonly precede ſtorms or earthquakes in a climate where they frequently happen.

"It is difficult to give in any degree an accurate account of the doctrines of Pherecydes; both becauſe he delivered them, after the manner of the times, under the concealment of ſymbols; and becauſe very few memoirs of this philoſopher remain. It is moſt probable that he taught thoſe opinions concerning the gods and the origin of the world which the ancient Grecian theogoniſts borrowed from Egypt;" and of which the reader will find accounts in different articles of this work. See Egypt, Metaphysics, Myſteries, Mythology, and Polytheism.

PHERETIMA, was the wife of Battus king of Cyrene, and the mother of Arceſilaus. After her ſon's death, ſhe recovered the kingdom by means of Amaſis king of Egypt, and to avenge the murder of Arceſilaus, ſhe cauſed all his aſſaſſins to be crucified round the walls of Cyrene, and ſhe cut of the breaſts of the wives, and hung them up near the bodies of their huſbands. It is ſaid that ſhe was devoured alive by worms; a puniſhment which according to ſome of the ancients, was inflicted by Providence for her unparalleled cruelties.

PHERON, was a king of Egypt, who ſucceeded Seſoſtris. He was blind; and he recovered his ſight by waſhing his eyes, according to the directions of the oracle, in the urine of a woman who had never had any unlawful connections. He tried his wife firſt, but ſhe appeared to have been faithleſs to his bed, and ſhe was burnt with all thoſe whoſe urine could not reſtore ſight to the king. He married the woman whoſe urine proved beneficial.

PHIAL, a well-known veſſel made of glaſs uſed for various purpoſes.

Leyden Phial, is a phial of glaſs coated on both ſides with tin-foil for a conſiderable way up the ſides, of great uſe in electrical experiments. See Electricity, *paſſim*.

PHIDIAS, the moſt famous ſculptor of antiquity, was an Athenian and a cotemporary of the celebrated Pericles; who flouriſhed in the 83d Olympiad. This wonderful artiſt was not only conſummate in the uſe of his tools, but accompliſhed in thoſe ſciences and branches of knowledge which belong to his profeſſion, as hiſtory, poetry, fable, geometry, optics, &c. He firſt taught the Greeks to imitate nature perfectly in this way; and all his works were received with admiration. They were alſo incredibly numerous; for it was almoſt peculiar to Phidias, that he united the greateſt facility with the greateſt perfection. His Nemeſis was ranked among his firſt pieces; it was carved out of a block of marble, which was found in the camp of the Perſians after they were defeated in the plains of Marathon. He made an excellent ſtatue of Minerva for the Plateans; but the ſtatue of this goddeſs in her magnificent temple at Athens, of which there are ſtill ſome ruined remains, was an aſtoniſhing production of human art. Pericles, who had the care of this pompous edifice, gave orders to Phidias, whoſe prodigious talents he well knew, to make a ſtatue of the goddeſs; and Phidias formed a figure of ivory and gold 39 feet high. Writers never ſpeak of this illuſtrious monument of ſkill without raptures; yet what has rendered the name of the artiſt immortal, proved at that time his ruin. He had carved upon the ſhield of the goddeſs his own portrait and that of Pericles; and this was, by thoſe that envied them, made a crime in Phidias. He was alſo charged with embezzling part of the materials which were deſigned for the ſtatue. Upon this he withdrew to Elis, and revenged himſelf upon the ungrateful Athenians, by making for the Elians the Olympic Jupiter; a prodigy of art, and which was afterwards ranked among the ſeven wonders of the world. It was of ivory and gold; 60 feet high, and every way proportioned. "The majeſty of the work did equal the majeſty of the god (ſays Quintilian,) and its beauty ſeems to have added luſtre to the religion of the country." Phidias concluded his labours with this maſterpiece; and the Elians, to do honour to his memory, erected, and appropriated to his deſcendants, an office, which conſiſted in keeping clean this magnificent image.

PHIDITIA, in Grecian antiquity, feaſts celebrated with great frugality at Sparta. They were held in the public places and in the open air. Rich and poor aſſiſted at them equally, and on the ſame footing: their deſign being to keep up peace, friendſhip, good underſtanding, and equality among the citizens great and ſmall. It is ſaid that thoſe who attended this feaſt brought each a buſhel of flour, eight meaſures of wine named *chorus*, five minces of cheeſe, and as many figs.

PHILA, in mythology, one of the attributes of Venus, which diſtinguiſhes her as the mother of love from *φιλειν to love*.

PHILADELPHIA, in antiquity, were games inſtituted at Sardis to celebrate the union of Caracalla and Geta, the ſons of Septimius Severus.

Philadelphia, the capital of Pennſylvania, and preſent ſeat of the federal government, is ſituate in the temperate latitude of 39° 56′ N. 75° 8′ W. Long. It is built on the weſtern bank of the Delaware, about 120 miles above where it flows into the Atlantic ocean; diſtant ninety ſeven miles ſouth-weſt from New York, and one hundred and two miles from Baltimore. The river at Philadelphia is about one mile wide, and the navigation is ſafe for ſhips of 1200 tons burden. The tide riſes ſix feet perpendicular, flowing on at the rate of four miles in an hour, to the Falls near Trenton, which is about thirty miles higher up the country. Above that place the Delaware is paſſable only by boats and timber-rafts.

The ground plot of the city is an oblong ſquare, about one mile north and ſouth, and two miles eaſt and weſt, lying in the narroweſt part of the iſthmus between the Delaware and Schuylkill rivers, about five miles in a right line above their confluence. This oblong was at firſt divided into thirty two ſtreets, twenty three of which lie about north and ſouth, and nine, which interſect the former at right angles, lie as near eaſt and weſt. Theſe ſtreets form one hundred and eighty four ſquares of ground of different areas. The ſtreets running eaſt and weſt are named (except High-ſtreet near the middle of the city) from the trees found in the country on the arrival of the colony: Vine, Saſſafras, Mulberry, High, Cheſnut, Walnut, Spruce, Pine, and Cedar ſtreets, and thoſe running north and ſouth from their numeral order, Front, Second, Third, Fourth, &c. to Broad-ſtreet, which is midway between the two rivers. In deeds and other deſcriptive writings which require exactneſs, theſe ſtreets have the Delaware or Schuylkill prefixed to their numeral names, to diſtinguiſh to which they belong; as Delaware Second-ſtreet, &c.; but as there are very few buildings weſtward of Broad-ſtreet, this addition is never made in common converſation, but when they are named they are always underſtood to be Delaware front unleſs Schuylkill is added.

Of theſe High-ſtreet is one hundred feet, Broad-ſtreet one hundred and thirteen feet, Mulberry ſixty feet, and all the others fifty feet wide. Within the improved parts of the city they are paved, in the middle with pebble ſtones for carts and carriages which uſually contain three-fifths of the whole breadth, and on each ſide with bricks for foot paſſengers. Between the brick and ſtone pavements are gutters paved with brick to carry off the water, and the foot-ways are defended from the approach of carriages, by rows of poſts placed without the gutters, at the diſtance of ten or twelve feet from each other.

Beſides the forementioned main ſtreets, there are many others not originally laid down in the plot; the moſt public of which are Water-ſtreet and Dock-ſtreet. Water-ſtreet is about thirty feet wide, running below the bank, at the diſtance of about forty feet eaſtward from the parallel to Front-ſtreet, extending from the north line of the city ſouthward, to the bridge over the dock, which was formerly a draw-bridge, and retains that name in common uſe, although it was converted into a ſtone arch above thirty years ſince. From the bridge it is forty feet wide in a right line to Pine-ſtreet, and leaves a row of houſes, without yards, on the bank, in its whole length, between it and Front-ſtreet.

Southward of Pine-ſtreet there is an offset of about eighty feet eaſtward, and, the ſtreet from thence to Cedar-ſtreet is 45 feet wide, and called Penn-ſtreet.

Beſides the diviſion into ſtreets, in order to regulate elections, the city and liberties are likewiſe parcelled into wards; the city, from Cedar to Vine-ſtreet, contains twelve wards; the liberties, on the north of the city, two; the diſtrict of Southwark two; Paſſyunk and Moyamenſing, each one.

The magiſtracy conſiſts of two branches: fifteen aldermen are choſen by the freeholders to continue in office for ſeven years; who chooſe a recorder from the citizens at large for ſeven years, and a mayor from their own number for one year. Thirty common-council men are choſen by the citizens at large, entitled to vote for repreſentatives in aſſembly, to continue in office for three years; theſe were intended to form a balanced government upon the principle, that the choice by freeholders, and for a longer term would produce a more ſelect body of aldermen, and that the citizens at large would chooſe characters fitter to repreſent and form the popular branch of city government. Eight aldermen and ſixteen common-council men form a quorum or board to tranſact buſineſs, at which the mayor or recorder preſides; they ſit and deliberate together, but no act is legal, unleſs, a majority of the aldermen, a majority of the common-council men preſent, and the mayor or recorder concur.

A city court is held by the mayor, recorder and aldermen four times a year, and holds cogniſance of all crimes and miſdemeanors committed within the city.

A court of aldermen having cogniſance of debts above forty ſhillings, and not exceeding twenty pounds is held every week beginning on Monday morning, and ſitting by adjournments until the buſineſs of the week is finiſhed.

Each alderman has ſeparate cogniſance of debts, under forty ſhillings.

The number of inhabitants including the city and ſuburbs (including the diſtrict of Southwark and the compactly built part of the Northern Liberties, which to every purpoſe, (but as their governments) are conſidered as parts of the city, is found by the late cenſus to be 42,400, there was then about 7000 houſes, ſtores and workſhops. The number has now increaſed to about 9000, and there are at preſent a great number building. Hence if the number of inhabitants has increaſed in the ſame ratio as the houſes, which is highly probable, the number of citizens may be eſtimated at about 55,000.

The buildings appropriated to public worſhip in the city and ſuburbs are in number 28, and are as follows:

Of the baptiſt church one, German Calviniſt one, proteſtant epiſcopal church three, Friends meeting-houſes five, of the German Lutherans two, Swediſh Lutherans one, of the Hebrews one, of the Moravians one, of the Preſbyterians of different denominations ſix, of the Roman Catholics three, and of the univerſaliſts one.

There are alſo lately erected two buildings by the Africans; the one denominated the African proteſtant epiſcopal church; in which the miniſters of the epiſcopal churches occaſionally officiate. The other is called the African methodiſt epiſcopal church.

The city is provided with a number of public and private charitable inſtitutions; the principal of which are, the Pennſylvania hoſpital, the houſe of employment, commonly called the bettering-houſe; the Friends alms-houſe; Chriſt church hoſpital; the diſpenſary; the humane ſociety; the Philadelphia library; ſeminaries of learning, &c.

The Pennſylvania hoſpital, the deſign of which was firſt ſuggeſted by the late Dr Thomas Bond, is ſupported partly by public grants and partly by private ſubſcriptions; its preſent property amounts to a little above 30,000*l.* Six phyſicians choſen by the managers attend the hoſpital. Lately the aſſembly granted 10,000*l.* out of certain loan-office funds to enable the managers to make additions to the buildings agreeable to the original plan, and to comprize a lying-in and foundling hoſpital, as ſoon as a ſpecific fund can be raiſed.

This inſtitution has been extenſively uſeful, and the conduct of the managers has done honour to their benevolence and integrity. The medical ſtudents pay for the privilege of attending the hoſpital practice, and this money the phyſicians have generouſly given for the purpoſe of founding a medical library, and to purchaſe Dr Chovet's preparations; by the addition of which to Dr Fothergil's valuable preſent, the inſtitution without any expence to its funds, is poſſeſſed of the moſt uſeful and ornamental collection that was ever ſeen in America. The pay of thoſe pupils exceeds 100*l.* per annum, which is amply ſufficient to furniſh the library with new books and to preſerve the anatomical caſtings, &c.

The houſe of employment is under the direction of a board of managers and of the overſeers, or guardians of the poor. This is a ſpacious, convenient building, where the poor of the city and liberties receive a comfortable maintenance; and thoſe who are able to work are employed in ſome coarſe uſeful manufactures. The managers of this houſe were incorporated in the year 1766, and were authoriſed to impoſe taxes to defray the neceſſary contingent expences.

The quaker's alms-houſe, deſigned for the reception of the aged poor of that religious community, is placed under the ſuperintendence of committees appointed from time to time by the monthly meetings of Philadelphia. Beſides their contributions in common with the reſt of their fellow-citizens to the ſupport of the infirm and indigent of the general maſs, this chriſtian ſociety is concerned to make particular proviſion for their own poor: ſome of whom are admitted within theſe walls and receive all the aſſiſtance their ſeveral caſes require.

The Philadelphia diſpenſary was eſtabliſhed by and is wholly dependent on the contributions of a generous public for its continuance. It is under the direction of twelve mangers, elected annually from among the ſubſcribers. Theſe managers provide the beſt medicines that can be procured, and appoint an apothecary, who gives conſtant attendance to prepare and diſtribute them to all the poor who apply. They likewiſe appoint ſix attending and four conſulting phyſicians, whoſe buſineſs it is to viſit the ſick who are unable to go abroad, and to preſcribe when called upon whatever medicines are delivered. It is neceſſary that patients who apply ſhould produce a recommendation from ſome one of the ſubſcribers; and every ſubſcriber who contributes one guinea annually has the privilege of recommending two patients at a time.

Among all the exertions of active benevolence for which this metropolis is diſtinguiſhed, perhaps there is no one calculated to become ſo extenſive a bleſſing as this inſtitution. Many are the inſtances of the poor who do not chooſe to apply for admittance into the Pennſylvania hoſpital, and who at the ſame time are too indigent to pay a phyſician for medicine and attendance. To prevent patients of this deſcription from languiſhing under their complaints, was the benevolent intention of the Philadelphia diſpenſary: and ſo great, indeed, hath been the ſucceſs of the inſtitution, that for one year, from December 1789 to December 1790, 1892 patients were under the care of the board, of whom 1578 were cured, and 111 relieved.

Chriſt Church hoſpital is an endowment for aged women of the proteſtant epiſcopal church, made by Dr John Kearſley, formerly an eminent phyſician in this city; who bequeathed for this purpoſe, an eſtate chiefly landed, which he veſted in the rector, church-wardens, and veſtrymen of the united epiſcopal churches of Chriſt Church and St Peter's.

Since the endowment of this inſtitution, it has received a conſiderable acceſſion of property, by the gift of Mr Joſeph Dobbins, a native of this city, now reſiding in Carolina; ſubject to an annuity during Mr Dobbins's life.

Dr Kearſley's will requires that the women belonging to this inſtitution ſhall be ſupplied with meat, drink, and lodging; with neceſſary aſſiſtance in phyſic and ſurgery:—there are now nineteen on the foundation.

The Humane Society. This charter qualifies the ſociety, as a body corporate, to meet on the firſt Wedneſday in March, and then to chooſe twelve managers for the enſuing year, to ſuperintend and direct in all caſes that relate to the deſign of the inſtitution. In order to ſpread their aſſiſtance as wide as their capital would admit of, they have purchaſed eighteen ſets of inſtruments, the beſt adapted to take bodies out of the water, and eighteen boxes of medicines, &c. which, with printed directions how to uſe them, they have depoſited under prudent perſons, at all thoſe places in and near the city where they were moſt likely to be uſeful.

Beſides theſe principal eſtabliſhments, there are many others, more reſtricted in their deſign and uſefulneſs; as the ſociety for viſiting the public priſon, and alleviating the miſeries of its unhappy tenants; a claſs of citizens, who, in times paſt, have been conſidered as the outcaſts of ſociety, incapable of reformation, and unworthy of pity.—The ſociety to promote the abolition of ſlavery, and to befriend the free Africans, who ſtand in need of ſupport in aſſerting their rights. The ſociety for eſtabliſhing Sunday ſchools, calculated to ſpread the knowledge of religion and uſeful learning among poor children.

Societies, ſome of which are incorporated, for the relief of the widows and children of the clergy, ſupported by the members of the particular community to which they belong; and various other aſſociations. In ſhort, ſo multiplied are the inſtitutions of generoſity and beneficence, public and private, that there is hardly a preſſure under which the poor and ſtranger can ſuffer, but what will meet with ſome alleviation as ſoon as the caſe is ſufficiently known.

The Philadelphia Library. This valuable collection of books was begun in the year 1731, with the trifling ſum of 100*l*. raiſed by ſubſcription among a few private gentlemen, the friends of ſcience. In the year 1742, the ſtock had accumulated ſo much, and its utility was ſo generally recognized, that the company received a charter of incorporation. Since this latter period the collection has greatly increaſed, by an annual contribution of ten ſhillings from each member, and the occaſional donations of generous individuals, at home and abroad. At preſent it contains more than twelve thouſand volumes, beſides a valuable philoſophical apparatus. The rooms are open every day in the week, except Sunday, for the benefit of ſtrangers as well as citizens. Such free acceſs to ſo large a repoſitory of knowledge, in every branch of ſcience, cannot fail of being extenſively uſeful. And perhaps it is to inſtitutions of this kind which are eſtabliſhed in all the conſiderable towns of America, that her citizens are in a great degree, indebted for their general information and improvement.

Under this head it is not amiſs to take notice that the Loganian library, the moſt rare and valuable collection of books in the ancient languages which is to be found on the continent, has lately been removed to a room built for the purpoſe, adjoining to the city library. This maſs of antiquity was bequeathed by the late James Logan, Eſq. to the public; and cannot fail to add much to the gratification of thoſe who have a taſte to explore the tomes of ancient erudition.

Seminaries of learning. Of theſe the firſt in rank is the Pennſylvania univerſity. This ſeminary was inſtituted by a ſpecial act of the legiſlature in the year 1779: and by another act in the year 1791, it was united with the old college, academy, and charitable ſchools of Philadelphia, and placed under the direction of one board, conſiſting of twenty four truſtees, of whom the governor of the ſtate for the time being, is always preſident ex officio.

The funds of this inſtitution are about two thouſand three hundred pounds per annum. The number of ſtudents in all the ſchools is about five hundred; of whom five-and-twenty are admitted annually to the honour of degrees. The library and philoſophical apparatus which belong to the ſeminary are judiciouſly ſelected, and very reſpectable.

The faculty conſiſt of a provoſt, who is profeſſor of natural philoſophy; a vice-provoſt, who is profeſſor of moral philoſophy; and profeſſors of the Greek and Latin languages; of Mathematics; of Engliſh and belles lettres; of the German language; of anatomy, ſurgery, and midwifery; of the practice of phyſic; of the inſtitutes, and clinical medicine; of chemiſtry; of anatomy, &c. of materia medica; of botany, and natural hiſtory; and of law.

The college of phyſicians. This ſociety was formed in the year 1787, and obtained a charter in the year 1789. It was inſtituted with the laudable deſign of conſulting in new and difficult caſes, and introducing greater uniformity in practice They hold their ſtated meetings on the firſt Tueſday in every month.

The muſeum, which Mr Peale has now brought to a degree of importance and perfection which would not have been looked for in the time, is highly ornamental and uſeful; and the many public and private inſtitutions which abound in Philadelphia, at once announce its proſperity and contribute to the advantage and pleaſure of its inhabitants.

American philoſophical ſociety.—The American philoſophical ſociety, for promoting uſeful knowledge, was formed in the year 1769, by the union of two ſocieties, which had been inſtituted with ſimilar views; viz. the advancement of uſeful knowledge.

One of theſe, ſtiled, "The American philoſophical ſociety," was inſtituted in the year 1743, and, at the time of their union conſiſted of 127 members: the other ſtyled, "The American ſociety for promoting and propagating uſeful knowledge, held in Philadelphia;" was inſtituted in the year 1766, and at the time of their union conſiſted of 78 fellows, and 69 correſponding members.

The peculiar ſituation of Philadelphia, poſſeſſing, by means of the Delaware, all the advantages of an excellent ſeaport, and from its inland ſituation in the midſt of an extenſive and well ſettled country, admirably adapted to the internal trade both of Pennſylvania and the neighbouring ſtates, has contributed greatly to the increaſe of its population and the extenſion of its commerce, the foundations of which were laid in the wiſdom and moderation of its firſt founders. Placed in the midſt of a plentiful country, its markets are amply ſupplied with all the neceſſaries and moſt of the luxuries of life.

There is not a place in America, or, perhaps, in Europe, which can boaſt of a better market of freſh proviſions, than Philadelphia. Nothing affords a more impreſſive image of the number of the inhabitants, and the plenty with which they are ſupplied, than a walk through High-ſtreet, on the morning of a market-day. Here is the principal market-place, which abounds, twice every week, (on Wedneſdays and Saturdays) with the greateſt plenty of butchers' meat, poultry, eggs, butter, flour, cheeſe, and vegetables. Butchers' meat, and vegetables, may be had at the ſame place, on any day of the ſeven, except Sunday. The clerks of the market, officers appointed by the corporation, attend on all the ſtated market-days, to detect frauds, prevent the ſale of unwholeſome proviſions, diſcourage foreſtalling, and to preſerve good order.

Proviſions and houſe rents were very moderate till of late, when the arrival of great numbers of people from Europe and the Weſt Indies, and the ſupplies of proviſions for the belligerent powers of Europe have greatly increaſed the rates of both.

The banks of North America, the United States, and Pennſylvania, all of which are in Philadelphia, have greatly contributed to facilitate and extend its commerce.

Philadelphia, an ancient town of Turkey in Aſia, in Natolia. It is ſeated at the foot of mount Tmolus, by the river Cogamus, from whence there is an exceeding fine view over an extenſive plain. This place was founded by Attalus Philadelphus, brother of Eumenes.

It was very liable to earthquakes, which perhaps, aroſe from its vicinity to the region called *Catakekanmene*. So ſevere were thoſe earthquakes, that even the city walls were not ſecure; and ſo frequent were they, that theſe experienced daily concuſſions. The inhabitants, therefore, who were not numerous, lived in perpetual apprehenſion, and their conſtant employment was in repairs. In fact, ſo great were their fears, that their chief reſidence was in the country, the ſoil of which was very fertile. Such is Strabo's account of this place. In the year 1097. it was taken by aſſault by John Ducas the Greek general. It was without difficulty reduced alſo in the year 1109, under the ſame emperor. The Turks marched from the Eaſt with a deſign to plunder it and the maritime towns. The Emperor Mamul, in 1175, retired for protection from the Turks to this place. In 1309 it fell by lot to Caraman. In 1306 it was beſieged by Aliſaras, and conſiderably haraſſed; but was not taken. In 1391, this place alone refuſed to admit Bajazet; but it was at length forced to capitulate for want of proviſions. It has been matter of ſurpriſe that this town was not totally abandoned; and yet it has ſurvived many cities leſs liable to inconveniences, and is ſtill an extenſive place, tho' in its appearance it is poor and mean. Some remnants of its walls are ſtill ſtanding, but with large gaps. The materials of the wall are ſmall ſtones ſtrongly cemented. It is thick, lofty, and has round towers. Near this place, between the mountains, there is a ſpring of a purgative quality; it is much eſteemed, and many people reſort to it in the hot months. It taſtes like ink, is clear, but tinges the earth with the colour of ochre. The famous wall which credulity has aſſerted to be made of human bones, ſtands beyond this and beyond the town. See the article next.

Travels in Greece.

When Dr Chandler was there he tells us, "The biſhop of Philadelphia was abſent; but the proto-papas or chief-prieſt, his ſubſtitute, whom we went to viſit, received us at his palace, a title given to a very indifferent houſe or rather a cottage of clay. We found him ignorant of the Greek tongue, and were forced to diſcourſe with him by an interpreter in the Turkiſh language. He had no idea that Philadelphia exiſted before Chriſtianity, but told us it had become a city in conſequence of the many religious foundations. The number of churches he reckoned at 24, moſtly in ruins and mere maſſes of wall decorated with painted ſaints. Only ſix are in a better condition, and have their prieſts. The epiſcopal church is large, and ornamented with gilding, carving, and holy portraits, The Greeks are about 300 families, and live in a friendly intercourſe with the Turks, of whom they ſpeak well. We were aſſured that the clergy and laity in general knew as little of Greek as the protopapas; and yet the liturgies and offices of the church are read as elſewhere, and have undergone no alteration on that account.

"The Philadelphians are a civil people. One of the Greeks ſent us a ſmall earthen veſſel full of choice wine. Some families beneath the trees by a rill of water, invited us to alight and partake of their refreſhments. They ſaluted us when we met: and the aga or governor, on hearing that we were Franks, bade us welcome by a meſſenger.

"Philadelphia poſſeſſing waters excellent in dying, and being ſituated on one of the moſt capital roads to Smyrna, is much frequented, eſpecially by Armenian merchants. The Greeks ſtill call this place by its ancient name, but the Turks call it *Allahijur*. The number of inhabitants are about 7000 or 8000; of whom 2000 are ſuppoſed to be Chriſtians. It is about 40 miles E. S. E. of Smyrna. E. Long. 28. 15. N. Lat. 38. 28.

Philadelphia-ſtones, a name which ſome authors have given to what is otherwiſe called *Chriſtian bones*, found in the walls of that city. It is a vulgar error that theſe walls are built of bones; and the tradition of the country is, that when the Turks took the place, they fortified it for themſelves, and built their walls of the bones of the Chriſtians whom they had killed there. Dr Smyth, in one of his epiſtles, mentions this wall as an inſtance of Turkiſh barbarity. This idle opinion has gained credit merely from a looſe and porous ſtone of the ſparry kind, found in an old aqueduct, which is ſtill in the wall. Sir Paul Rycaut brought home pieces of theſe ſtones, which even he ſuppoſed to have been bones, but they proved on examination to be various bodies, chiefly vegetable, incruſted over and preſerved in a ſpar of the nature of that which forms incruſtations in Knareſborough ſpring, and other places with us. Theſe bodies are often cemented together in conſiderable numbers by this matter, and their true ſhape loſt in the congeries till a diligent and judicious eye traces them regularly.

Philadelphian-Society, in eccleſiaſtical hiſtory, an obſcure and inconſiderable ſociety of myſtics. They were formed about the end of the laſt century by an Engliſh female fanatic, whoſe name was *Jane Leadley*. This woman ſeduced by her viſions, predictions, and doctrines, ſeveral diſciples, among whom were perſons of learning. She believed that all diſſenſions among Chriſtians would ceaſe, and the kingdom of the Redeemer become a ſcene of charity and felicity, if Chriſtians, diſregarding the forms of doctrine or diſcipline of their ſeveral communions, would all join in committing their ſouls to the care of the internal guide, to be inſtructed, governed, and formed, by his divine impulſe and ſuggeſtions. But ſhe went farther than this: ſhe even pretended a divine commiſſion to proclaim the approach of this glorious communion of ſaints; and was convinced that the ſociety eſtabliſhed by herſelf was the true kingdom of Chriſt. One of her leading doctrines was, that of the final reſtoration of all intelligent beings to perfection and happineſs.

PHILADELPHUS, in antiquity, was a title or ſurname born by ſeveral ancient kings; formed from the Greek, φιλος "friend, lover," and αδελφος, "brother;" *q. d.* one who loves his brother or brethern. See Ptolemy and Egypt.

Philadelphus, the Pipe-tree, or *Mock orange*; a genus of the monogynia order, belonging to the icoſandria claſs of plants.

Species 1. The coronarius, white ſyringe, or mock-Britain has been long cultivated in the gardens of country as a flowering ſhrub; it is not well known in what country it is to be found native. It riſes ſeven or eight feet high; ſending up a great number of ſlender ſtalks from the root. Theſe have a grey bark, branch out from their ſides, and are garniſhed with oval ſpear-ſhaped leaves. Theſe laſt have deep indentures on their edges; their upper ſurface being of a deep green, but the under ſurface pale, with the taſte of a freſh cucumber. The flowers are white, and come out from the ſides and at the ends of the branches in looſe bunches, each ſtanding on a diſtinct foot-ſtalk: they have four oval petals, which ſpread open, with a great number of ſtamina within, ſurrounding the ſtyle.

Dict. of Planting and Gardening.

This ſhrub by its flowers makes a fine figure in May and June; for they are produced in cluſters both at the end and from the ſides of the branches. They are of a fine white colour, and exceedingly fragrant. The petals of which each is compoſed are large, and ſpread open like thoſe of the orange; and then forming branches, which ſtand each on its own ſeparate ſhort footſtalk, and being produced in plenty all over the ſhrub, both at once feaſt the eye and the ſmell: The eye, by the pleaſing appearance it will then have; the ſmell, as the air at ſome diſtance will be replete with the odoriferous particles conſtantly emitted ftom thoſe fragrant flowers. Theſe flowers, however, are very improper for chimneys, water glaſſes, &c. in rooms; for in thoſe places their ſcent will be too ſtrong; and for the ladies in particular, often too powerful.

The double-flowering ſyringa, is a low variety of this ſpecies, ſeldom riſing to more than a yard high. The deſcription of the other belongs to this ſort, except that the leaves and branches are proportionably ſmaller and more numerous, and the bark of the ſhoots of a lighter brown. It is called the *Double flowering ſyringa*, becauſe it ſometimes produces a flower or two with three or four rows of petals; whereas, in general, the flowers, which are very few, and ſeldom produced, are ſingle. They are much ſmaller than thoſe of the other; and you will not ſee a flower of any kind on this ſhrub oftener perhaps than once in five years. It is hardly worth propagating on this account; ſo that a few plants only ought to be admitted into a collection, to be ready for obſervation.

The dwarf ſyringa is ſtill of lower growth than the other, ſeldom ariſing to more than two feet in height. The deſcription of the firſt ſort ſtill agrees with this; only that the branches and leaves are ſtill proportionally ſmaller and more numerous, and the bark is ſtill of a lighter brown. It never produces flowers.

2. The nanus, with oval leaves ſomewhat indented, and double flowers, ſeldom riſes above three feet high; the flowers come out ſingly from the ſides of the branches, and have a double or treble row of petals of the ſame ſize and form as well as the ſame ſcent with the former; but this ſort flowers very rarely, ſo is but little eſteemed.

3. The inodorous, with entire leaves, is a native of Carolina, and as yet but little known in Europe. It riſes with a ſhrubby ſtalk of about 16

feet in height, ſending out ſlender branches from the ſides oppoſite, garniſhed with ſmooth leaves ſharped like thoſe of the pear-tree, and ſtanding on pretty long foot ſtalks. The flowers are produced at the ends of the branches; and are large, white, ſpreading open, with a great number of ſhort ſtamina with yellow ſummits. This is called the *Carolina ſyringa*, is the talleſt grower by far of any ſort of the ſyringa, and makes the grandeſt ſhow when in blow; though the flowers are deſtitute of ſmell.

The propagation of all the ſorts is very eaſy: They are increaſed by layers, cuttings, or ſuckers. 1. The moſt certain method is by layers; for the young twigs being laid in the earth in the winter, will be good-rooted plants by the autumn following. 2. Theſe plants may be increaſed by cuttings, which being planted in October, in a ſhady moiſt border, many of them will grow; though it will be proper to let thoſe of the Carolina ſort remain until ſpring, and then to plant them in pots, and help them by a little heat in the bed. By this aſſiſtance, hardly one cutting will fail. 3. They may be alſo increaſed by ſuckers: for all the ſorts throw out ſuckers, though the Carolina ſyringa the leaſt of any. Theſe will all ſtrike root, and be fit for the nurſery ground: nay, the double-flowering and the dwarf ſorts are always increaſed this way; for theſe plants having ſtood five or ſix years, may be taken up and divided into ſeveral ſcores. All the plants, however, whether raiſed from layers, cuttings, or ſuckers ſhould be planted in the nurſery-ground to get ſtrength, before they are ſet out for growth. They ſhould be planted a foot aſunder, and the diſtance in the rows ſhould be two feet. After this they will require no other care than hoeing the weeds, until they have ſtood about two years, which will be long enough for them to ſtand there.

PHILÆNI, were two brothers, citizens of Carthage, who ſacrificed their lives for the good of their country. At the time when the Carthaginians ruled over the greateſt part of Africa, the Cyrenians were alſo a great and wealthy people. The country in the middle betwixt them was all ſandy, and of an uniform appearance. There was neither river nor mountain to diſtinguiſh their limits; a circumſtance which engaged them in a terrible and tedious war with one another. After their armies and fleets had been often routed and put to flight on both ſides, and they had weakened one another pretty much; and fearing leſt by and by, ſome third people ſhould fall upon the conquered and conquerors together, equally weakened, upon a ceſſation of arms they made an agreement, "that upon a day appointed deputies ſhould ſet out from their reſpective homes, and the place where they met one another ſhould be accounted the common boundary of both nations." Accordingly the two brothers called Philæni, ſent from Carthage, made all diſpatch to perform their journey. The Cyrenians proceeded more ſlowly. Theſe laſt, perceiving themſelves a little behind, and turning apprehenſive of puniſhment at home for miſmanaging the affair, charged the Carthaginians with ſetting out before the time; made a mighty buſtle upon it; and, in ſhort, would rather chooſe any thing than to go away outdone. But whereas the Carthaginians deſired any other terms, provided only they were fair, the Greeks made this propoſal to the Carthaginians, "either to be buried alive in the place which they claimed as the boundary to their nation; or that they would advance forward to what place they inclined upon the ſame condition." The Philæni accepting the offer, made a ſacrifice of themſelves and their lives to their country, and ſo were buried alive. The Carthaginians dedicated altars in that place to the memory of the two brothers. Theſe altars, called *Aræ Philænorum*, ſerved as a boundary to the empire of the Carthaginians, which extended from this monument to Hercules's Pillars, which is about 2000 miles, or, according to the accurate obſervations of the moderns, only 1420 geographical miles. It is Salluſt who gives this account in his hiſtory of the Jugurthine war.

PHILANTHROPY is compounded of two Greek words which ſignify the love of mankind. It is therefore of nearly the ſame import with *benevolence* (A); and differs from *friendſhip*, as this latter affection ſubſiſts only between a few individuals, whilſt *philanthropy* comprehends the whole ſpecies.

Whether man has an inſtinctive propenſity to love his ſpecies, which makes him incapable of happineſs but in the midſt of ſociety, and impels him to do all the good that he can to others, feeling their felicity an addition to his own, is a queſtion that has been warmly debated among philoſophers ever ſince metaphyſics was ſtudied as a ſcience. With the opinions of the ancients we ſhall not, in this detached article, trouble our readers; but it would be unpardonable to paſs without notice the different theories which on ſo intereſting a ſubject have divided the moderns.

Hobbes, who believed, or pretended to believe, that right reſults from power, and that in ſociety there is no other ſtandard of juſtice than the law of the land, or the will of the ſupreme magiſtrate, built his opinions upon a theory of human nature in which philanthropy has no place. According to him, mankind, in the original ſtate of nature, were wholly *ſelfiſh*. Each endeavoured to ſeize, by fraud or force, whatever he thought would contribute to his comfort; and as all had nearly the ſame wants, the inevitable conſequence of this ſelfiſhneſs was univerſal war. We are taught indeed by the ſame philoſopher, that, in a ſeries of ages, mankind diſcovered the miſeries of this ſtate of nature; and therefore, upon the ſame baſis of univerſal ſelfiſhneſs, formed ſocieties over which they placed ſupreme governors for the purpoſe of protecting the weak againſt the violence of the ſtrong. He does not, however, explain how men, whoſe angry and ſelfiſh paſſions were thus excited to the utmoſt againſt each other, could enter upon this friendly treaty; or, ſuppoſing it formed, how the ignorant multitude were induced to pay obedience to the more enlightened few. Clogged with this and other inſurmountable difficulties, his philoſophy of human nature ſoon fell into merited contempt; but about the *origin* of philanthropy thoſe who united in oppoſition to him ſtill thought very differently from one another.

(A) We ſay *nearly* of the ſame import; becauſe *benevolence* extends to every being that has life and ſenſe, and is of courſe ſuſceptible of pain and pleaſure; whereas *philanthropy* cannot comprehend more than the human race.

The elegant *Shafteſbury*, who had imbibed much of the ſpirit of Plato, endeavoured, like his maſter, to deduce all the duties of man, and almoſt all his actions, from a number of internal feelings or inſtincts which he ſuppoſed to be interwoven with his conſtitution by the immediate hand of God. This ſyſtem appeared ſo honourable to human nature, and at the ſame time was ſo eaſily comprehended, that the noble lord had ſoon many followers, and may indeed be conſidered as the founder of a ſchool which has produced philoſophers whoſe works do honour to the age and country in which they flouriſhed. Among theſe we muſt reckon *Biſhop Butler*, *Hutchiſon*, *Lord Kames*, *Dr Beattie*, and perhaps *Dr Reid*.

According to the ſyſtem of theſe writers, the whole duty of man reſults from an intuitive principle, to which they have given the name of the moral ſenſe; and with this ſenſe they conceive philanthropy to be inſeparably united, or rather perhaps to make an eſſential part of it. (See MORAL PHILOSOPHY.) If this theory be carried to its utmoſt extent, as it has been by ſome of its patrons, it ſeems to follow, that peace and harmony ſhould reign among ſavages; and that a man who had from his infancy grown up in ſolitude, would be delighted with the firſt ſight of a fellow-creature, and run to him with eagerneſs as to a new ſource of enjoyment. This concluſion, however, is contrary to acknowledged facts. Savages are generally divided into ſmall tribes or hordes; and though the attachment of individuals to their own tribe appears indeed to be abundantly ſtrong, the tribes themſelves are frequently at war, and entertain a conſtant jealouſy of each other. Savages, too, are almoſt univerſally afraid of ſtrangers; and the few ſolitary individuals, who have been caught in parts where they had run wild from their infancy, inſtead of being delighted with the appearance of fellow-men, have either fled from them with their utmoſt ſpeed, or been fixed to the ſpot in terror and aſtoniſhment. Theſe are no indications of that inſtinctive philanthropy for which ſome writers ſo ſtrenuouſly plead. They have indeed induced others to deny, that in human nature there is any inſtinctive principles at all; and to endeavour to account for our ſeveral propenſities by the influence of education producing early and deep-rooted habits.

At the head of this ſchool ſtood Locke and Hartley. The former, employing himſelf almoſt wholly on the intellectual powers of man, and combating the abſurd, though then generally received, belief, that there are in the human mind innate principles of ſpeculative truth, has touched but incidentally on our principles of action. It ſeems, however, to be evident, that he did not conſider any *one* of theſe principles as innate; and his opinion was adopted by Hartley, who ſtudied the ſenſitive part of human nature with greater induſtry and ſucceſs than perhaps any writer who had preceded him in that department of ſcience. This philoſopher refuſes all kinds of inſtinct to man, even the στοργη of a mother to her new-born infant, and that which has been generally ſuppoſed innate—the propenſity of the infant to ſuck the breaſt. It is therefore needleſs to ſay that in his theory of human nature, innate philanthropy can have no place.

The reader, however, muſt not ſuppoſe, that the theory of Hartley is the theory of Hobbes. Though he admits no *innate* principles of action in the human mind, he is far from dreaming that the original ſtate of man was a ſtate of war and ſelfiſhneſs, or that the acquiſition of philanthropic ſentiments is not natural. He conſiders ſuch acquiſitions as even neceſſary and unavoidable, and founds them on the great law of aſſociation, which we have elſewhere endeavoured to explain (See METAPHYSICS, Part I. chap. v.) Hartley was a Chriſtian, and appears to have been a man of great piety. Conceiving with Locke that men are born without any ideas, or any principles either of knowledge or of action, but that they are ſubject to the law of aſſociation as much as to the impreſſions of ſenſe, he ſeems to have thought, that the important purpoſe for which they are ſent into this world is, that they may acquire habits of piety and virtue, which, operating like inſtincts, will fit them for the purer ſociety of a future ſtate. That this theory is unfriendly to morals, no man who underſtands it will preſume to affirm. It appears, indeed, to be more conſiſtent with the neceſſity of a revelation from God than that of Shafteſbury, which has ſo many followers: but notwithſtanding this, we cannot help thinking that the excellent author has carried his antipathy to inſtincts much too far (ſee INSTINCT), and that the truth lies in the middle between him and his opponents.

Without ſome inſtincts to influence before the dawn of reaſon, it is not eaſy to be conceived how children could be induced to that exerciſe which is abſolutely neceſſary to life and health; nor does it appear with ſufficient evidence that the human race are deſerted by every inſtinct as ſoon as their rational powers are evolved. It ſeems to be a matter of fact which cannot be controverted, that women have an inſtinctive attachment to their new-born infants; but that theſe, when they become capable of diſtinguiſhing objects, are *inſtinctively* attached to their parents, their brothers, and ſiſters, is a poſition which, though it may be true, ſeems incapable of proof. That they ſoon appear to be ſo attached, is a fact which we believe no man will deny: but the attachment may be accounted for by the aſſociating principle operating upon that deſire of happineſs which is neceſſarily formed as ſoon as happineſs is experienced. (See PASSION). An infant becomes earlier attached to its nurſe than to any other perſon; becauſe, feeling wants which ſhe ſupplies, the idea of enjoyment becomes ſoon aſſociated in its mind with the perception of the woman. If this woman be its mother, a haſty obſerver immediately attributes this attachment to inſtinct directing the infant to love its parent; but that inſtinct has here no place, is evident from the well-known facts, that a child is as fond of a tender nurſe, though no relation, as of the moſt affectionate mother; and as regardleſs of a mother who ſeldom ſees it, or ſees it with indifference, as of any other perſon. Nay, we have ſeen children of the ſweeteſt diſpoſitions as fond of the maid with whom they ſlept, as of a very affectionate parent by whom they had been tenderly nurſed: and ſure no man will ſay that this could be inſtinct; it was evidently a new aſſociation of the idea of the maid with the greateſt happineſs which they enjoyed after the period of their ſuckling was at an end.

It is much in the ſame way that children acquire an attachment to their brothers and ſiſters. Brothers and ſiſters being conſtantly together, contribute to each other's amuſement: hence ariſes that pleaſure which they have in each other's company, and the uneaſineſs which they feel when ſeparated. This generates mutual love in their minds, which is ſtrengthened by the perpetual injunctions, of their parents; for if theſe have any virtue themſelves, they cannot fail to inculcate the duty of loving each other on their tender offſpring. Benevolence, thus generated, ſoon extends to their daily companions; and takes a wider and a wider range as theſe companions are multiplied, and as children advance towards the ſtate of manhood. New objects then preſent themſelves to the mind. A man ſoon diſcovers, that, as he is a member of a community, his happineſs as an individual depends in a great meaſure on the proſperity of the whole. Hence ariſes *patriotiſm*, and that pleaſure which we all take in the eminence of our countrymen. But the principle of benevolence ſtops not here. He whoſe mind is enlarged by a liberal education, conſiders all particular countries as provinces of one great country extended over the whole globe; and all mankind, of courſe, as not only ſharing the ſame nature with himſelf, but as being in reality his fellow-citizens and brethren. The principles of religion, if he be actuated by them, muſt aid theſe reflexions, and make him wiſh the happineſs of all who ſtand in the ſame relation with himſelf to the Great Governor of the world. This is *philanthropy*; and we ſee how it may ſpring, by the great law of aſſociation, from deſires which, in their original ſtate, cannot be conſidered as other than ſelfiſh. It is a calm ſentiment, which we believe hardly ever riſes to the warmth of affection, and certainly not to the heat of paſſion.

Should any of our readers be diſpoſed to controvert this opinion, or to fancy it degrading to human nature, we will not enter into controverſy with them; we only beg leave to aſk, whether they have ever rejoiced in the good fortune of a ſtranger or foreigner, or regretted his loſs, with any portion of thoſe feelings which they have frequently experienced on hearing of the proſperity or the death of a friend or a neighbour? We anſwer candidly for ourſelves, that we feel no intereſt which can be called *paſſion* or *affection* in the fortunes of a native of China; and yet we ſhould be ſorry to think that our philanthropy is leſs than that of other men. A common clown, we are inclined to believe, ſeldom extends his affection beyond his friends and neighbours; and, though, from having often heard his country praiſed and knowing that he belongs to that country, he would probably be offended at the man who ſhould prefer another to it; yet if no miſfortune befal himſelf, or his friends and neighbours, we imagine that his grief for public calamities may be borne with patience. In his mind no ſuch aſſociations have been formed as compromiſe the good of a country, far leſs of all countries; and therefore his philanthropy muſt be confined to a very limited range. We doubt not, however, but that as opportunity offers, and as circumſtances permit, ſuch a man is ready to feed the hungry and clothe the naked of all countries; not indeed from ſentiments of affection either innate or acquired, but from the obvious reflection that he is not exempted from thoſe calamities which have befallen them, and from a ſtill higher principle—a ſenſe of duty to that God who has made of one blood all nations upon earth, and commanded them to be mutually aiding to each other.

PHILEMON, a Greek comic poet, was ſon to Damon, and cotemporary with Menander. Any advantage he had over this poet, was owing leſs to his own merit than to the intrigues of his friends. Plautus has imitated his comedy *du Marchand*. He is reported to have died laughing on ſeeing his aſs eat figs. He was then about 97 years of age. His ſon, Philemon the younger, was alſo the author of 54 comedies, of which there are ſtill extant ſome conſiderable fragments collected by Grotius. Theſe clearly prove that he was not a poet of the firſt rank. He flouriſhed about the year 274 before our Saviour.

PHILEMON, was a rich citizen of Coloſſæ in Phrygia. He was converted to the Chriſtian faith, with Appia his wife, by Epaphras the diſciple of St Paul; for St Paul himſelf did not preach at Coloſſæ, Coloſſ. ii. 1. Perhaps we ſhould have known nothing of St Philemon, had it not been on the account of his ſlave Oneſimus, who having robbed him, and run away from him, came to Rome where he found St Paul, and was very ſerviceable to him. St Paul converted him, baptized him, and ſent him back to his maſter Philemon; to whom he wrote a letter ſtill extant, and which paſſes for a maſterpiece of that kind of eloquence, natural, lively, ſtrong, and pathetic, that was peculiar to St Paul. Philemon (1. 2.) had made a church of his houſe, and all his domeſtics, as well as himſelf, were of the houſehold of faith. His charity, liberality, and compaſſion, were a ſure refuge to all that were in diſtreſs. The Apoſtolical Conſtitutions ſay, that St Paul made him biſhop of Coloſſæ; but the Menæa inſinuate, that he went to Gaza in Paleſtine, of which he was the apoſtle and firſt biſhop. From thence he returned to Coloſſæ where he ſuffered martyrdom with Appia his wife, in the time of Nero. They relate ſeveral particulars of his martyrdom, and ſay, that his body remained at Coloſſæ, where it performed ſeveral miracles.

PHILETAS, a Greek poet and grammarian, of the iſland of Cos, flouriſhed under Philip and Alexander the Great, and was preceptor of Ptolemy Philadelphus. He was the author of ſome elegies, epigrams, and other works, which have not come down to us. He is celebrated in the poems of Ovid and Propertius, as one of the beſt poets of his age. Elian reports a very improbable ſtory of him, namely, 'that his body was ſo ſlender and feeble, that he was obliged to have ſome lead in his pockets, to prevent him from being carried away by the wind.'

PHILETUS. St Paul writing to Timothy (2 Tim. ii. 16, 17, 18.) in the 65th year of Chriſt, and a little while before his own martyrdom, ſpeaks thus: "But ſhun profane and vain babblings, for they will increaſe unto more ungodlineſs. And their word will eat as doth a canker; of whom is Hymenæus and Philetus; who concerning the truth have erred, ſaying, that the reſurrection is paſt already, and overthrow the faith of ſome." We have nothing very certain concerning Philetus; for we make but ſmall account of what is read in the falſe Abdias, in the life of St James major, even ſuppoſing this author had not put the name of Philetus; inſtead of Phygellus. This is the ſubſtance of what is found in Abdias. St James the ſon of Zebedee, paſſing through the ſynagogues of Judea and Samaria, preached everywhere the faith of Jeſus Chriſt. Hermogenes and Philetus ſtrenuouſly oppoſed him, affirming, that Jeſus Chriſt was not the Meſſiah. Hermogenes was a notable magician, and Philetus was his diſciple, who being converted, was deſirous to bring his maſter to St James; but Hermogenes bound him up ſo by his magic art, that he could not come at the apoſtle. Philetus found means to make St James acquainted with what had happened to him; upon which St James unbound him, and Philetus came to him. Hermogenes perceiving how ineffectual his art was againſt the ſaint, became himſelf a convert as well as Philetus.

PHILIBEG, is a little plaid, called alſo *kilt*, and is a ſort of ſhort petticoat reaching nearly to the knees, worn by the Scotch Highlanders. It is a modern ſubſtitute for the lower part of the plaid, being found to be leſs cumberſome, eſpecially in time of action, when the Highlanders uſed to tuck their brechdan into their girdle. Almoſt all of them have a great pouch of badger and other ſkins, with taſſels dangling before, in which they keep their tobacco and money.

PHILIP, foſter-brother of Antiochus Epiphanes (1 Macc. vi. 14. & 55, 2 Macc. ix. 29.), was a Phrygian by birth and very much in Antiochus's favour. This prince made him governor of Jeruſalem (2 Macc. viii. 8. v. 22.) where he committed many outrages upon the Jews, to force them to forſake their religion. Seeing that Apollonius and Seron were defeated by Judas Maccabæus, he ſent for new ſuccours to Ptolemy governor of Cœlo-Syria, who ſent him Gorgias and Nicanor with a powerful army. Some time after, Antiochus going beyond the Euphrates, to extort money from the people, Philip went along with him; and Antiochus finding himſelf near his end (1 Macc. vi. 14.) made him regent of the kingdom, put his diadem into his hands, his royal cloak, and his ring, that he might render them to his ſon the young Antiochus Eupator. But Lyſias having taken poſſeſſion of the government in the name of young Eupator, who was but a child, Philip not being able to cope with him, durſt not return into Syria; but he went into Egypt, carrying the body of Epiphanes along with him, there to implore aſſiſtance from Ptolemy Philometor againſt Lyſias the uſurper of the government of Syria. The year following, while Lyſias was buſy in the war carrying on againſt the Jews, Philip got into Syria, and took poſſeſſion of Antioch: But Lyſias returning into the country, with great diligence, retook Antioch, and put Philip to death, who was taken in the city.

Philip the apoſtle was a native of Bethſaida in Galilee. Jeſus Chriſt having ſeen him, ſaid to him, "Follow me," John i. 43. 44. &c. Philip followed him; and ſoon after finding Nathanael, Philip ſaid to him, "We have found the Meſſiah, of whom Moſes and the prophets have ſpoken, Jeſus of Nazareth, the ſon of Joſeph." Nathanael aſked him, Can any thing good come out of Nazereth? To which Philip replied, "Come and ſee." Then he brought Nathanael to Jeſus, and they went with him to the marriage of Cana in Galilee. St Philip was called at the very beginning of our Saviour's miſſion; and when Jeſus Chriſt was about to feed the 5000 that followed him (Luke vi. 13. Mat. x. 2. John vi. 5—7.) he aſked St Philip, only to prove him, whence bread might be bought for ſuch a multitude of people? Philip anſwered, that 200 penny-worth of bread would not be ſufficient for every one to taſte a little. Some Gentiles having a curioſity to ſee Jeſus Chriſt, a little before his paſſion, they addreſſed themſelves to St Philip (John xii. 21, 22.) who mentioned it to St Andrew, and theſe two, to Chriſt. At the laſt ſupper, Philip deſired our Saviour, that he would be pleaſed to ſhow them the Father, being all that they deſired (John xiv. 8—10.) But Jeſus told them, that ſeeing the ſon they ſaw the Father alſo. This is all we find concerning Philip in the goſpel.

The upper Aſia fell to this apoſtle's lot, where he took great pains in planting the goſpel, and by his preaching and miracles made many converts. In the latter part of his life, he came to Hierapolis, in Phrygia, a city very much addicted to idolatry, and particularly to the worſhip of a ſerpent of a prodigious bigneſs. St Philip by his prayers procured the death, or at leaſt the diſappearing, of this monſter, and convinced its worſhippers of the abſurdity of paying divine honours to ſuch odious creatures. But the magiſtrates, enraged at Philip's ſucceſs, impriſoned him, and ordered him to be ſeverely ſcourged, and then put to death, which ſome ſay was by crucifixion; others, by hanging him up againſt a pillar. St Philip is generally reckoned among the married apoſtles; and it is ſaid he had three daughters, two whereof preſerved their virginity, and died at Hierapolis; the third, having led a very ſpiritual life, died at Epheſus. He left behind him no writings. The goſpel under his name was forged by the Gnoſtics, to countenance their bad principles and worſe practices. The Chriſtian church obſerves the feſtival of this ſaint, together with that of St James, on the firſt day of May. Euſeb. lib. iii. c. 30.

Philip, the ſecond of the ſeven deacons, was choſen by the apoſtles after our Saviour's reſurrection. (Acts vi. 5.) This deacon, they ſay, was of Cæſarea in Paleſtine. It is certain that his daughters lived in this city (Acts xxi. 8. 9.) After the death of St Stephen, all the the Chriſtians excepting the apoſtles, having left Jeruſalem, and being diſperſed in ſeveral places, St Philip went to preach at Samaria (*id.* viii. 1, 2, &c. where he performed ſeveral miracles, and converted many perſons. He baptiſed them; but being only a deacon, he could not confer on them the Holy Ghoſt. Wherefore having made known to the apoſtles at Jeruſalem, that Samaria had received the word of God, Peter and John came thither and the Samaritans that were converted received the Holy Ghoſt. St Philip was probably at Samaria when the angel of the Lord ordered him to go to the ſouth part of the country, in the road that leads from Jeruſalem to old Gaza. Philip obeyed, and there met with an Ethiopian eunuch belonging to Queen Candace, who had the care of her revenues and had been at Jeruſalem to worſhip God there (*id.* viii. 26, 27, &c.) He was then returning from his own country, and was reading the prophet Iſaiah as he went along in his chariot. Philip, hearing the eunuch reading the prophet Iſaiah, ſaid to him, Do you underſtand what you read? The eunuch replied, How ſhould I underſtand, except ſomebody explain it to me? He deſired Philip therefore to come and ſit down by him in the chariot. The paſſage the eunuch was reading is this, "He was led as a ſheep to the ſlaughter, and like a lamb dumb before his ſhearer, ſo he opened not his mouth." The eunuch then ſays to Philip, Pray, whom does the prophet ſpeak of in this place? Is it of himſelf, or of ſome other? Then Philip began to inſtruct him concerning Jeſus Chriſt. And having gone on together, they came to a fountain; when the eunuch ſaid to Philip, Here is water, what hinders me from being baptized? Philip told him that he might be ſo, if he believed with all his heart. He replied, I believe that Jeſus Chriſt is the ſon of God. He then ordered the chariot to ſtop, and they both alighted and went down into the water, while Philip baptized the eunuch. Being come out of the water, the Spirit of the Lord took away Philip, and the eunuch ſaw no more of him. But Philip was found again at Azotus, and he preached the goſpel in all the cities he paſſed through, till he arrived at Cæſarea in Paleſtine. After this the ſcripture does not inform us of any particulars relating to Philip. The modern Greeks ſay that he went to Tralles in Aſia, where he founded a church, of which he was the apoſtle and biſhop; and where he reſted in peace after performing many miracles. The Latins on the contrary, ſay that he died at Cæſarea, and that three of his daughters were there buried with him.

It is thought that the eunuch converted by St Philip was the firſt apoſtle of the Ethiopians; and that the Abyſſines boaſt of having received the Chriſtian faith from him.

Lempriere's Bibliotheca Claſſica.

PHILIP II. was the 4th ſon of Amyntas, king of Macedonia. He was ſent to Thebes as an hoſtage by his father, where he learnt the art of war under Epaminondas, and ſtudied with the greateſt care the manners and the purſuits of the Greeks. He diſcovered, from his earlieſt years, that quickneſs of genius and greatneſs of courage which afterwards procured him ſo great a name and ſuch powerful enemies. He was recalled to Macedonia; and at the death of his brother Perdiccas he aſcended the throne as guardian and protector of the youthful years of his nephew. His ambition, however, ſoon diſcovered itſelf, and he made himſelf independent about the year 380 before Chriſt. The valour of a prudent general, and the policy of an experienced ſtateſman, ſeemed requiſite to enſure his power. The neighbouring nations, ridiculing the youth and inexperience of the new king of Macedonia, appeared in arms; but Philip ſoon convinced them of their error. Unable to meet them as yet in the field of battle, he ſuſpended their fury by preſents, and ſoon turned his arms againſt Amphipolis, a colony tributary to the Athenians. Amphipolis was conquered, and added to the kingdom of Macedonia, and Philip meditated no leſs than the deſtruction of a republic which had rendered itſelf ſo formidable to the reſt of Greece, and had even claimed ſubmiſſion from the princes of Macedonia. His deſigns, however, were as yet immature; and before he could make Athens an object of conqueſt, the Thracians and the Illyrians demanded his attention. He made himſelf maſter of a Thracian colony, to which he gave the name of *Philippi*, and from which he received the greateſt advantages on account of the golden mines in the neighbourhood. Theſe made it a very important capture he ſettled in it a number of workmen, and was the firſt who cauſed gold to be coined in his own name. He employed his wealth in procuring ſpies and partiſans in all the great cities of Greece, and in making conqueſts without the aid of arms. It was at the ſiege of Methone in Thrace that Philip had the misfortune to receive a wound in his right eye from the ſtroke of an arrow. In the midſt of his political proſperity, Philip did not neglect the honour of his family. He married Olympias the daughter of Neoptolemus, king of the Moloſſi; and when, ſome time after, he became father of Alexander, the monarch, conſcious of the ineſtimable advantages which ariſe from the leſſons, the example, and converſation of a learned and virtuous preceptor, wrote a letter with his own hand to the philoſopher Ariſtotle, and begged him to retire from his uſual purſuits, and to dedicate his whole time to the inſtruction of the young prince. Every thing ſeemed now to conſpire to his aggrandizement; and hiſtorians have obſerved that Philip received in one day the intelligence of three things which could gratify the moſt unbounded ambition, and flatter the hopes of the moſt aſpiring monarch: the birth of a ſon, an honourable crown at the olympic games, and a victory over the barbarians of Illyricum. But all theſe increaſed rather than ſatiated his ambition: he declared his inimical ſentiments againſt the power of Athens, and the independence of all Greece, by laying ſiege to Olynthus, a place which on account of its ſituation and conſequence, would prove moſt injurious to the intereſts of the Athenians, and moſt advantages to the intrigues and military operations of every Macedonian prince. The Athenians, rouſed by the eloquence of Demoſthenes, ſent 17 veſſels and 2000 men to the aſſiſtance of Olynthus; but the money of Philip prevailed over all their efforts. The greateſt part of the citizens ſuffered themſelves to be bribed by the Macedonian gold, and Olynthus ſurrendered to the enemy, and was inſtantly reduced to ruins. Philip ſoon after defeated the Athenians, and made a great number of them priſoners, whom he diſmiſſed without ranſom. Of this victory, the fruit of that excellent diſcipline which he had eſtabliſhed in his army, the Macedonian Phalanx had the principal honour. This was a body of infantry heavily armed, conſiſting commonly of 16,000 men, who had each of them a ſhield ſix feet high and a pike 21 feet long. (See PHALANX). The ſucceſs of his arms, and eſpecially his generoſity after victory, made his alliance and a peace, a deſirable object to the people of Athens; and as both parties were inclined to this meaſure, it was concluded without delay. His ſucceſſes were as great in every part of Greece; he was declared head of the Amphictyonic council, and was intruſted with the care of the ſacred temple of Apollo at Delphi. If he was recalled to Macedonia, it was only to add freſh laurels to his crown, by victories over his enemies in Illyricum and Theſſaly. By aſſuming the maſk of a moderator and peace-maker, he gained confidence; and in attempting to protect the Peloponneſians againſt the incroaching power of Sparta, he rendered his cauſe popular; and by ridiculing the inſults that were offered to his perſon as he paſſed through Corinth, he diſplayed to the world his moderation and philoſophic virtues. In his attempts to make himſelf maſter of Eubœa, Philip was unſucceſsful; and Phocion, who deſpiſed his gold as well as his meanneſs, obliged him to evacuate an iſland whoſe inhabitants were as inſenſible to the charms of money as they were unmoved at the horrors of war, and the bold efforts of a vigilant enemy. From Eubœa he turned his arms againſt the Scythians; but the advantages he obtained over this indigent nation were inconſiderable, and he again made Greece an object of plunder and rapine. He advanced far in Bœotia, and a general engagement was fought at Chæronea. The fight was long and bloody, but Philip obtained the victory. His behaviour after the battle reflects great diſgrace upon him as a man and as a monarch. In the hour of feſtivity, and during the entertainment which he had given to celebrate the trophies he had won, Philip ſallied from his camp, and with the inhumanity of a brute, he inſulted the bodies of the ſlain, and exulted over the calamities of the priſoners of war. His inſolence, however, was checked, when Demades, one of the Athenian captives, reminded him of his meanneſs, by exclaiming, "Why do you, O king, act the part of a Therſites, when you can repreſent with ſo much dignity the elevated character of an Agamemnon?" The reproof was felt; Demades received his liberty; and Philip learned how to gain popularity even among his fallen enemies, by relieving their wants and eaſing their diſtreſſes. At the battle of Chæronea the independence of Greece was extinguiſhed; and Philip, unable to find new enemies in Europe, formed new enterprizes, and meditated new conqueſts. He was nominated general of the Greeks againſt the Perſians, and was called upon as well from inclination as duty to revenge thoſe injuries which Greece had ſuffered from the invaſions of Darius and of Xerxes. But he was ſtopped in the midſt of his warlike preparations, being ſtabbed by Pauſanias as he entered the theatre at the celebration of the nuptial of his daughter Cleopatra. This murder has given riſe to many reflections upon the cauſes which produced it; and many who conſider the recent repudiation of Olympias and the reſentment of Alexander, are apt to inveſtigate the cauſes of his death in the boſom of his family. The ridiculous honours which Olympias paid to her huſband's murderer ſtrengthened the ſuſpicion; yet Alexander declared that he invaded the kingdom of Perſia to revenge his father's death upon the Perſian ſatraps and princes, by whoſe immediate intrigues the aſſaſſination had been committed. The character of Philip is that of a ſagacious, artful, prudent, and intriguing monarch: he was brave in the field of battle, eloquent and diſſimulating at home, and he poſſeſſed the wonderful art of changing his conduct according to the diſpoſition and caprice of mankind, without ever altering his purpoſe, or loſing ſight of his ambitious aims. He poſſeſſed much perſeverance, and in the execution of his plans he was always vigorous. He had that eloquence which is inſpired by ſtrong paſſions. The hand of an aſſaſſin prevented him from atchieving the boldeſt and the moſt extenſive of his undertakings; and he might have acquired as many laurels, and conquered as many nations, as his ſon Alexander did in the ſucceeding reign; and the kingdom of Perſia might have been added to the Macedonian empire, perhaps with greater moderation, with more glory, and with more laſting advantages. The private character of Philip lies open to cenſure, and raiſes indignation. The admirer of his virtues is diſguſted to find him among the moſt abandoned proſtitutes, and diſgracing himſelf by the moſt unnatural crimes and laſcivious indulgencies which can make even the moſt debauched and the moſt profligate to bluſh. He was murdered in the 47th year of his age, and the 24th of his reign, about 336 years before the Chriſtian era. His reign is become uncommonly intereſting, and his adminiſtration a matter of inſtruction. He is the firſt monarch whoſe life and actions are deſcribed with peculiar accuracy and hiſtorical faithfulneſs. Philip was the father of Alexander the Great and of Cleopatra, by Olympias; he had alſo by Audaca an Illyrian, Cyna, who married Amyntas the ſon of Perdiccas, Philip's elder brother; by Nicaſipolis a Theſſalian, Nicæa, who married Caſſander; by Philæna a Lariſſæan dancer, Aridæus, who reigned ſome time after Alexander's death; by Cleopatra, the niece of Attalus, Caranus and Europa, who were both murdered by Olympias; and Ptolemy the firſt king of Egypt, by Arſinoe, who in the firſt month of her pregnancy was married to Lagus. Of the many memorable actions and ſayings reported by Plutarch of this prince, the following are the moſt remarkable. Being preſent at the ſale of ſome captives in an indecent poſture, one of them informed him of it; "Set this man at liberty (ſays Philip), I did not know that he was my friend. "Being ſolicited to favour a lord of his court, who was like to loſe his character by a juſt but ſevere ſentence, Philip refuſed to hearken to the ſolicitation, and added, "I had rather that he be diſgraced than myſelf." A poor woman was importuning him to do her juſtice; and as he ſent her away from day to day, under the pretence that he had no time to attend to her petition, ſhe ſaid to him with ſome warmth, "Ceaſe then to be a king." Philip felt all the force of this reproof, and immediately gave her ſatisfaction. Another woman came to aſk juſtice of him as he was going out from a great entertainment, and was condemned. "I appeal (exclaimed ſhe)!" "And to whom do you appeal (ſaid the king to her)?" "To Philip faſting." This anſwer opened the eyes of the monarch, who retracted his ſentence. If he poſſeſſed any virtue, it was principally that of ſuffering injuries with patience. Democharus, to whom the Greeks gave the ſurname of *Parrheſiaſtes*, on account of his exceſſive petulance of tongue, was one of the deputies whom the Athenians ſent to this monarch. Philip, at the concluſion of the audience, begged the ambaſſadors to tell him, "if he could be of any ſervice to the Athenians;" to which Democharus gave an inſolent return, which he forgave. Having learned that ſome Athenian ambaſſadors charged him, in full aſſembly, with atrocious calumnies: "I am under great obligations (ſaid he to thoſe gentlemen, for I ſhall henceforwards be ſo circumſpect in my words and actions, that I ſhall convict them of falſehood." One ſaying of Philip, which does him leſs honour than thoſe we have before-mentioned, was, "Let us amuſe children with playthings, and men with oaths." This abominable maxim, which was the ſoul and ſpring of his politics, gave riſe to the obſervation, "That he was in full length, what Louis XI. afterwards was in miniature." It is well known that Philip had a perſon about him, who called out at times, "Philip remember that thou art mortal;" but whether we ſhould place this to the account of his pride or his humility, it is difficult to ſay. Ibid,

Philip V. was king of Macedonia, and ſon of Demetrius. His infancy, at the death of his father, was protected by Antigonus, one of his friends, who aſcended the throne, and reigued ſor 12 years, with the title of *Independent monarch*. When Antigonus died, Philip recovered his father's throne, though only 15 years of age, and he early diſtinguiſhed himſelf by his boldneſs and his ambitious views, He came to the throne in the year 220 before our Saviour, and the beginning of his reign was rendered glorious by the conqueſts of Aratus; a general who was as eminent for his love of juſtice as his ſkill in war. But ſo virtuous a character could hardly fail to be diſagreeable to a prince who wanted to indulge himſelf in every ſpecies of diſſipation and vice: and indeed his cruelty to him ſoon diſplayed his character in its true light; for to the gratification of every vice, and every extravagant propenſity, he had the meanneſs to ſacrifice this faithful and virtuous Athenian. Not ſatisfied with the kingdom of Macedonia, Philip aſpired to become the friend of Annibal and wiſhed to ſhare with him the ſpoils which the diſtreſſes and continual loſs of the Romans ſeemed ſoon to promiſe. But his expectations were fruſtrated; the Romans diſcovered his intrigues; and though weakened by the valour and artifice of the Carthaginian, yet they were ſoon enabled to meet him in the field of battle. The conſul Lævinus entered, without delay his territories of Macedonia: and after he had obtained a victory over him near Apollonia, and reduced his fleet to aſhes, he compelled him to ſue for peace. This peaceful diſpoſition was not permanent; and when the Romans diſcovered that he had aſſiſted their formidable enemy Annibal with men and money, they appointed T. Q. Flaminius to puniſh his perfidy, and the violation of the treaty. The Roman conſul, with his uſual expedition, invaded Macedonia; and in a general engagement, which was fought near Cynocephale, the hoſtile army was totally defeated, and the monarch ſaved his life with difficulty by flying from the field of battle. Deſtitute of reſources, without friends either at home or abroad, Philip was obliged to ſubmit to the mercy of the conqueror, and to demand peace by his ambaſſadors. It was granted with difficulty: the terms were humiliating; but the poverty of Philip obliged him to accept the conditions, however diſadvantageous and degrading to his dignity. In the midſt of theſe public calamities, the peace of his family was diſturbed; and Perſes, the eldeſt of his ſons by a concubine, raiſed ſeditions againſt his brother Demetrius, whoſe condeſcenſion and humanity had gained popularity among the Macedonians, and who from his reſidence at Rome, as an hoſtage, had gained the good graces of the ſenate, and by the modeſty and innocence of his manners had obtained forgiveneſs from that venerable body for the hoſtilities of his father. Philip liſtened with too much avidity to the falſe accuſations of Perſes; and when he heard it aſſerted that Demetrius wiſhed to rob him of his crown, he no longer heſitated to puniſh with death ſo unworthy and ſo ungrateful a ſon. No ſooner was Demetrius ſacrificed to credulity, than Philip became convinced of his cruelty and raſhneſs: and to puniſh the perfidy of Perſes, he attempted to make Antigonus, another ſon, his ſucceſſor on the Macedonian throne. But he was prevented from executing his purpoſe by death, in the 42d year of his reign, 178 years before the Chriſtian era. The aſſaſſin of Demetrius ſucceeded his father, and with the ſame ambition, with the ſame raſhneſs and oppreſſion renewed the war againſt the Romans, till his empire was deſtroyed, and Macedonia became a Roman province. Philip has been compared with his great anceſtor of the ſame name; but though they poſſeſſed the ſame virtues, the ſame ambition, and were tainted with the ſame vices, yet the father of Alexander was more ſagacious and more intriguing, and the ſon of Demetrius was more ſuſpicious, more cruel, and more implacable; and, according to the pretended prophecy of one of the Sybils, Macedonia was indebted to one Philip for her riſe and conſequence among nations, and under another Philip ſhe lamented the loſs of her power, her empire, and her dignity.

Ibid.

Philip (M. Julius), a Roman emperor, of an obſcure family in Arabia, from whence he was ſurnamed *Arabian*. From the loweſt rank in the army he gradually roſe to the higheſt offices; and when he was made general of the pretorian guards, he aſſaſſinated Gordian, to make himſelf emperor. To ſecure himſelf on the imperial throne, he left Meſopotamia a prey to the continual invaſions of the Perſians, and hurried to Rome, where his election was univerſally approved by the ſenate and the Roman people. Philip rendered his cauſe popular by his liberality and profuſion; and it added much to his ſplendor and dignity, that the Romans during his reign commemorated the foundation of their city; a ſolemnity which was obſerved but once every 100 years, and which was celebrated with more pomp and more magnificence than under the preceding reigns. The people were entertained with games and ſpectacles; the theatre of Pompey was ſucceſſively crowded during three days and three nights; and 2000 gladiators bled in the circus at once, for the amuſement and pleaſure of a gazing populace. His uſurpation, however, was ſhort. Philip was defeated by Decius, who had proclaimed himſelf emperor in Pannonia; and he was aſſaſſinated by his own ſoldiers near Verona, in the 45th year of his age, and the 5th of his reign. His ſon, who bore the ſame name, and who had ſhared with him the imperial dignity, was alſo maſſacred in the arms of his mother. Young Philip was then in the 12th year of his age, and the Romans lamented in him the loſs of riſing talents, of natural humanity, and endearing virtues.

Ibid.

Philip, a native of Acarnania, phyſician to Alexander the Great. When that monarch had been ſuddenly taken ill, after bathing in the Cydnus, Philip undertook to remove the complaint, when the reſt of the phyſicians believed that all medical aſſiſtance would be ineffectual. But as he was preparing his medicine, Alexander received a letter from Parmenio, in which he was adviſed to beware of his phyſician Philip, as he had conſpired againſt his life. The monarch was alarmed; and when Philip preſented him the medicine, he gave him Parmenio's letter to peruſe, and began to drink the potion. The ſerenity and compoſure of Philip's countenance, as he read the letter, removed every ſuſpicion from Alexander's breaſt, and he purſued the directions of his phyſician, and in a few days recovered.

There were beſides, a vaſt number of perſons of this name in antiquity, and many of them were very eminent.

Philip I. king of France, ſucceeded his father

Henry I. in 1060, when but eight years of age, under the regency and guardianſhip of Baudouin V. count of Flanders, who diſcharged his truſt with zeal and fidelity. He defeated the Gaſcons who were inclined to revolt, and died, leaving his pupil 15 years of age. This young prince made war in Flanders againſt Robert, Baudouin's younger ſon, who had invaded Flanders, which belonged to the children of his elder brother. Philip marched againſt him with a numerous army, which was cut to pieces near Mount Caſſel. Peace was the conſequence of the victory, and the conqueror quietly enjoyed his uſurpation. Philip, after the fatigues of the war, by way of relaxation gave himſelf up entirely to pleaſure and diſſipation. Tired of his wife Bertha, and fond of Bertrade, ſpouſe of Foulques count of Anjou, he carried her off from her huſband. Having in 1093, legally annulled his own marriage, under the pretext of barrenneſs, and Bertrade's marriage with the count of Anjou having been ſet aſide under the ſame pretext, Philip and ſhe were afterwards ſolemnly married by the biſhop of Beauvais. This union was declared void by Pope Urban II. a Frenchman by birth, who pronounced the ſentence in the king's own dominions, to which he had come for an aſylum. Philip, fearing that the anathemas of the Roman pontiff might be the means of exciting his ſubjects to rebellion, ſent deputies to the pope, who obtained a delay, during which time he was permitted to uſe the crown. To know what is meant by this permiſſion, it is neceſſary to recollect, that at that period kings appeared on public ſolemnities in royal habit, with the crown on their heads, which they received from the hand of a biſhop. This delay was not of long duration. Philip was excommunicated anew in a council held at Poitiers in 1100; but in the year 1104, Lambert biſhop of Arras, legate of Pope Paſchal II. at laſt brought him his abſolution to Paris, after having made him promiſe never to ſee Bertrade more; a promiſe which he did not keep It would appear that the pope afterwards approved their marriage; for Suger informs us, that their ſons were declared capable of ſucceeding to the crown Philip died at Melun the 29th of July 1108, aged 57 years after having witneſſed the firſt cruſade, in which he declined taking any part. His reign, which comprehends a period of 48 years, was the longeſt of any of his predeceſſors, excepting that of Clotarius, and of all who came after him except thoſe of Louis XIV. and Louis XV. It was diſtinguiſhed by ſeveral great events: but Philip, though brave in battle, and wiſe in counſels, was no very excellent character. He appeared ſo much the more contemptible to his ſubjects, as that age abounded with heroes. Philip is not the firſt of the French monarchs (as is commonly reported), who, in order to give the greater authority to his charters, cauſed them to be ſubſcribed by the officers of the crown; for Henry I. had ſometimes done the ſame before him.

PHILIP II. ſurnamed *Auguſtus*, the *conqueror* and *given of God*, ſon of Louis VII. (called the *younger*). King of France, and of Alix, his third wife, daughter of Thibault, count of Champagne, was born the 22d of Auguſt 1165. He came to the crown, after his father's death in 1180, at the age of 15 years. His youth was not ſpent like that of the generality of other princes, for, by avoiding the rock of pleaſure on which ſo many are apt to ſplit, his courage thereby became the more lively and intrepid. The king of England ſeemed willing to take advantage of his minority, and to ſeize upon a part of his dominions. But Philip marched againſt him, and compelled him, ſword and hand, to confirm the ancient treaties between the two kingdoms. As ſoon as the war was ended, he made his people enjoy the bleſſings of peace. He gave a check to the oppreſſions of the great lords, baniſhed the comedians, puniſhed blaſphemies, cauſed the ſtreets and public places of Paris to be paved, and annexed to that capital a part of the adjacent villages. It was incloſed by walls with towers; and the inhabitants of other cities were equally proud to fortify and embelliſh theirs. The Jews having for a long time practiſed the moſt ſhameful frauds in France, Philip expelled them from his kingdom, and declared his ſubjects quit with them; an action unjuſt, contrary to the laws of nature, and conſequently to religion. The tranquillity of France was ſomewhat diſturbed by a difference with the count of Flanders, which was however happily terminated in 1184. Some time after he declared war againſt Henry II. king of England, and took from him the towns of Iſſoudun, Tours, Mans and other places The epidemical madneſs of the cruſades then agitated all Europe; and Philip, as well as other princes, caught the infection. He embarked in the year 1190, with Richard I. king of England, for the relief of the Chriſtians in Paleſtine who were oppreſſed by Saladin. Thoſe two monarchs ſat down befor Acre, which is the ancient Ptolemais; as did almoſt all the Chriſtians of the eaſt, while Saladin was engaged in a civil war on the banks of the Euphrates. When the two European monarchs had joined their forces to thoſe of the Aſiatic Chriſtians, they counted above 300,000 fighting men. Acre ſurrendered the 13th of July 1191; but the unhappy diſagreement which took place between Philip and Richard, rivals of glory and of intereſt, did more miſchief than could be compenſated by the ſucceſsful exertions of thoſe 300,000 men. Philip, tired of theſe diviſions and diſpleaſed with the behaviour of Richard his vaſſal, returned to his own country, which perhaps he ſhould never have left, or at leaſt have ſeen again with more glory. Beſides, he was attacked (ſay hiſtorians) with a languiſhing diſorder, the effects of which were attributed to poiſon; but which might have been occaſioned merely by the ſcorching heat of a climate ſo different from that of France. He loſt his hair, his beard, and his nails; nay, his very fleſh came off. The phyſicians urged him to return home; and he ſoon determined to follow their advice. The year after, he obliged Baudouin VIII. count of Flanders to leave him the county of Artois. He next turned his arms againſt Richard king of England, from whom he took Evreux and Vexin; though he had promiſed upon the holy goſpels never to take any advantage of his rival during his abſence; ſo that the conſequences of this war were very unfortunate. The French monarch repulſed from Rouen with loſs, made a truce for ſix months; during which time he married Ingelburge, princeſs of Denmark, whoſe beauty could only be equalled by her virtue. The divorcing of this lady, whom he quitted in order to marry Agnes daughter of the duke of Merania, embroiled him with the court of

Rome. The pope iſſued a ſentence of excommunication againſt him; but it was taken off upon his promiſing to take back his former wife. John Sans-terre, ſucceeded to the crown of England in 1199, to the prejudice of his nephew Arthur, to whom of right it belonged. The nephew, ſupported by Philip, took arms againſt the uncle, but was defeated in Poitou, where he was taken priſoner, and afterwards murdered. The murderer being ſummoned before the court of the peers of France, not having appeared, was declared guilty of his nephew's death, and condemned to loſe his life in 1203. His lands, ſituated in France, were forfeited to the crown. Philip ſoon ſet about gathering the fruit of his vaſſal's crime. He ſeized upon Normandy, then carried his victorious arms into Maine, Anjou, Touraine, Poitou, and brought thoſe provinces, as they anciently were, under the immediate authority of his crown. The Engliſh had no other part left them in France but the province of Guienne. To crown his good fortune, John his enemy was embroiled with the court of Rome; which had lately excommunicated him. This eccleſiaſtical thunder was very favourable for Philip. Innocent II. put into his hands, and transferred to him, a perpetual right to the kingdom of England. The king of France, when formerly excommunicated by the pope, had declared his cenſures void and abuſive; he thought very differently, however, when he found himſelf the executor of a bull inveſting him with the Engliſh crown. To give the greater force to the ſentence pronounced by his holineſs, he employed a whole year in building 1700 ſhips, and in preparing the fineſt army that was ever ſeen in France. Europe was in expectation of a deciſive battle between the two kings, when the pope laughed at both, and artfully took to himſelf what he had beſtowed upon Philip. A legate of the holy ſee perſuaded John Sans-terre to give his crown to the court of Rome, which received it with enthuſiaſm. Then Philip was expreſsly forbid by the pope to make any attempt upon England, now become a ſee of the Roman church, or againſt John who was under her protection. Meanwhile, the great preparations which Philip had made alarmed all Europe; Germany, England, and the Low-Countries were united againſt him in the ſame manner as we have ſeen them united againſt Louis XIV. Ferrand, count of Flanders, joined the emperor Othon IV. He was Philip's vaſſal; which was the ſtrongeſt reaſon for declaring againſt him. The French king was nowiſe diſconcerted; his fortune and his courage diſſipated all his enemies. His valour was particularly conſpicuous at the battle of Bouvines, which was fought on the 27th of July 1214, and laſted from noon till night. Before the engagement, he knew well that ſome of his nobles followed him with reluctance. He aſſembled them together; and placing himſelf in the midſt of them, he took a large golden cup, which he filled with wine, and into which he put ſeveral ſlices of bread. He eat one of them himſelf, and offering the cup to the reſt, he ſaid, "My companions, let thoſe who would live and die with me follow my example." The cup was emptied in a moment, and thoſe who were the leaſt attached to him fought with all the bravery that could be expected from his warmeſt friends. It is alſo reported that after ſhowing the army the crown that was worn by ſovereigns upon theſe occaſions, he ſaid, "If any one thought himſelf more worthy than he was to wear it, he had only to explain himſelf; that he ſhould be content it were the prize of that man who ſhould diſplay the greateſt valour in battle." The enemy had an army of 150,000 fighting men; that of Philip was not half ſo numerous; but it was compoſed of the flower of his nobility. The king run great hazard of his life; for he was thrown down under the horſes feet, and wounded in the neck. It is ſaid 30,000 Germans were killed; but the number is probably much exaggerated. The counts of Flanders and Boulogne were led to Paris with irons upon their feet and hands; a barbarous cuſtom which prevailed at that time. The French king made no conqueſt on the ſide of Germany after this ever memorable action; but it gained him an additional power over his vaſſals. Philip, conqueror of Germany, and poſſeſſor of almoſt all the Engliſh dominions in France, was invited to the crown of England by the ſubjects of King John, who were grown weary of his tyranny. The king of France, upon this occaſion, conducted himſelf like an able politician. He perſuaded the Engliſh to aſk his ſon Louis for their king; but as he wiſhed at the ſame time to manage the pope, and not loſe the crown of England, he choſe to aſſiſt the prince his ſon, without appearing to act himſelf. Louis made a deſcent upon England, was crowned at London, and excommunicated at Rome in 1216; but that excommunication made no change upon John's ſituation, who died of grief. His death extinguiſhed the reſentment of the Engliſh, who having declared themſelves for his ſon Henry III. forced Louis to leave England. Philip-Auguſtus died a little time after, at Mantes, the 14th of July 1223, aged 59, after a reign of 43 years. Of all the kings of the 3d race, he made the greateſt acceſſion to the crown-lands, and tranſmitted the greateſt power to his ſucceſſors. He reunited to his dominions Normandy, Anjou, Maine, Touraine, Poitou, &c. After having ſubdued John Sans-terre, he humbled the great lords, and by the overthrow of foreign and domeſtic enemies, took away the counterpoiſe which balanced his authority in the kingdom. He was more than a conqueror; he was a great king and an excellent politician; fond of ſplendor on public occaſions, but frugal in private life; exact in the adminiſtration of juſtice; ſkilful in employing alternately flattery and threatenings, rewards and puniſhments; he was zealous in the defence of religion, and always diſpoſed to defend the church; but he knew well how to procure from her ſuccours for ſupplying the exigencies of the ſtate. The lords of Coucy, Rhetel, Roſey, and ſeveral others, ſeized upon the property of the clergy. A great many of the prelates applied for protection to the king, who promiſed them his good offices with the depradators. But, notwithſtanding his recommendations, the pillages continued. The biſhops redoubled their complaints, and intreated Philip to march againſt their enemies. "With all my heart (ſaid he): but in order to fight them, it is neceſſary to have troops, and troops cannot be raiſed without money." The clergy underſtood his meaning; they furniſhed ſubſidies, and the pillages ceaſed. The enterprizes of Philip Auguſtus were almoſt always ſucceſsful: becauſe he formed his projects with deliberation, and executed them without delay. He began by rendering the French happy, and in the end rendered them formidable; though he was more inclined to anger than to gentleneſs, to puniſh than to pardon, he was regretted by his ſubjects as a powerful genius, and as the father of his country. It was in his reign that the marſhal of France was ſeen, for the firſt time, at the head of the army. It was then alſo, that families began to have fixed and hereditary ſurnames; the lords took them from the lands which they poſſeſſed; men of letters from the place of their birth; the converted Jews and rich merchants from that of their reſidence. Two very cruel evils, *viz.* leproſy and uſury, were prevalent at that time; the one infected the body; the other proved the ruin of the fortunes of families. The number of lepers was ſo great, that the ſmalleſt villages were obliged to have an hoſpital for the cure of that diſtemper. It is remarkable, that when Philip was on the point of engaging Richard, the Engliſh who were lying in ambuſh near the Loire, run away with his equipages, in which he cauſed to be carried all the deeds or writings reſpecting the rights of the crown; a cuſtom which is uſed at this day by the grand ſeignior. Philip cauſed copies of his charters to be collected wherever they could be found; but after all his endeavours ſome of them were never recovered. The ſurname of *Auguſtus* was given to Philip by his cotemporaries. Mezerai is miſtaken, when he aſſerts that Paulus Emilius was the firſt who rendered the name of *conqueror* by that of Auguſtus; a learned critic has proved the contrary by undoubted authorities.

Philip of *Valois*, firſt king of France of the collateral branch of the Valois, was ſon to Charles count of Valois, brother of Philip *the Fair*. He mounted the throne in 1328, on the death of his couſin Charles the Fair, after having held for ſome time the regency of the kingdom. France was much divided in the beginning of his reign, by diſputes about the ſucceſſion to the crown. Edward III. king of England laid claim to it as grandſon of Philip the Fair, by his mother; but Philip of Valois took poſſeſſion of it as firſt prince of the blood. The people gave him upon his acceſſion to the throne, the title of *fortunate*; to which might have been added, for ſome time, thoſe of *victorious* and *juſt*. He marched to the relief of his vaſſal the count of Flanders, whoſe ſubjects, on account of bad uſage, had taken up arms againſt him. He engaged the rebels at Caſſel, performed prodigies of valour, and gained a ſignal victory, the 24th of Auguſt 1328. Having made all quiet, he went home, after ſaying to the count of Flanders, "Be more prudent and more humane, and you will have fewer diſloyal ſubjects." The victorious Philip devoted the time of peace to the internal regulations of his kingdom. The financiers were called to an account, and ſome of them condemned to death; among others Peter Remi, general of the finances, who left behind him near 20 millions. He afterwards enacted the law reſpecting freeholds, impoſing a tax upon churches, and commoners who had acquired the lands of the nobility. Then, alſo, began to be introduced the form of *appeal comme d'abus*, the principles of which are more ancient than the name. The year 1329 was diſtinguiſhed by a ſolemn homage paid to Philip, by Edward king of England, for the duchy of Guienne, upon his knees, and with his head uncovered. The interior peace of the kingdom was diſturbed by diſputes about the diſtinction of the church and ſtate. An aſſembly was ſummoned for hearing the two parties, in the preſence of the king; and in this aſſembly Peter de Cugnieres, his majeſty's advocate, defended the ſecular juriſdiction with great ability as a man well-informed, and an enlightened philoſopher. Bertrand biſhop of Autun, and Roger archbiſhop of Sens, pleaded the cauſe of the clergy with leſs ingenuity and judgment. This did not, however prevent the king from ſhowing them favours, though the controverſy itſelf laid the foundation of all the diſputes which were afterwards agitated about the authority of the two powers; diſputes which contributed not a little to confine the eccleſiaſtical juriſdiction within narrower limits. While Philip was employing himſelf in ſome uſeful regulations, he was unhappily interrupted by Edward III. declaring war againſt France. This prince immediately recovered thoſe parts of Guienne of which Philip was in poſſeſſion. The Flemiſh having again revolted from France in ſpite of oaths and treaties, joined the ſtandard of Edward; and required that he would aſſume the title of *king of France*, in conſequence of his pretenſions to the crown; becauſe then, agreeably to the letter of their treaty, they only followed the king of France. From this period is dated the union of the flower-de-luce and leopards in the arms of England. Edward, in order to juſtify the change of his arms, cauſed the following manifeſto to be publiſhed in the verſe of the times.

Rex ſum regnorum, bina ratione, duorum:
Anglorum in regno ſum rex ego jure paterno:
Matris jure quidem Francorum nuncupor idem;
Hinc eſt armorum variatio facta meorum.

In the way of a parody to theſe lines, Philip made the following reply:

Prædo regnorum qui diceris eſſe duorum,
Francorum regno privaberis, atque paterno.
Succedunt mares huic regno, non mulieres:
Hinc eſt armorum variatio ſtulta tuorum.

In the mean time Philip put himſelf in a poſture of defence. His arms were at firſt attended with ſome ſucceſs; but thoſe advantages were far from compenſating the loſs of the battle of Ecluſe, in which the French-fleet, conſiſting of 120 large ſhips, and manned by 40,000 ſeamen, was beat by that of England in the year 1340. This defeat is to be attributed, in part, to the little attention which had been paid to the navy of France, notwithſtanding her favourable ſituation, by being waſhed by two ſeas. She was obliged to make uſe of foreign ſhips, which obeyed but ſlowly, and even with ſome reluctance. This war, which had been alternately diſcontinued and renewed begun again with more heat than ever in 1345. The two armies having come to an engagement the 26th of Auguſt 1346, near Crecy, a village in the county of Ponthieu, the Engliſh there gained a ſignal victory. Edward had only 40,000 men, while Philip had nearly twice that number; but the army of the former was inured to war, and that of the latter was ill diſciplined and overcome with fatiguing marches. France loſt from 25,000 to 30,000 men; of which numbers were John king of Bohemia (who though blind, fought gallantly), and about 1500 gentlemen, the flower of the French nobility. The loſs of Calais, and ſeveral other places, was the ſad fruit of this defeat. Some time before Edward had challenged Philip of Valois to a ſingle combat; which he refuſed, not on the ſcore of cowardice, but from the idea that it was improper for a ſovereign prince to accept a challenge from a king who was his vaſſal. At length, in 1347, a truce for ſix months was concluded between France and England, and afterwards prolonged at different times. Philip died a ſhort time after, the 23d of Auguſt 1350, aged 57 years, and far from bearing on his monument the title of *Fortunate*. He had, however, reunited Dauphiny to France. Humbert, the laſt prince of that country, having loſt all his children, and wearied with the wars which he had held out againſt Savoy, turned a Dominican, and gave his province to Philip, in 1349, on condition that the eldeſt ſon of the kings of France ſhould bear the title of Dauphin. Philip likewiſe added to his domain Rouſillon and a part of Cerdague, by lending ſome money to the king of Majorca, who gave him thoſe provinces as a ſecurity; provinces which Charles VIII. afterwards reſtored without any reimburſement. It is ſurpriſing that in ſo unfortunate a reign he ſhould have been able to purchaſe thoſe provinces after having paid a great deal for Dauphiny; but the duty on ſalt, the riſe on the other taxes, and eſpecially the frauds committed in the coinage of money, are ſuppoſed to have enabled him to make thoſe acquiſitions. The fictitious and ideal value of the coin was not only raiſed, but a great deal of bad money was iſſued from the mint. The officers of the mint were ſworn upon the Goſpels to keep the ſecret: but how could Philip flatter himſelf that ſo groſs a fraud would not be diſcovered?

PHILIP II. ſon of Charles V. and of Iſabella of Portugal, who was born at Valladolid on the 21ſt of May 1527, became king of Naples and Sicily by his father's abdication in 1554. He aſcended the throne of Spain on the 17th of January 1556 by the ſame means. Charles had made a truce with the French, but his ſon broke it; and having formed an alliance with England, poured into Picardy an army of 40,000 men. The French were cut to pieces at the battle of St Quintin, which was fought on the 20th of Auguſt 1557. That town was taken by aſſault, and the day on which the breach was mounted Philip appeared armed cap-a-pee in order to animate the ſoldiers. It was the firſt and laſt time that he was obſerved to wear this military dreſs. It is well known, indeed, that his terror was ſo great during the action that he made two vows; one, that he ſhould never again be preſent in a battle; and the other, to build a magnificient monaſtery dedicated to St Lawrence, to whom he attributed the ſucceſs of his arms, which he executed at Eſcurial, a village about ſeven leagues from Madrid. After the engagement, his general the Duke of Savoy, wanted to kiſs his hand; but Philip prevented him ſaying, "It is rather my duty to kiſs your's, who have the merit of ſo glorious a victory;" and immediately preſented him with the colours taken during the action. The taking of Catelet, Ham, aad Noyon, were the only advantages which were derived from a battle which might have proved the ruin of France. When Charles V. was informed of this victory, it is ſaid he aſked the perſon who brought him the intelligence, "if his ſon was at Paris?" and being anſwered in the negative, he went away without uttering a ſingle word. The Duke of Guiſe having had time to aſſemble an army, repaired the diſgrace of his country by the taking of Calais and Thionville. While he was animating the French, Philip gained a pretty conſiderable battle againſt Marſhal de Thermes near Gravelines. His army was, on this occaſion, commanded by count Egmont, whom he afterwards cauſed to be beheaded. The conqueror made no better uſe of the victory of Gravelines than he had done of that of St Quintin; but he reaped conſiderable advantage from the glorious peace of Chateau-Cambreſis, the maſter-piece of his politics. By that treaty, concluded the 13th of April 1559, he gained poſſeſſion of the ſtrong places of Thionville, Marienbourg, Montmedi, Heſdin, and the county of Charollois. This war, ſo terrible, and attended with ſo much cruelty, was terminated like many others, by a marriage. Philip took for his third wife Elizabeth, daughter of Henry II. who had been promiſed to Don Carlos.

After theſe glorious achievements, Philip returned in triumph to Spain without having drawn a ſword. His firſt care, upon his arrival at Valladolid, was to demand of the grand inquiſitor the ſpectacle of an *auto-da-fé*. This was immediately granted him; 40 wretches, ſome of whom were prieſts or monks, were ſtrangled and burnt, and one of them was burnt alive. Don Carlos de Seza, one of thoſe unfortunate victims, ventured to draw near to the king, and ſaid to him, "How, Sir, can you ſuffer ſo many wretches to be committed to the flames? Can you be witneſs of ſuch barbarity without weeping?" To this Philip coolly replied, "If my own ſon were ſuſpected of hereſy, I would myſelf give him up to the ſeverity of the inquiſition. Such is the horror which I feel when I think of you and your companions, that if an executioner were wanting, I would ſupply his place myſelf." On other occaſions he conducted himſelf agreeably to the ſpirit which had dictated this anſwer. In a valley of Piedmont, bordering on the country of the Milaneſe, there were ſome heretics; and the governor of Milan had orders to put them all to death by the gibbet. The new opinions having found their way into ſome of the diſtricts of Calabria, he gave orders that the innovators ſhould be put to the ſword, with the reſervation of 60 of them, of whom 30 were afterwards ſtrangled, and the reſt committed to the flames.

This ſpirit of cruelty, and ſhameful abuſe of his power, had the effect to weaken that power itſelf. The Flemiſh, no longer able to bear ſo hard a yoke, revolted. The revolution began with the fine and large provinces of the continent; but the maritime provinces only obtained their liberty. In 1579 they formed themſelves into a republic, under the title of the United Provinces. Philip ſent the Duke of Alva to reduce them: but the cruelty of that general only ſerved to exaſperate the ſpirit of the rebels. Never did either party fight with more courage, or with more fury. The Spaniards, at the ſiege of Haerlem, having thrown into the town the head of a Dutch officer who had been killed in a ſkirmiſh, the inhabitants threw to them the heads of eleven Spaniards, with this inſcription: "Ten heads for the payment of the tenth penny, and the eleventh for intereſt." Haerlem having ſurrendered at diſcretion, the conquerors cauſed all the magiſtrates, all the paſtors, and above 1500 citizens, to be hanged.

The Duke of Alva, being at length recalled, the grand commander of the Requeſnes was ſent in his place, and after his death Don John of Auſtria; but neither of thoſe generals could reſtore tranquility in the Low Countries. To this ſon of Charles V. ſucceeded a grandſon no leſs illuſtrious, namely, Alexander Farneſe duke of Parma, the greateſt man of his time; but he could neither prevent the independence of the United provinces, nor the progreſs of that republic which aroſe under his own eye. It was then that Philip, always at his eaſe in Spain, inſtead of coming to reduce the rebels in Flanders, proſcribed the Prince of Orange, and ſet 25,000 crowns upon his head. William, ſuperior to Philip, diſdained to make uſe of that kind of vengeance, and truſted to his ſword for his preſervation.

In the mean time the king of Spain ſucceeded to the crown of Portugal, to which he had a right by his mother Iſabella. This kingdom was ſubjected to him by the Duke of Alva, in the ſpace of three weeks, in the year 1580. Antony, prior of Crato, being proclaimed king by the populace of Liſbon, had the reſolution to come to an engagement; but he was vanquiſhed, purſued, and obliged to fly for his life.

A cowardly aſſaſſin, Balthazor Gerard, by a piſtol-ſhot killed the Prince of Orange, and thereby delivered Philip from his moſt implacable enemy. Philip was charged with this crime, it is believed without reaſon; though, when the news was communicated to him, he was imprudent enough to exclaim, "If this blow had been given two years ago, the Catholic religion and I would have gained a great deal by it."

This murder had not the effect to reſtore to Philip the Seven United Provinces. That republic, already powerful by ſea, aſſiſted England againſt him. Philip having reſoved to diſtreſs Elizabeth, fitted out, in 1588, a fleet called the *Invincible*. It conſiſted of 150 large ſhips, on which were counted 2650 pieces of cannon, 8000 ſeamen, 20,000 ſoldiers, and all the flower of the Spaniſh nobility. This fleet, commanded by the Duke of Medina Sidonia, ſailed from Liſbon when the ſeaſon was too far advanced: and being overtaken by a violent ſtorm, a great part of it was diſperſed. Twelve ſhips, driven upon the Coaſt of England, were captured by the Engliſh fleet, which conſiſted of 100 ſhips; 50 were wrecked on the coaſts of France, Scotland, Ireland, Holland, and Denmark. Such was the ſucceſs of the Invincible. See ARMADA.

This enterpriſe, which coſt Spain 40 millions of ducats, 20,000 men, and 100 ſhips, was productive only of diſgrace. Philip ſupported this misfortune with an heroic reſolution. When one of his courtiers told him with an air of conſternation, what had happened, he coolly replied, "I ſent to fight the Engliſh, and not the winds. God's will be done." The day after Philip ordered the biſhops to return thanks to God for having preſerved ſome remains of his fleet; and he wrote thus to the pope: "Holy father, as long as I remain maſter of the fountain-head, I ſhall not much regard the loſs of a rivulet. I will thank the Supreme Diſpoſer of empires, who has given me the power of eaſily repairing a diſaſter which my enemies muſt attribute ſolely to the elements which have fought for them."

At the ſame time that Philip attacked England, he was encouraging in France the Holy League: the object of which was to overturn the throne and divide the ſtate. The leaguers conferred upon him the title of *Protector* of their aſſociation; which he eagerly accepted, from a perſuaſion that their exertions would ſoon conduct him or one of his family, to the throne of France. He thought himſelf ſo ſure of his prey, that when ſpeaking of the principal cities in France, he uſed to ſay, "My fine city of Paris, my fine city of Orleans," in the ſame manner as he would have ſpoken of Madrid and Seville. What was the reſult of all theſe intrigues? Henry IV. embraced the Catholic religion, and by his abjuration of Proteſtantiſm made his rival loſe France in a quarter of an hour.

Philip, at length, worn out by the debaucheries of his youth, and by the toils of government, drew near his laſt hour. A ſlow fever, the moſt painful gout, and a complication of other diſorders, could not diſengage him from buſineſs, nor draw from him the leaſt complaint. "What!" ſaid he to the phyſicians who heſitated about letting blood of him; "What! are you afraid of drawing a few drops of blood from the veins of a king who has made whole rivers of it flow from heretics?" At laſt, exhauſted by a complication of diſtempers, which he bore with an heroic patience, and being eaten up of lice, he expired the 13th of September 1598, aged 72 years, after a reign of 43 years and eight months. During the laſt 50 days of his illneſs he ſhowed a great ſenſe of religion, and had his eyes almoſt always fixed towards heaven.

Watſon's Philip II.

No character was ever drawn by different hiſtorians in more oppoſite colours than that of Philip; and yet, conſidering the length and activity of his reign, there is none which it ſhould ſeem would be more eaſy to aſcertain. From the facts recorded in hiſtory, we cannot doubt that he poſſeſſed, in an eminent degree, penetration, vigilance, and a capacity for government. His eyes were continually open upon every part of his extenſive dominions. He entered into every branch of adminiſtration; watched over the conduct of his miniſters with unwearied attention; and in his choice both of them and of his generals diſcovered a conſiderable ſhare of ſagacity. He had at all times a compoſed and ſettled countenance, and never appeared to be either elated or depreſſed. His temper was the moſt imperious, and his looks and demeanor were haughty and ſevere; yet among his Spaniſh ſubjects he was of eaſy acceſs; liſtened patiently to their repreſentations and complaints; and where his ambition and bigotry did not interfere, was generally willing to redreſs their grievances. When we have ſaid thus much in his praiſe, we have ſaid all that truth requires or truth permits. It is indeed impoſſible to ſuppoſe that he was inſincere in his zeal for religion. But as his religion was of the moſt corrupt kind, it ſerved to increaſe the natural depravity of his diſpoſition: and not only allowed, but even prompted, him to commit the moſt odious and ſhocking crimes. Although a prince in the bigotted age of Philip might be perſuaded that the intereſt of religion would be advanced by falſehood and perſecution; yet it might be expected, that, in a virtuous prince, the ſentiments of honour and humanity would on ſome occaſions triumph over the dictates of ſuperſtition: but of this triumph there occurs not a ſingle inſtance in the reign of Philip; who without heſitation violated his moſt ſacred obligations as often as religion afforded him a pretence, and under that pretence exerciſed for many years the moſt unrelenting cruelty without reluctance or remorſe. His ambition, which was exorbitant; his reſentment, which was implacable; his arbitrary temper, which would ſubmit to no controul—concurred with his bigotted zeal for the Catholic religion, and carried the ſanguinary ſpirit, which that religion was calculated to inſpire, to a greater height in Philip than it ever attained in any other prince of that or of any former or ſucceeding age.

Though of a ſmall ſize, he had an agreeable perſon. His countenance was grave, his air tranquil, and one could not diſcover from his looks either joy in proſperity or chagrin in adverſity. The wars againſt Holland, France, and England, coſt Philip 564 millions of ducats: But America furniſhed him with more than the half of that ſum. His revenues, after the junction of Portugal, are ſaid to have amounted to 25 millions of ducats, of which he only laid out 100,000 for the ſupport of his own houſehold. Philip was very jealous of outward reſpect; he was unwilling that any ſhould ſpeak to him but upon their knees. The duke of Alva having one day entered this prince's cabinet without being introduced, he received the following harſh ſalutation, accompanied with a ſtormy countenance: "An impudence like this of your's would deſerve the hatchet." If he thought only how to make himſelf be feared, he ſucceeded in doing ſo; for few princes have been more dreaded, more abhorred, or have cauſed more blood to flow, than Philip II. of Spain. He had ſucceſſively, if not all at once, war to maintain againſt Turkey, France, England, Holland, and almoſt all the Proteſtants of the empire, without having a ſingle ally, not even the branch of his own houſe in Germany. Notwithſtanding ſo many millions employed againſt the enemies of Spain, Philip found in his œconomy and his reſources wherewith to build 30 citadels, 64 fortified places, 9 ſea-ports, 25 arſenals, and as many palaces, without including the eſcurial. His debts amounted to 140 millions of ducats, of which, after having paid ſeven millions of intereſt, the greateſt part was due to the Genoeſe. Moreover, he had ſold or alienated a capital ſtock of 100 millions of ducats in Italy. He made a law, fixing the majority of the kings of Spain at 14 years of age. He affected to be more than commonly devout; he eat often at the refectory with the monks; he never entered their churches without kiſſing all the relics; he cauſed knead his bread with the water of a fountain which was thought to poſſeſs a miraculous virtue; he boaſted of never having danced, and of never wearing breeches after the Grecian faſhion. Grave and ſolemn in all his actions, he drove from his preſence a woman who had ſmiled while he was blowing his noſe. One great event of his domeſtic life is the death of his ſon Don Carlos. The manner of this prince's death is not certainly known. His body, which lies in the monument of the eſcurial, is there ſeparated from his head: but it is pretended that the head is ſeparated only becauſe the leaden coffin which contains the body is too ſmall. The particulars of his crime are as little known as the manner in which it was committed. There is no evidence, nor is there any probability, that Philip would have cauſed him to be condemned by the inquiſition. All that we know of the matter is, that in 1568 his father, having diſcovered that he had ſome correſpondence with the Hollanders his enemies, arreſted him himſelf in his own room. He wrote at the ſame time to Pope Pius V. in order to give him an account of his ſon's impriſonment; and in his letter to this pontiff, the 20th of January 1568, he ſays, "that from his earlieſt years the ſtrength of a wicked nature has ſtifled in Don Carlos every paternal inſtruction." It was Philip II. who cauſed to be printed at Anvers, between 1569 and 1572, in 8 vols folio, the fine Polyglot Bible, which bears his name; and it was he who ſubjected the iſlands afterwards called the *Philippines*. He married ſucceſſively, 1ſt, Mary daughter of John III. king of Portugal; 2dly, Mary daughter of Henry VIII. and queen of England; 3dly, Elizabeth of France, daughter of Henry II.: 4thly, Anne, daughter of the Emperor Maximilian II. Don Carlos was the ſon of his firſt wife, and Philip III. of the laſt.

PHILIPPI (anc. geog.), a town of Macedonia, in the territory of the Edones, on the confines of Thrace (Pliny, Ptolemy), ſituated on the ſide of a ſteep eminence; anciently called *Datum* and *Drenides* (Appian), though Strabo ſeems to diſtinguiſh them. This town was famous on ſeveral accounts; not only as taking its name from the celebrated Philip of Macedon, father to Alexander the Great, who conſidered it as a fit place for carrying on the war againſt the Thracians; but alſo on account of two battles fought in its neighbourhood between Auguſtus and the republican party. In the firſt of theſe battles, Brutus and Caſſius had the command of the republican army; while Octavianus, afterwards Auguſtus, and Mark Antony, had the command of their adverſaries. The army of Brutus and Caſſius conſiſted of 19 legions and 20,000 horſe; the imperial forces of an equal number of legions, but more complete, and 13,000 horſe; ſo that the numbers on both ſides were pretty equal. The troops of Brutus were very richly dreſſed, moſt of them having their armour adorned with gold and ſilver; for Brutus, though very frugal in other reſpects, was thus extravagant with reſpect to his men, thinking that the riches that they had about them would make them exert themſelves the more, to prevent theſe from falling into the enemy's hands. Both the republican generals appear to have been inferior in ſkill to Mark Antony; for as to Octavianus, he is allowed never to have conquered but by the valour of others. A little before the firſt engagement, Octavianus, who had been indiſpoſed, was carried out of the camp, at the perſuaſion of Artorius his phyſician, who had dreamed that he ſaw a viſion directing him to be removed. Brutus's men, who oppoſed the wing commanded by Octavianus, charged without orders, which cauſed great confuſion. However, they were ſucceſsful; for part of them, taking a compaſs about, fell upon the enemy's rear: after which they took and plundered the camp, making a great ſlaughter of ſuch as were in it, and among the reſt putting 2000 Lacedemonians to the ſword who were newly come to the aſſiſtance of Octavianus. The emperor himſelf was ſought for, but in vain, having been conveyed away for the reaſon abovementioned; and as the ſoldiers pierced the litter in which he was uſually carried, it was thence reported that he had been killed. This threw that whole part of the army into ſuch conſternation, that when Brutus attacked them in front, they were moſt completely routed: three whole legions being cut in pieces, and a prodigious ſlaughter made among the fugitives. But by the imprudence of the general in purſuing too far, the wing of the republican army commanded by Caſſius was left naked and ſeparated from the reſt of the army; on which they were attacked at once in front and in flank, and thus they were defeated and their camp taken, while Brutus imagined that he had gained a complete victory. Caſſius himſelf retired to an eminence at a ſmall diſtance from Philippi; whence he ſent one of his greateſt intimates to procure intelligence concerning the fate of Brutus. That general was on his way, and already in view, when the meſſenger ſet out. He ſoon met his friends; but they ſurrounding him to inquire the news, Caſſius who beheld what paſſed, imagined that he was taken priſoner by the enemy, retired to his tent, and in deſpair cauſed one of his freedmen cut off his head. Thus far at leaſt is certain, that he went into the tent with that freedman, and that his head was found ſeparated from his body when Brutus entered. However, the freedman was never afterwards ſeen.

The ſecond engagement was pretty ſimilar to the firſt. Brutus again oppoſed Octavianus, and met with the ſame ſucceſs; but in the mean time Antony, to whom he ought undoubtedly to have oppoſed himſelf, having to do only with the lieutenants of Caſſius gained a complete victory over them. What was worſt, the fugitives, inſtead of leaving the field of battle altogether, fled for protection to Brutus's army; where, crowding in among the ranks, they carried deſpair and confuſion wherever they went, ſo that a total defeat enſued, and the republican army was almoſt entirely cut in pieces. After the battle, Brutus put an end to his own life, as is related more fully under the article Rome.

The city of Philippi is likewiſe remarkable on account of an epiſtle written by St Paul to the church in that place. It was a Roman colony (Luke, Pliny, Coin, Inſcription). It is alſo remarkable for being the birth place of Adraſtus, the Peripatetic philoſopher, and diſciple of Ariſtotle.—The town is ſtill in being, and is an archbiſhop's ſee; but greatly decayed and badly peopled. However, there is an old amphitheatre, and ſeveral other monuments of its ancient grandeur. E. Long. 44. 55. N. Lat. 41. 0.

PHILIPPICS, φιλιππικοι λογοι, in literature, is a name which is given to the orations of Demoſthenes againſt Philip king of Macedon. The Philippics are reckoned the maſter-pieces of that great orator: Longinus quotes many inſtances of the ſublime from them, and points out a thouſand latent beauties. Indeed that pathetic in which Demoſthenes excelled, the frequent interrogations and apoſtrophes wherewith he attacked the indolence of the Athenians, where could they be better employed? Whatever delicacy there be in the oration againſt Leptines, the Philippics have the advantage over it, were it only on account of the ſubject, which gives Demoſthenes ſo fair a field to diſplay his chief talent, we mean, with Longinus, that of moving and aſtoniſhing.

Dionyſius Halicarnaſſeus ranks the oration on the Haloneſe among the Philipics, and places it the eighth in order: but though his authority be great, yet that force and majeſty wherein Cicero characteriſes the Philippics of Demoſthenes, ſeem to exclude the oration on the Haloneſe out of the number; and authoriſe the almoſt univerſal opinion of the learned, who reject it as ſpurious. Libanius, Photius, and others, but above all the languidneſs of the ſtyle, and the lowneſs of the expreſſions, which reign throughout the whole, father it on Hegeſippus.

Philippic is likewiſe applied to the fourteen orations of Cicero againſt Mark antony. Cicero himſelf gave them this title in his epiſtles to Brutus: and poſterity have found it ſo juſt, that it has been continued to our times. Juvenal, Sat x. calls the ſecond the *divine Philippic*, and witneſſes it to be of great fame, *conſpicuæ divina Philippica famæ*. That orator's intitling his laſt and moſt valued orations after the Philippics of Demoſthenes ſhows the high opinion he had of them. Cicero's Philippics coſt him his life; Mark Antony had been ſo irritated with them, that when he arrived at the triumvirate, he procured Cicero's murder, cut off his head, and ſtuck it up in the very place whence the orator had delivered the Philippics.

PHILIPPINE islands, are certain iſlands of Aſia, which lie between 114 and 126 degrees of eaſt longitude, and between 6 and 20 degrees of north latitude; about 300 miles ſouth eaſt of China. They are ſaid to be about 1200 in number, of which there are 400 very conſiderable. They form a principal diviſion of that immenſe Indian Archipelago, which conſiſts of ſo many thouſand iſlands, ſome of which are the largeſt, and many of them the richeſt, in the world. The Philippines form the northernmoſt cluſter of theſe iſlands, and were diſcovered in the year 1521 by the famous navigator Ferdinand Magellan, a Portugueſe gentleman, who had ſerved his native country both in the wars of Africa and in the Eaſt Indies; particularly under Albuquerque, the famous Portugueſe general, who reduced Goa and Malacca to the obedience of that crown. Magellan having had a conſiderable ſhare in thoſe actions, and finding himſelf neglected by the government of Portugal, and even denied, as it is ſaid, the ſmall advance of a ducat a month in his pay, left the court of Portugal in diſguſt, and offered his ſervices to Charles V. then emperor of Germany and king of Spain, whom he convinced of the probability of diſcovering a way to the Spice Iſlands, in the Eaſt Indies, by the weſt; whereupon the command of five ſmall ſhips being given him, he ſet ſail from Seville, on the 10th of Auguſt 1519, and ſtanding over to the coaſt of South America, proceeded ſouthward to 52°, where he fortunately hit upon a ſtrait, ſince called the *Strait of Magellan*, which carried him into the Pacific Ocean or South Sea; and then ſteering northward, repaſſed the equator: after which he ſtretched away to the weſt, acroſs that vaſt ocean, till he arrived at Guam, one of the Ladrones, on the 10th of March 1521; and ſoon after ſailed to the weſtward, and diſcovered the Philippines, which he did on St Lazarus's day; and, in honour of that ſaint, he called them the *Archipelago of St Lazarus*. He took poſſeſſion of them in the name of the king of Spain, but happened to be killed in a ſkirmiſh he had with the natives of one of them. His people,

Beatſon's Mil. Mem.

Philippine Iſlands.

however, arrived afterwards at the Moluccas, or Clove Iſlands, where they left a colony, and returned to Spain by the way of the Cape of Good Hope: being the firſt perſons that ever ſailed round the globe.—But there was no attempt made by the Spaniards to ſubdue or plant the Philippine Iſlands until the year 1564, in the reign of Philip II ſon of Charles V. when Don Louis de Velaſco, viceroy of Mexico, ſent Michael Lopez Delagaſpes thither with a fleet, and a force ſufficient to make a conqueſt of theſe iſlands, which he named the *Philippines*, in honour of Philip II. then upon the throne of Spain; and they have remained under the dominion of that crown till taken by Sir William Draper. The Philippines are ſcarce inferior to any other iſlands of Aſia in all the natural productions of that happy climate; and they are by far the beſt ſituated for an extenſive and advantageous commerce. By their poſition, they form the centre of intercourſe with China, Japan, and the Spice Iſlands; and whilſt they are under the dominion of Spain, they connect the Aſiatic and American commerce, and become a general magazine for the rich manufactures of the one and for the treaſures of the other. Beſides, they are well ſituated for a ſupply of European goods, both from the ſide of Acapulco and by the way of the Cape of Good Hope. In fact, they formerly enjoyed a traffic in ſome degree proportioned to the peculiar felicity of their ſituation; but the Spaniſh dominion is too vaſt and unconnected to be improved to the beſt advantage.—The ſpirit of commerce is not powerful in that people. The trade of the Philippines is thought to have declined; its great branch is now reduced to two ſhips, which annually paſs between theſe iſlands and Acapulco in America, and to a ſingle port of Manila in the iſland of Luconia.

Indeed the Spaniards appear by no means to be actuated by the ſpirit of induſtry; for, ſo far from improving the fine ſituation of theſe iſlands to the utmoſt, it happens, on the contrary, that the trade is hurtful to the mother country; for (to confine ourſelves to Manila, with which they have moſt to do), inſtead of taking Spaniſh manufactures, they trade with the Chineſe for ſpices, ſilks, ſtockings, Indian ſtuffs, callicoes, chintz, and many other articles: and with the Japaneſe for cabinets, and all ſorts of lacquered ware; for all which they pay in gold or ſilver. All theſe commodities, together with what the iſlands produce in great quantities of wrought plate by the Chineſe artiſans, are collected at Manila, and tranſported annually in two ſhips to Acapulco in Mexico. Each of theſe ſhips is eſteemed worth L.600,000 Sterling; and in the war which began in 1739, and which was not diſtinguiſhed by ſuch a ſeries of wonderful ſucceſſes as that which ended in 1763, the taking of one of the galleons which carry on the trade between Manila and America, was conſidered as one of the moſt brilliant advantages which the Engliſh gained. This trade is not laid open to all the inhabitants of Manila, but is confined by very particular regulations, ſomewhat analogous to thoſe by which the trade of the regiſter ſhips from Cadiz to the Weſt Indies is reſtrained. The ſhips employed are all king's ſhips, commiſſioned and paid by him; and the tonage is divided into a certain number of bales, all of the ſame ſize. Theſe are divided among the convents at Manila, but principally the Jeſuits (A), as a donation to ſupport their miſſions, for the propagation of the Roman Catholic faith. Moſt of the religious are concerned in this trade, and ſell to the merchants at a great price what room in the ſhip they are not to occupy. This trade is by a royal edict limited to a certain value, but it always exceeds it, each ſhip being generally worth 3,000,000 of dollars. The returns made from America are in ſilver, cochineal, ſweetmeats, together with ſome European millenary ware for the women, and ſome ſtrong Spaniſh wine. It is obvious, that the greateſt part of the treaſure remitted does not remain at Manila, but is diſperſed over India for goods. Many ſtrong remonſtrances againſt this Indian trade to Mexico have been made to the court of Spain, wherein they urge, that the ſilk manufactories of Valentia and other parts of Spain, the linens from Cadiz, and their other manufactories, are hurt in their ſale in Mexico and Peru, by the Chineſe being able to afford them goods of the ſame ſort cheaper than they are able; that were this trade laid open, the whole treaſure of the New World would centre in Spain, or with European Merchants; but now it enriches only the Jeſuits and a few private perſons. Wiſe as theſe arguments are, the Jeſuits and prieſts, verſant in intrigue, and the moſt ſelfiſh ſet of men on earth, had intereſt enough at court to ſtop the effect.

At Cavite in this bay are a fort, a town, and a fine dock-yard, where theſe large galleons are built and repaired, and where they load and unload, together with all the other large ſhips that trade to this bay.

The principal of the Philippine iſlands are Luconia or Manila, Tandago or Samul, Maſbate, Mindora, Luban, Paragoa, Panay, Leyte, Bohel, Sibu, Sogbu, Negros, St John, Xolo, and Mindanao. In moſt of theſe, the Spaniſh power prevails, and all are under the governor of Luconia; but there are ſome in which the nation has little authority, or even influence, ſuch as Mindanao.

The inhabitants of theſe iſlands conſiſt of Chineſe, Ethiopians, Malays, Spaniards, Portugueſe, Pintados or Painted People, and Meſtees, a mixture of all theſe. Their perſons and habits reſemble thoſe of the ſeveral nations whence they derive their original; only, it is obſervable, that the features of the blacks of theſe iſlands are as agreeable as thoſe of the white people. There is not a ſoil in the world that produces greater plenty of all things for life; as appears by the multitude of inhabitants to be found in the woods and mountains, who ſubſiſt almoſt entirely by the fruits of the earth, and the veniſon they take. Nor can any country appear more beautiful; for there is a perpetual verdure, and buds, bloſſoms, and fruit, are found upon the trees all the year round, as well on the mountains as in the cultivated gardens. Vaſt quantities

ties

(A) We do not know who has the Jeſuits ſhare ſince they were expelled the Spaniſh dominions.

ties of gold are waſhed down from the hills by the rains, and found mixed with the ſand of their rivers. There are alſo mines of other metals, and excellent load-ſtones found here; and ſuch numbers of wild buffaloes, that a good huntſman on horſeback, armed with a ſpear, will kill 10 or 20 in a day. The Spaniards take them for their hides, which they ſell to the Chineſe; and their carcaſes ſerve the mountaineers for food. Their woods alſo abound with deer, wild hogs, and goats. Of the laſt there is ſuch plenty in one of theſe iſlands, that the Spaniards gave it the name of *Cabras*. Horſes and cows have been likewiſe imported into theſe iſlands, from New Spain, China, and Japan, which have multiplied conſiderably; but the ſheep that were brought over came to nothing. The trees produce a great variety of gums; one kind, which is the commoneſt, by the Spaniards called *brea*, is uſed inſtead of pitch; of the others ſome are medicinal, others odoriferous.

In thoſe iſlands are monkeys and baboons of a monſtrous bigneſs, that will defend themſelves if attacked by men. When they can find no fruit in the mountains, they go down to the ſea to catch crabs and oyſters; and that the oyſters may not cloſe and catch their paws, they firſt put in a ſtone to prevent their ſhutting cloſe; they take crabs by putting their tail in the holes where they lie, and when the crab lays hold of it they draw him out. There are alſo great numbers of civet-cats in ſome of the iſlands. The bird called *tavan*, is a black ſea-fowl ſomething leſs than a hen, and has a long neck; it lays its eggs in the ſand by the ſea ſide, 40 or 50 in a trench, and then covers them, and they are hatched by the heat of the ſun. They have likewiſe the bird *ſaligan*, which builds her neſt on the ſides of rocks, as the ſwallows do againſt a wall; and theſe are the delicious *Birds-Neſts* ſo much eſteemed, being a kind of jelly that diſſolves in warm water.

The Spaniards have introduced ſeveral of the American fruits, which thrive here as well as in America; the cocoa or chocolate-nut particularly, which increaſes ſo that they have no occaſion now to import it from Mexico. Here is alſo the *Fountain-Tree*, from which the natives draw water; and there is likewiſe a kind of cane, by the Spaniards called *vaxuco*, which, if cut, yields fair water enough for a draught, of which there are plenty in the mountains, where water is moſt wanted.

Theſe iſlands being hot and moiſt, produce abundance of venomous creatures, as the ſoil does poiſonous herbs and flowers, which do not kill thoſe who touch or taſte them, but ſo infect the air, that many people die in the time of their bloſſoming.

The orange, lemon, and ſeveral other trees, bear twice a year. A ſprig, when planted, becomes a tree and bears fruit in a year's time; ſo that without any hyperbole it may be affirmed, that a more luxuriant verdant ſoil can ſcarcely be conceived. The woods are filled with old, large, and lofty trees, and ſuch as yield more ſuſtenance to man than is to be found in almoſt any other part of the world. Theſe iſlands, however, beſides their other inconveniences, of which they have many, are very ſubject to earthquakes, which often prove very fatal. See MANILA.

PHILIPPINES, a religious ſociety of young women at Rome, ſo called from their taking St Philip de Neri for their protector. The ſociety conſiſts of 100 poor girls, who are brought up till they are of age to be married, or become nuns, under the direction of ſome religious women, who teach them to read, write, and work, and inſtruct them in the duties of Chriſtianity. They wear a white veil, and a black croſs on their breaſts. See MACEDONIA.

PHILIPPISTS, a ſect or party among the Lutherans; the followers of Philip Melancthon. He had ſtrenuouſly oppoſed the Ubiquiſts, who aroſe in his time; and the diſpute growing ſtill hotter after his death, the univerſity of Wittemberg, who eſpouſed Melancthon's opinion, were called by the Flacians, who attacked it, *Philippiſts*.

PHILIPS (Fabian), was author of ſeveral books relating to ancient cuſtoms and privileges in England. He was born at Preſtbury in Glouceſterſhire, September 28th, 1601. When very young, he ſpent ſome time in one of the Inns of Chancery; and went from thence to the Middle-Temple, where he became learned in the law. In the civil wars he was a bold aſſertor of the king's prerogative; and was ſo paſſionate a lover of Charles I. that two days before that illuſtrious monarch was beheaded, he wrote a proteſtation againſt the intended murder, and cauſed it to be printed, and affixed to poſts in all public places. He likewiſe publiſhed in 1649, 4to, a pamphlet intituled, "*Veritas Inconcuſſa;* or King Charles I. no Man of Blood, but a Martyr for his People:" which was reprinted in 1660, 8vo. In 1653, when the courts of juſtice at Weſtminſter, eſpecially the Chancery, were voted down by Oliver's parliament, he publiſhed, "Conſiderations againſt the diſſolving and taking them away:" for which he received the thanks of William Lenthal, Eſq; ſpeaker of the late parliament, and of the keepers of the liberties of England. He was for ſome time filazer for London, Middleſex, Cambridgeſhire, and Huntingdonſhire; and ſpent much money in ſearching records, and writing in favour of the royal prerogative. The only advantage he received for this attachment to the royal cauſe was, the place of one of the commiſſioners for regulating the law, worth L. 200 *per annum*, which only laſted two years. After the Reſtoration of Charles II. when the bill for taking away the tenures was depending in parliament, he wrote and publiſhed a book to ſhew the neceſſity of preſerving them, intitled, "*Tenenda non Tollenda:* or, the neceſſity of preſerving tenures *in capite*, and by Knight's-ſervice, which, according to their firſt inſtitution, were, and are yet, a great part of the *ſalus populi*, &c. 1660," 4to. In 1663 he publiſhed, "The antiquity, Legality, Reaſon, Duty, and Neceſſity of Pre-emption and Pourveyance for the King," 4to; and afterwards many other pieces upon ſubjects of a ſimilar kind. He aſſiſted Dr Bates in his "*Elenchus Motuum;* eſpecially in ſearching the records and offices for that work. He died November 17th, 1690, in his 89th year; and was buried near his wife in the church of Twyford in Middleſex. He was a man well acquainted with records and antiquities; but his manner of writing is neither cloſe nor well digeſted. He publiſhed a political pamphlet in 1681, intitled, “ *Urſa Major et Minor;* ſhowing that there is no ſuch Fear, as is factitiouſly pretended, of Popery and arbitrary Power.”

PHILIPS (Ambroſe), an Engliſh poet, was deſcended from a very ancient and conſiderable family of that name in Leiceſterſhire. He received his eduation at St John's college, Cambridge; during his ſtay at which univerſity, he wrote his paſtorals, which acquired him at the time ſo high a reputation. His next performance was, *The Life of Archbiſhop Williams*, written, according to Mr Cibber, to make known his political principles, which in the courſe of it he had a free opportunity of doing, as the archbiſhop, who is the hero of his work, was a ſtrong opponent to the high church meaſures.

When he quitted the univerſity, and came to London, he became a conſtant attendant at, and one of the wits of, Button's coffee-houſe, where be obtained the friendſhip and intimacy of many of the celebrated geniuſes of that age, more particularly of Sir Richard Steele, who, in the firſt volume of his *Tatler*, has inſerted a little poem of Mr Philips's, which he calls a *Winter Piece*, dated from Copenhagen, and addreſſed to the earl of Dorſet, on which he beſtows the higheſt encomiums; and indeed, ſo much juſtice is there in theſe his commendations, that even Mr Pope himſelf, who had a fixed averſion for the author, while he affected to deſpiſe his other works, uſed always to except this from the number.

The firſt diſlike Mr Pope conceived againſt Mr Philips, proceeded from that jealouſy of fame which was ſo conſpicuous in the character of that great poet; for Sir Richard Steele had taken ſo ſtrong a liking to the paſtorals of the latter, as to have formed a deſign for a critical compariſon of them with thoſe of Pope, in the concluſion of which the preference was to have been given to Philips. This deſign, however, coming to Mr Pope's knowledge, that gentleman, who could not bear a rival near the throne, determined to ward off this ſtroke by a ſtratagem of the moſt artful kind; which was no other than taking the ſame taſk on himſelf; and, in a paper in the Guardian, by drawing the like compariſon, and giving a like preference, but on principles of criticiſm apparently fallacious, to point out the abſurdity of ſuch a judgment. However, notwithſtanding the ridicule that was drawn on him in conſequence of his ſtanding as it were in competition with ſo powerful an antagoniſt, it is allowed, that there are, in ſome parts of Philips's paſtorals, certain ſtrokes of nature, and a degree of ſimplicity that are much better ſuited to the purpoſes of paſtoral, than the more correctly turned periods of Mr Pope's verſification. Mr Philips and Mr Pope being of different political principles, was another cauſe of enmity between them; which aroſe at length to ſo great a height, that the former, finding his antagoniſt too hard for him at the weapon of wit, had even determined on making uſe of a rougher kind of argument; for which purpoſe he even went ſo far as to hang up a rod at Button's for the chaſtiſement of his adverſary whenever he ſhould come thither; which, however, Mr Pope declining to do, avoided the *argumentum baculinum* in which he would, no doubt, have found himſelf on the weakeſt ſide of the queſtion. Our author alſo wrote ſeveral dramatical pieces; The Briton, Diſtreſſed Mother, and Humphrey duke of Glouceſter; all of which met with ſucceſs, and one of them is at this time a ſtandard of entertainment at the theatres, being generally repeated ſeveral times in every ſeaſon. Mr Philips's circumſtances were in general, through his life, not only eaſy but rather affluent, in conſequence of his being connected, by his political principles, with perſons of great rank and conſequence. He was concerned with Dr Hugh Boulter, afterwards archbiſhop of Armagh, the right honourable Richard Weſt, Eſq; lord chanceller of Ireland, the reverend Mr Gilbert Burnet, and the reverend Mr Henry Stevens, in writing a ſeries of papers called the *Free Thinker*, which were all publiſhed together by Mr Philips, in three volumes in 12mo.

In the latter part of Queen Anne's reign, he was ſecretary to the Hanover club, who were a ſet of noblemen and gentlemen who had formed an aſſociation in honour of that ſucceſſion, and for the ſupport of its intereſts, and who uſed particularly to diſtinguiſh in their toaſts ſuch of the fair ſex as were moſt zealouſly attached to the illuſtrious Houſe of Brunſwic. Mr Philips's ſtation in this club, together with the zeal ſhown in his writings, recommended him to the notice and favour of the new government. He was, ſoon after the acceſſion of king George I. put into the commiſſion of the peace, and appointed one of the commiſſioners of the lottery. And, on his friend Dr Boulter's being made primate of Ireland, he accompanied that prelate acroſs St George's channel, where he had conſiderable preferments beſtowed on him, and was elected a member of the Houſe of Commons there, as repreſentative for the county of Armagh. At length, having purchaſed an annuity for life of 400 l. *per annum*, he came over to England ſome time in the year 1748; but having a very bad ſtate of health, and being moreover of an advanced age, he died ſoon after, at his lodgings near Vauxhall, in Surry.

“ Of his perſonal character (ſays Dr Johnſon) all I have heard is, that he was eminent for bravery, and ſkill in the ſword, and that in converſation he was ſolemn and pompous.” He is ſomewhere called *Quaker Philips*, but, however, appears to have been a man of integrity; for the late Paul Whitehead relates, that when Mr Addiſon was ſecretary of ſtate, Philips applied to him for ſome preferment, but was coolly anſwered, “ that it was thought that he was already provided for, by being made a juſtice for Weſtminſter.” To this obſervation our author, with ſome indignation, replied, “ Though poetry was a trade he could not live by, yet he ſcorned to owe ſubſiſtence to another which he ought not to live by.”

The following anecdote is told of our author by Dr Johnſon: “ At a coffee-houſe, he (Philips) was diſcourſing upon pictures, and pitying the painters, who, in their hiſtorical pieces, always draw the ſame ſort of *ſky*. “ They ſhould travel (ſaid he), and then they would ſee that there is a different *ſky* in every country, in England, France, Italy, and ſo forth.” “ Your remark is juſt (ſaid a grave gentleman who ſat by), I have been a traveller, and can teſtify what you obſerve is true; but the greateſt variety of *ſkies* that I found was in Poland.” “ In Poland, Sir? (ſays Philips).”

Philips.

lips).” “Yes, in Poland; for there is Sobie*ſky*, and Sabun*ſky*, and Jablon*ſky*, and Podebra*ſky*, and many more *ſkies*.

Philifs (Catharine), a very ingenious lady, the daughter of Mr John Fowler merchant, was born at London in January 1631, and educated at a ſchool at Hackney. She married James Philips of the priory of Cardigan, Eſq; and went with the viſcounteſs of Dungannon into Ireland, where ſhe tranſlated Corneille's tragedy of Pompey into Engliſh, which was ſeveral times acted there with great applauſe.

She tranſlated alſo the four firſt acts of Horace, another tragedy of Corneille, the fifth being done by Sir John Denham. This excellent and amiable lady, for ſuch it ſeems ſhe was, died of the ſmall-pox in London, the 22d of June 1664, much and juſtly regretted; “having not left (ſays Langbaine) any of her ſex her equal in poetry.—She not only equalled (adds he) all that is reported of the poeteſſes of antiquity, the Leſbian Sappho and the Roman Sulpitia, but juſtly found her admirers among the greateſt poets of our age.” Cowley wrote an ode upon her death. Dr Jeremy Taylor had addreſſed to her his “Meaſures and offices of Friendſhip:” the ſecond edition of which was printed in 1657, 12mo. She aſſumed the name of *Orinda*. In 1667, were printed, in folio, “Poems by the moſt deſervedly admired Mrs Catharine Philips, the matchleſs Orinda. To which is added, monſieur Corneille's Pompey and Horace, tragedies. With ſeveral other tranſlations from the French;” and her picture before them, engraven by Faithorne. There was likewiſe another edition in 1678, folio; in the preface of which we are told, that “ſhe wrote her familiar letters with great facility, in a very fair hand, and perfect orthography; and if they were collected with thoſe excellent diſcourſes ſhe wrote on ſeveral ſubjects, they would make a volume much larger than that of her poems.” In 1705, a ſmall volume of her letters to Sir Charles Cottrel were printed under the title of “Letters from Orinda to Poliarchus. The editor of theſe letters tells us, that “they were the effect of an happy intimacy between herſelf and the late famous Poliarchus, and are an admirable pattern for the pleaſing correſpondence of a virtuous friendſhip. They will ſufficiently inſtruct us, how an intercourſe of writing between perſons of different ſexes ought to be managed with delight and innocence; and teach the world not to load ſuch a commerce with cenſure and detraction, when it is removed at ſuch a diſtance from even the appearance of guilt.”

Philips (John), an eminent Engliſh poet, was born in 1676. He was educated at Wincheſter and Oxford, where he became acquainted with Milton, whom he ſtudied with great application, and traced in all his ſucceſsful tranſlations from the ancients. The firſt poem which diſtinguiſhed our author, was his *Splendid Shilling*, which is in the *Tatler* ſtyled the *fineſt burleſque poem in the Engliſh language*. His next was intitled *Blenheim*, which he wrote at the requeſt of the earl of Oxford, and Mr Henry St John, afterwards Lord Bolingbroke, on the victory obtained there by the duke of Marlborough in 1704. It was publiſhed in 1705; and the year after he finiſhed another poem upon cyder, the firſt book of which had been written at Oxford. It is on the model of Virgil's Georgics, and is a very excellent piece. We have no more of Mr Philips but a Latin ode to Henry St John, Eſq; which is eſteemed a maſter-piece. He was contriving greater things; but illneſs coming on, he was obliged to drop every thing but the care of his health. This care, however, did not ſave him; for, after lingering a long time, he died at Hereford, Feb. 15, 1708, of a conſumption and aſthma, before he had reached his 33d year. He was interred in the cathedral of that city with an inſcription over his grave; and had a monument erected to his memory in Weſtminſter-abbey by Sir Simon Harcourt, afterwards lord-chancellor, with an epitaph upon it written by Dr Atterbury, though commonly aſcribed to Dr Freind. He was one of thoſe few poets, whoſe muſe and manners were equally excellent and amiable; and both were ſo in a very eminent degree.

Philips.

Dr Johnſon obſerves, that “Philips has been always praiſed, without contradiction as a man modeſt, blameleſs, and pious; who bore a narrow fortune without diſcontent, and tedious and painful maladies without impatience; beloved by thoſe that knew him, but not ambitious to be known. He was probably not formed for a wide circle. His converſation is commended for its innocent gaiety, which ſeems to have flowed only among his intimates; for I have been told, that he was in company ſilent and barren, and employed only upon the pleaſures of his pipe. His addiction to tobacco is mentioned by one of his biographers, who remarks, that in all his writings except Blenheim, he has found an opportunity of celebrating the fragrant fume. In common life, he was probably one of thoſe who pleaſe by not offending, and whoſe perſon was loved, becauſe his writings were admired. He died honoured and lamented, before any part of his reputation had withered, and before his patron St John had diſgraced him. His works are few. The Splendid Shilling has the uncommon merit of an original deſign, unleſs it may be thought precluded by the ancient *Centos*. To degrade the ſounding words and ſtately conſtruction of Milton, by an application to the loweſt and moſt trivial things, gratifies the mind with a momentary triumph over that grandeur which hitherto held its captives in admiration; the words and things are preſented with a new appearance, and novelty is always grateful where it gives no pain. But the merit of ſuch performances begins and ends with the firſt author. He that ſhould again adopt Milton's phraſe to the groſs incidents of common life, and even adapt it with more art, which would not be difficult, muſt yet expect but a ſmall part of the praiſe which Philips has obtained; he can only hope to be conſidered as the repeater of a jeſt.

“There is a Latin ode written to his patron St John, in return for a preſent of wine and tobacco, which cannot be paſſed without notice. It is gay and elegant, and exhibits ſeveral artful accommodations of claſſic expreſſions to new purpoſes. It ſeems better turned than the odes of Hannes. To the poem on cyder, written in imitation of the Georgics, may be given this peculiar praiſe, that it is grounded in truth; that the precepts which it contains are exact and juſt; and that it is therefore at once a book of entertainment and of ſcience. This I was told by Miller, the great gardener and botaniſt, whoſe expreſſion was, that 'there were many books written on the ſame ſubject in proſe, which do not contain ſo much truth as that poem.' In the diſpoſition of his matter, ſo as to interſperſe precept, relating to the culture of trees, with ſentiments more generaly pleaſing, and in eaſy and graceful tranſitions from one ſubject to another, he has very diligently imitated his maſter; but he unhappily pleaſed himſelf with blank verſe, and ſuppoſed that the numbers of Milton which impreſs the mind with veneration, combined as they are with ſubjects of inconceivable grandeur, could be ſuſtained by images which at moſt can riſe only to elegance. Contending angels may ſhake the regions of heaven in blank verſe; but the flow of equal meaſures and the embelliſhment of rhime, muſt recommend to our attention the art of engrafting, and decide the merit of the redſtreak and pearmain. What ſtudy could confer, Philips had obtained; but natural deficiency cannot be ſupplied. He ſeems not born to greatneſs and elvation. He is never lofty, nor does he often ſurpriſe with unexpected excellence: but perhaps to his laſt poem may be applied what Tully ſaid of the work of Lucretius, that 'it is written with much art, though with few blazes of genius."

It deſerves to be remarked, that there were two poets of both the names of our author, and who flouriſhed in his time. One of them was Milton's nephew, and wrote ſeveral things, particularly ſome memoirs of his uncle, and part of Virgil Traveſtied. The other was the author of two political farces, which were both printed in 1716; 1. The Earl of Marr married, with the Humours of Jocky the Highlander. 2. The Pretender's Flight; or a Mock Coronation, with the Humours of the facetious Harry St John.

PHILIPSBURG, is an imperial town of Germany, in the circle of the Upper Rhine. It is very ſtrong, and looked upon as one of the bulwarks of the empire. It is ſeated in a moraſs, and fortified with ſeven baſtions and ſeveral advanced works. The town belongs to the biſhop of Spire, but all the works and the fortifications to the empire. It has been ſeveral times taken and retaken, particularly by the French in 1734, when the duke of Berwick was killed at the ſiege; but it was rendered back the year following, in conſequence of the treaty of Vienna. It is ſeated on the river Rhine, over which there is a bridge ſeven miles ſouth of Spire, 22 ſouth-eaſt of Worms, and 40 north-eaſt of Straſburg. E. Long. 8 33. N. Lat. 49. 12.

PHILISTÆA (anc. geog.), the country of the Philiſtines (Bible); which lay along the Mediterranean, from Joppa to the boundary of Egypt, and extending to inland places not far from the coaſt. *Palæſtini*, the people; *Palæſtina*, the country (Joſephus); Afterwards applied to the whole of the Holy Land and its inhabitants. *Philiſtæi*, the people (Septuagint *Philiſtini* (Vulgate); the *Caphtorim* and *Philiſtim*, originally from Egypt, and deſcendants of Cham (Moſes). Expelled and deſtroyed the Hivites the ancient inhabitants, and occupied their country; that is, the region which retained the name of *Philiſtim*, in which that of *Caphtorim* was ſwallowed up.

PHILISTINES, were the ancient inhabitants of Paleſtine, well known in ſacred hiſtory. Theſe people are ſometimes called in Scripture *Cherethites* and *Caphtorims* the earlier part of their hiſtory is, like that of moſt other nations, very obſcure and uncertain. The authors of the univerſal Hiſtory tell us, that they were deſcended from the Caſluhim partly, and partly from the Caphtorim, both from the loins of Mizraim the ſon of Ham, the ſon of Noah. Moſes tells us (Deut. xi. 23.), that they drove out the Avim or Avites even to Azzah or Gazah, where they ſettled; but when this happened cannot be determined. On the whole, however, our learned authors are clearly of opinion, that the Caſluhim and Caphtorim, from whom the Philiſtines are deſcended, came originally from Egypt; and called the country which they had conquered by their own name (See PALESTINE). Many interpreters, however, think, that Caphtor was but another name for Cappadocia, which they imagine to have been the original country of the Philiſtines. But Father Calmet, in a particular diſſertation prefixed to the firſt book of Samuel, endeavours to ſhow that they were originally of the iſle of Crete. The reaſons which led him to think that Caphtor is the iſle of Crete are as follow: The Philiſtines were ſtrangers in Paleſtine as appears in various parts of Scripture; ſuch as Gen. x. 14. Deut. ii. 23. Jer. xlvii. 4. and Amos ix. 7. whence the Septuagint always tranſlate this name *Strangers*. Their proper name was Cherethims for Ezekiel (xxv. 16.), ſpeaking againſt the Philiſtines, has theſe words, "I will ſtretch out my hand upon the Philiſtines, and I will cut off the Cherethims, and deſtroy the remnant of the ſea-coaſt." Zephaniah (ii. 5.), inveighing againſt the ſame people, ſays, "Wo unto the inhabitants of the ſea-coaſts, the nation of the Cherethites." And Samuel (Book I. xxx. 14.) ſays, that the Amalekites made an irruption into the country of the Cherethites, that is to ſay, of the Philiſtines, as the ſequel of the diſcourſe proves. And afterwards the kings of Judah had foreign guards called the *Cherethites* and *Pelethites*, who were of the number of the Philiſtines (2 Sam. xv. 18. The Septuagint, under the name *Cherethites*, underſtood the *Cretans*; and by *Cherith* they underſtood *Crete*. Beſides the Scripture ſays, that the Philiſtines came from the iſle of Caphtor. Now we ſee no iſland in the Mediteranean wherein the marks whereby the Scripture deſcribes Caphtor and Cherethim agree better than in the iſle of Crete. The name *Cretim* or *Cherethim* is the ſame with that of *Cretenſis*. The Cretans are one of the moſt ancient and celebrated people which inhabited the iſlands of the Mediterranean. They pretended to have been produced originally out of their own ſoil. This iſland was well peopled in the time of the Trojan war. Homer calls it the iſland with a hundred cities. The city of Gaza in Paleſtine went by the name of *Minoa (Steph. Bizant. in Gaza)*, becauſe Minos king of Crete coming into that country, called this ancient city by his own name.

Herodotus acknowledges that the Cretans were originally all barbarians, and did not come from Greece. Homer ſays, that a different language was ſpoken in the iſle of Crete; that there were Greeks there, true or ancient Cretans Pelaſgians, &c. The ancient Cretans are the ſame as the Cherethites, the Pelaſgians as the Philiſtines or Pelethites of the Scripture: their language was the ſame with that of the Cannaanites or Phœnicians, that is, Hebrew: they were deſcended, as well as Canaan, from Ham, by Mizraim (Gen. x. 6. 13, 14.) The manners, arms, religion, and gods of the Cretans and Philiſtines were the ſame. The arms of the one and the other were bows and arrows. Dagon the god of the Philiſtines was the ſame as the Dictynna of the Cretans.

Whether theſe arguments are convincing, it is not for us to determine; but Wells does not think they are, as he is of the ſame opinion whith the authors of the Univerſal hiſtory, who ſay, that *Coptus*, the name of an old city of Egypt, is a corruption of the ancient *Caphtor*. It is not, however, of great importance to determine whether they came from Crete, from Cappadocia, or from Egypt: they had certainly been a conſiderable time in the Land of Canaan, when Abraham arrived there in the year of the world 2083. They were then a very powerful people, were governed by kings, and in poſſeſſion of ſeveral conſiderable cities. The race of kings then in power were honoured with the title of *Abimelech*. This race, however, was but of ſhort duration; for their monarchy became an ariſtocracy of five lords, who were, as far as we can diſcover, partly independent of each other, though they acted in concert for the common cauſe. This form of government was again ſucceeded by another race of kings, diſtinguiſhed by the title of *Achiſh*, though they alſo bore that of *Abimelech*. The kings were always under great limitations. The Philiſtines appear to have been a very warlike people, induſtrious, and lovers of freedom; they did not circumciſe, and in the early periods of their hiſtory held adultery in the greateſt abhorrence. "Their character (ſay the authors of the Univerſal Hiſtory) muſt be conſidered at different periods; for we may ſay they were not always the ſame people. In the days of Abraham and Iſaac, they were without all doubt a righteous and hoſpitable nation: but afterwards a revolution in government, religion, and morals, may have enſued. From thenceforward they became like other idolatrous nations; the ſame enormities crept in and prevailed among them. They are conſtantly mentioned in Scripture as ſtrangers; and though, poſſeſſed of a moſt conſiderable part of the Land of Promiſe, yet God would never ſuffer them to be driven out, they being Egyptians by deſcent, and not original natives, whoſe land only was promiſed to Abraham and his ſeed. Their arrogance and ambition were great; and ſo irreconcileable was their enmity (a) to the Iſraelites, that one would be almoſt tempted to think they were created on purpoſe to be a thorn in their ſides; for though the hand of God was evidently againſt them ſeveral times, and particularly when they detained the ark, yet they hardened their hearts, and cloſed their eyes againſt conviction. They ſeem to have entertained a very fond veneration for their deities, in which they perſiſted, tho' they were eye-witneſſes of the ſhame and ignominy which befel them in the preſence of the captive ark; nay, they were ſo biaſſed in their favour, as to imagine that their gods might prevail againſt Him who had in ſo glaring a manner put them to ſhame and diſgrace. They were much addicted to trade; which, conſidering their ſituation, they may have exerciſed from the beginning; but, by the acceſſion of the fugitive Edomites in David's time, they roſe to ſo great a reputation as merchants, that the Greeks, it ſeems, preferred them to all other nations in that reſpect, and from them called all the country bordering on theirs *Paleſtine*. Their language was not ſo different from that ſpoken by the Hebrews as to cauſe any difficulty for them to converſe together, as will be perceived by their intercourſe with Abraham and Iſaac; ſo that, in all this region, the ſeveral nations ſpoke one and the ſame tongue, perhaps with ſome variation of dialect. They had doubtleſs the arts and ſciences in common with the moſt learned and ingenious among their contemporaries, and perhaps ſome of them in greater perfection. They had giants among them, but whether they were originally of the breed of the Anakims, who retired hither when they were expelled from Hebron, or were ſprung from accidental births, is not eaſily determined. We muſt not forget, that the invention of the bow and arrow is aſcribed to this people.

Anc. part, vol. i. p. 480. &c.

"Their religion was different at different times; under their firſt race of kings, they uſed the ſame rites with the Hebrews. Abimelech, in the ſin he had like to have committed with Sarah, through Abraham's timidity, was favoured with a divine admonition from God; and, by his ſpeech and behaviour at that time, it ſeems as if he had been uſed to converſe with the Deity. In after-times, they erred into endleſs ſuperſtitions, and different kinds of idolatry; each of the principal or five cities ſeemed to have had an idol of its own. Marna, Marnas, or Marnaſh, was worſhipped at Gaza, and is ſaid to have migrated into Crete, and to have become the Cretan Jupiter. Dagon was worſhipped at Azotus: he ſeems to have been the greateſt, the moſt ancient, and moſt favourite god they had; to which may be added, that he perhaps ſubſiſted the longeſt of any that did not ſtraggle out of the country. To him they aſcribed the invention of bread-corn, or of agriculture, as his name imports. We cannot enter into the common notion of his being repreſented as a monſter, half man half fiſh; nor conſequently into another almoſt as common, that he is the ſame with the Syrian goddeſs Derceto, who, we are told, was repreſented under ſome ſuch mixed form. Our opinion is, that this idol was in ſhape wholly like a man; for we read of his head, his hands, and his feet. He ſtood in a temple at Azotus, and had prieſts of his own who paid him a very conſtant attendance.

(a) "From a paſſage in Chronicles, it is gueſſed to have been of very ancient date; where it is ſaid, that 'the men of Gath ſlew the Children of Ephraim, who would have taken their cattle from them.' This incident is nowhere elſe to be found; and there are various notions concerning the ſenſe in which we muſt take this paſſage. As to the time of the tranſaction, moſt people allow it to have been while the children of Iſrael were ſojourners in Egypt. It plainly appears, by the next verſe, that Ephraim himſelf was living at that period. The Targum ſuppoſes his children miſcomputed the time they were to ſerve in Egypt, and began too early an attempt upon their Promiſed Land."

Philiſtines.

Next to Dagon was Baalzebub the God of Ekron. In the text of the New Teſtament he is called *Beelzebub*, and the *prince of devils*. His name is rendered *lord of flies*; which by ſome is held to be a mock appellation beſtowed on him by the Jews; but others think him ſo ſtyled by his worſhippers, as Hercules Apomylos, and others, were, from his driving thoſe inſects away; and urge, that Ahaziah, in his ſickneſs, would ſcarcely have applied to him, if his name had carried in it any reproach. But it muſt be remembered, it is the ſacred hiſtorian that makes uſe of that contemptuous term in deriſion; whereas the idolatrous monarch, who was one of his votaries, might call him by his common name, ſuppoſed to have been *Baal-zebaoth*, ‘the lord of armies,’ or *Baal-ſhamim*, ‘lord of heaven,’ or ſome other bordering on Baal-zebub. How, or under what form he was repreſented, is uncertain: ſome place him on a throne, and attire him like a king; others paint him as a fly. Not to dwell on this obſcurity, it appears that he became an oracle of the higheſt repute for omniſcience and veracity; that he had prieſts of his own; and that he, in the middle times at leaſt, was much ſought after by thoſe who were anxious about futurity. Derceto we take certainly to have been the goddeſs of Aſcalon; but we are ſupported by profane authority, without the leaſt countenance from Scripture. Gath is ſeemingly the only city of all the five unprovided with a deity; wherefore, as the Scripture declares, that Aſhtaroth, or Aſtarte, was worſhipped by this people, we are ready to place her at Gath, and the rather, as this of all their cities may have had moſt communication with Sidon. To ſpeak in general concerning their religious rites and ceremonies, which is all we can do, they ſeem to have erected very large and ſpacious temples, or very wide halls, for the celebration of their ſolemn ſeaſons and feſtivals (for ſuch they ſurely had); their religious offices were attended with much pomp, and a great concourſe from all parts; and they preſented their gods with the chief part of their ſpoil, and carried them about with them when they went to war. We do not find in Scripture that they ſacrificed their children; and yet the Curetes (B) are ſaid to be their deſcendants."

With reſpect to the hiſtory of this extraordinary people, we find from the above extract, that they were not comprehended in the number of nations devoted to extermination, and whoſe territory the Lord had abandoned to the Hebrews; nor were they of the curſed ſeed of Canaan. However, Joſhua did not forbear to give their lands to the Hebrews, and to ſet upon them by command from the Lord, becauſe they poſſeſſed a country which was promiſed to the people of God (Joſh. xv. 45—47. and xiii. 2, 3.) But theſe conqueſts of Joſhua muſt have been ill maintained, ſince under the Judges, under Saul, and at the beginning of the reign of David, the Philiſtines oppreſſed the Iſraelites. True it is, Shamgar, Samſon, Samuel, and Saul, made head againſt them, but did not reduce their power; and they continued independent down to the reign of David, who ſubjected them to his government.

Philiſtines, Phillyrea.

They continued in ſubjection to the kings of Judah down to the reign of Jehoram, ſon of Jehoſhaphat; that is, for about 246 years. However Jehoram made war againſt them, and probably reduced them to his obedience again; becauſe it is obſerved in Scripture, that they revolted again from Uzziah; and that this prince kept them to their duty during the time of his reign (2 Chr. xxi. 16. and xxvi. 6. 7.) During the unfortunate reign of Ahaz, the Philiſtines made great havoc in the territories of Judah; but his ſon and ſucceſſor Hezekiah ſubdued them (2 Chr. xxviii. 18. and 2 Kings xviii. 8.) Laſtly, they regained their full liberty under the latter kings of Judah; and we may ſee by the menaces denounced againſt them by the prophets Iſaiah, Amos, Zephaniah, Jeremiah, and Ezekiel, that they brought a thouſand hardſhips and calamities upon the children of Iſrael: for which cruelties God threatened to puniſh them. Eſarhaddon beſieged Aſhdod or Azoth, and took it (Iſa. xx. 1.) And according to Herodotus, Pſammeticus king of Egypt took the ſame city, after a ſiege of 29 years. There is great probability, that Nebuchadnezzar, when he ſubdued the Ammonites, Moabites, Egyptians, and other nations, bordering upon the Jews, reduced alſo the Philiſtines. After this, they fell under the dominion of the Perſians; then under that of Alexander the Great, who deſtroyed the city of Gaza, the only city of Phœnicia that durſt oppoſe him. After the perſecution of Antiochus Epiphanes, the Aſmonæans ſubjected under their obedience ſeveral cities of the Philiſtines; and Tryphon gave to Jonathan Maccabæus the government of the whole coaſt of the Mediterranean, from Tyre as far as Egypt, which included all the country of the Philiſtines.

PHILLYREA, MOCK PRIVET; a genus of the monogynia order, belonging to the diandria claſs of plants. Each flower contains two males and one female. Some ſay there are ſeven ſpecies, all of them ſhrubby plants, and natives of France or Italy. Others reckon only three ſpecies, which are as follow:

Dict. Planting and Gardening.

1. *Phillyrea media;* the oval leaved phillyrea or mock privet, or the medial leaved phillyrea, a tall evergreen ſhrub, native of the ſouth of Europe. 2. *Phillyrea latifolia;* the broad-leaved phillyrea or mock privet a tall evergreen ſhrub, native of the ſouth of Europe. 3. *Phillyrea anguſtifolio;* the narrow-leaved phillyrea or mock privet, a deciduous ſhrub, native of Spain and Italy.

1. The firſt has three varieties, *viz.* The firſt is the common ſmooth-leaved phillyrea. This plant grows to be 12 or 14 feet high, and the branches are very numerous. The older branches are covered with a dark brown bark, but the bark on the young ſhoots is of a fine green colour. They are oval, ſpear-ſhaped, and grow oppoſite, by pairs, on ſtrong ſhort footſtalks. The

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(B) "The Curetes ſacrificed their children to Saturn; and from the ſimilitude this name bears to Cherethites or Philiſtines, it has been advanced that they are the ſame people; but as we have no warrant for ſaying the Philiſtines practiſed ſo barbarous and unnatural a cuſtom, we may venture to pronounce, that they learned it not from them, but borrowed it elſewhere."

The flowers are produced in cluſters from the wings of the young branches. They are ſmall, and of a kind of greeniſh-white colour; they appear in March, and are ſucceeded by berries, which are firſt green, then red, and black in the autumn when ripe. The ſecond variety is the privet-leaved phillyrea, which grows to be 10 or 12 feet high, and the branches of which are covered with a brown bark. The leaves a little reſemble the privet; they are of a fine green colour, and grow by pairs on the brances. They are of a lanceolate figure, and their edges are entire or nearly ſo; for ſome ſigus of ſerratures ſometimes appear. The flowers grow like others in cluſters in March. They are whitiſh, and are ſucceeded by ſmall black berries. The third variety, or the olive-leaved phillyrea, is the moſt beautiful of all the ſorts. It will grow to be about 10 or 12 feet high; and the branches, which are not numerous, ſpread abroad in a free eaſy manner, which may not improperly be ſaid to give the tree a fine air. They are long and ſlender, and are covered with a light brown bark; and on theſe the leaves ſtand oppoſite by pairs at proper intervals on ſhort footſtalks. They reſemble thoſe of the olive-tree, and are of ſo delightful a green as to force eſteem. Their ſurface is exceeding ſmooth, their edges are entire, and the membrane of a thickiſh conſiſtence. The flowers are ſmall and white, and like the other ſorts make no ſhow. They are ſucceeded by ſingle roundiſh berries.

2. The broad-leaved phillyrea will grow to be about 12 feet high. The branches ſeem to be produced ſtronger and more upright than thoſe of the former ſpecies. The bark is of a grey colour, ſpotted with white, which has a pretty effect; and the leaves grow oppoſite by pairs. They are of a heart-ſhaped oval figure of a thick conſiſtence, and a ſtrong dark-green colour. Their edges are ſharply ſerrated, and they ſtand on ſhort ſtrong footſtalks. The flowers grow from the wings of the leaves in cluſters in March. They are of a kind of greeniſh-white colour, make no ſhow, and are ſucceeded by ſmall round black berries. There are alſo three varieties of this ſpecies, *viz.* the ilex-leaved phillyrea, the prickly phillyrea, and the olive phillyrea with ſlightly ſerrated edges.

3. The narrow-leaved phillyrea is of lower growth, ſeldom riſing higher than 8 or 10 feet. The branches are few and ſlender, and they alſo are beautifully ſpotted with grey ſpots. The leaves, like the others, ſtand oppoſite by pairs. They are long and narrow, ſpear-ſhaped, and undivided, of a deep green colour, and of a thick conſiſtence. Their edges are entire, and they alſo ſtand on ſhort footſtalks. The flowers, like the others, make no ſhow. They are whitiſh, and grow in cluſters from the wings of the branches, in March; and are ſucceeded by ſmall round black berries. The varieties of this ſpecies are, the roſemary phillyrea, lavender phillyrea, ſtriped phillyrea, &c.

This vegetable is to be propagated by ſeeds or layers. 1. By ſeeds. Theſe ripen in the autumn, and ſhould be ſown ſoon after. The mould muſt be made fine; and if it is not naturally ſandy, if ſome drift ſand be added, it will be ſo much the better. The ſeeds for the moſt part remain until the ſecond ſpring before they come up; and if they are not ſown ſoon after they are ripe, ſome will come up even the third ſpring after. They muſt be ſown about an inch deep; and during the following ſummer ſhould be kept clean from weeds. After they are come up, the ſame care muſt be obſerved, and alſo watering in warm weather; and if the beds are hooped, and the plants ſhaded in the hotteſt ſeaſon, they will be ſo much the better for it. However, at the approach of winter they muſt be hooped, and the beds covered with mats in the hardeſt froſts, otherwiſe there will be danger of loſing the whole crop; for theſe trees, though they are very hardy when grown tolerably large, are rather tender whilſt ſeedlings. It will be proper to let them remain in the ſeed-beds with this management for two ſummers; and then waiting for the firſt autumnal rains, whether in September or October (and having prepared a ſpot of ground), they ſhould at that juncture be planted out, and this will occaſion them immediately to ſtrike root. The diſtance they ſhould be planted from each other need not be more than a foot, if they are not deſigned to remain long in the nurſery. If there is a probability of their not being wanted for ſome years, they ſhould be allowed near double that diſtance; and every winter the ground in the rows ſhould be well dug, to break their roots, and cauſe them to put out freſh fibres otherwiſe they will be in danger of being loſt when brought into the ſhrubbery quarters. 2. By layers they will eaſily grow. The autumn is the beſt time for this operation, and the young ſhoots are fit for the purpoſe. The beſt way of layering them is by making a ſlit at the joint; though they will often grow well by a twiſt being only made. When the gardener chooſes the method of twiſting a young branch for the layers, he muſt be careful to twiſt it about a joint ſo as only to break the bark; for if it is too much twiſted, it will die from that time, and his expectations wholly vaniſh. But if it be gently twiſted with art and care, it will at the twiſted parts be preparing to ſtrike root, and by the autumn following, as well as thoſe layers that had been ſlit, will have good roots; the ſtrongeſt of which will be fit for planting where they are wanted to remain, whilſt the weaker and worſt-rooted layers may be planted in the nurſery-ground like the ſeedlings, and treated accordingly.

PHILO, an ancient Greek writer, was of a noble family among the Jews, and flouriſhed at Alexandria during the reign of Caligula. He was the chief of an embaſſy ſent to Rome about the year 42, to plead the cauſe of the Jews againſt Apion, who was ſent by the Alexandrians to charge them with neglecting the honours due to Cæſar. Caligula, however, would not allow him to ſpeak, and behaved to him in ſuch a manner that Philo was in conſiderable danger of loſing his life. Others again tell us that he was heard; but that his demands were refuſed. He afterwards went to Rome in the reign of Claudius; and then, Euſebius and Jerome inform us, he became acquainted with St Peter, with whom he was on terms of friendſhip. Photius adds, that he became a Chriſtian, and afterwards, from ſome motive of reſentment, renounced it. Great part of this however, is uncertain, for few believe that St Peter was at Rome ſo early as the reign of Claudius, if he ever was there at all.

Philo was educated at Alexandria, and made very great progreſs in eloquence and philoſophy. After the faſhion of the time, he cultivated, like many of his nation and faith, the philoſophy of Plato, whoſe principles

ciples he ſo thoroughly imbibed, and whoſe manner he ſo well imitated, that it became a common ſaying, "Aut Plato philonizat, aut Philo platonizat." Joſephus ſays, he was a man "eminent on all accounts:" and Euſebius deſcribes him, "copious in ſpeech, rich in ſentiments, and ſublime in the knowledge of holy writ" He was, however, ſo much immerſed in philoſophy, particularly the Platonic, that he neglected the Hebrew language, and the rites and cuſtoms of his own people. Scaliger ſays, that Philo "knew no more of Hebrew and Syriac than a Gaul or a Scythian." Grotius is of opinion, that "he is not fully to be depended on, in what relates to the manners of the Hebrews:" and Cudworth goes further; for "though a Jew by nation (ſays he), he was yet very ignorant of Jewiſh cuſtoms." Fabricius thinks differently; for though he allows ſome inadvertencies and errors of Philo with regard to theſe matters, yet he does not ſee a ſufficient foundation on which to charge ſo illuſtrious a doctor of the law with ignorance. He allows, however, that Philo's paſſion for philoſophy had made him more than half a Pagan; for it led him to interpret the whole law and the prophets upon Platonic ideas; and to admit nothing as truly interpreted which was not agreeable to the principles of the academy. Beſides, this led him farther; he turned every thing into allegory, and deduced the darkeſt meanings from the plaineſt words. This moſt pernicious practice Origen, it is known, imitated, and expoſed himſelf by it to the ſcoffs of Celſus and of Porphyry. Philo's writings abound with high and myſtical, new and ſubtile, far-fetched and abſtracted notions; and indeed the doctrines of Plato and Moſes are ſo promiſcuouſly blended, that it is not an eaſy matter to aſſign to each his principles. There are certainly, however, in his works many excellent things. Though he is continually Platoniſing and allegoriſing the Scriptures, he abounds with fine ſentiments and leſſons of morality; and his morals are rather the morals of a Chriſtan than of a Jew. Hiſtory, together with his own writings, give us every reaſon to believe that he was a man of great prudence, conſtancy, and virtue.

His works were firſt publiſhed in Greek by Turnebus at Paris 1552. A Latin tranſlation made by Gelenius was afterwards added, and printed ſeveral times with it. The Paris edition of 1640 in folio was the beſt for a whole century; which made Cotelerius ſay, that "Philo was an author that deſerved to have a better text and a better verſion." In 1742, a handſome edition of his work was publiſhed at London by Dr Mangey in two volumes folio; which is certainly preferable if it were only for the paper and print, but it is not ſo good a one as Philo deſerves.

Many of our readers may be deſirous of further details reſpecting this celebrated man; we refer ſuch therefore to *Joſephus's Antiquities*, *Euſebius's Eccleſiaſtical Hiſtory*, St Jerome's work *De Scriptoribus Eccleſiaſticis*, *Fabricius Bibl. Græc. Cave Hiſt. Liter.* and vol. II. of *Monuments of the Greek Church.*

PHILOCLES, an admiral of the Athenian fleet during the Peloponneſian war. He recommended to his countrymen to cut off the right hand of ſuch of the enemies as were taken, that they might be rendered unfit for ſervice. His plan was adopted by all the ten admirals except one; but their expectations were fruſtrated, and inſtead of being conquerors they were totally defeated at Ægoſpotamos by Lyſander, and Philocles was put to death with the reſt of his colleagues.

PHILOCTETES, in fabulous hiſtory, the ſon of Pæan, was the faithful companion of Hercules; who at his death obliged him to ſwear not to diſcover the place where his aſhes were interred, and preſented him with his arrows dipped in the Hydra's blood. The Greeks at the ſiege of Troy being informed by an oracle that they could never take that city without thoſe fatal arrows, went to Philoctetes, and inſiſted upon his diſcovering where he had left his friend; when Philoctetes, to evade the guilt of perjury, let them know where Herculus was intombed, by ſtamping upon the place: but he was puniſhed for the violation of his oath, by dropping an arrow upon that foot; which, after giving him great agony, was at length cured by Macaon. He was afterwards taken by Ulyſſes to the ſiege of Troy, where he killed Paris with one of his arrows.

PHILOLAUS, of Crotona, was a celebrated philoſopher of antiquity, of the ſchool of Pythagoras, to whom that philoſopher's *Golden Verſes* have been aſcribed. He made the heavens his principal object of contemplation; and has been idly (A) ſuppoſed to have been the author of that true ſyſtem of the world which Copernicus afterwards revived. This made Bullialdus place the name of Philolaus at the head of two works, written to illuſtrate and confirm that ſyſtem.

Hiſt. of Philoſophy

"He was (ſays Dr Enfield) a diſciple of Archytas, and flouriſhed in the time of Plato. It was from him that Plato purchaſed the written records of the Pythagorean ſyſtem, contrary to an expreſs oath taken by the ſociety of Pythagoreans, pledging themſelves to keep ſecret the myſteries of their ſect. It is probable, that among theſe books were the writings of Timæus, upon which Plato formed the dialogue which bore his name. Plutarch relates, that Philolaus was one of the perſons who eſcaped from the houſe which was burned by Cylon, during the life of Pythagoras; but this account cannot be correct. Philolaus was contemporary with Plato, and therefore certainly not with Pythagoras. Interfering in affairs of ſtate, he fell a ſacrifice to political jealouſy.

"Philolaus treated the doctrine of nature with great ſubtlety, but at the ſame time with great obſcurity; referring every thing that exiſts to mathematical principles. He taught, that reaſon, improved by mathematical learning, is alone capable of judging concerning the nature of things; that the whole world conſiſts of infinite and finite; that number ſubſiſts by itſelf, and is the chain which by its power ſuſtains the eternal frame of things; that the Monad is not the ſole principle of all things, but that the Binary is neceſſary to furniſh materials from which all ſubſequent numbers may be produced; that the world is one whole, which has a fiery centre, about which the ten celeſtial ſpheres revolve, heaven, the ſun, the planets, the

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A) We ſay idly, becauſe there is undoubted evidence that Pythagoras learned that ſyſtem in Egypt. See PHILOSOPHY.

the earth, and the moon; that the ſun has a vitreous ſurface, whence the fire diffuſed through the world is reflected, rendering the mirror from which it is reflected viſible; that all things are preſerved in harmony by the law of neceſſity: and that the world is liable to deſtruction both by fire and by water. From this ſummary of the doctrine of Philolaus it appears probable, that, following Timæus, whoſe writings he poſſeſſed, he ſo far departed from the Pythagorean ſyſtem as to conceive two independent principles in nature, God and Matter, and that it was from the ſame ſource that Plato derived his doctrine upon this ſubject."

PHILOLOGY.

1 Definition. PHILOLOGY is compounded of the two Greek words φιλος and λογος, and imports "the deſire of inveſtigating the properties and affections of *words*." The ſages of Greece were, in the moſt ancient times, denominated Σοφοι, that is, *wiſe men*. Pythagoras renounced this pompous appellation, and aſſumed the more humble title of φιλοσοφος, that is, *a lover of wiſe men*. The learned Greeks were afterwards called *philoſophers*; and in proceſs of time, in imitation of this epithet, the word *philologer* was adopted, to import "a man deeply verſed in languages, etymology, antiquities, &c." Hence the term *philology*, which denotes the ſcience that we propoſe briefly to diſcuſs in the following article.

Though philology, in its original import, denoted only the ſtudy of words and language, it gradually acquired a much more extenſive, and at the ſame time a much more uſeful, as well as more exalted, ſignification.
2 Objects and uſes of philology. It comprehended the ſtudy of grammar, criticiſm, etymology, the interpretation of ancient authors, antiquities; and, in a word, every thing relating to ancient manners, laws, religion, government, language, &c. In this enlarged ſenſe of the word, philology becomes a ſcience of the greateſt utility; opens a wide field of intellectual inveſtigation; and indeed calls for a more intenſe exertion of induſtry, and multifarious erudition, than moſt of thoſe departments of literature which cuſtom hath dignified with more high-ſounding names. It is indeed apparent, that, without the aid of philological ſtudies, it is impoſſible, upon many occaſions, to develope the origin of nations; to trace their primary frame and conſtitution; to diſcover their manners, cuſtoms, laws, religion, government, language, progreſs in arts and arms; or to learn by what men and what meaſures the moſt celebrated ſtates of antiquity roſe into grandeur and conſideration. The ſtudy of hiſtory, ſo eminently uſeful to the legiſlator, the divine, the military man, the lawyer, the philoſopher, and the private gentleman who wiſhes to employ his leiſure in a manner honourable and improving to himſelf, and uſeful to his country, will contribute very little towards enlightening the mind without the aid of philological reſearches. For theſe reaſons we ſhall endeavour to explain the various branches of that uſeful ſcience as fully and as intelligibly as the nature of the preſent undertaking will permit.

3 Object of this article. Moſt of the branches of philology have been already canvaſſed under the various heads of CRITICISM, ETYMOLOGY, GRAMMAR, LANGUAGE, &c. There ſtill remains one part, which has been either ſlightly touched upon, or totally omitted, under the foregoing topics: we mean, the nature and complexion of moſt of the oriental tongues; as alſo ſome of the radical dialects of the languages of the weſt. As we would willingly gratify our readers of every deſcription to the utmoſt of our power, we ſhall endeavour in this place to communicate to them as much information upon that ſubject as the extent of our reading, and the limits preſcribed one ſingle article, will permit.

Before we enter upon this ſubject, we muſt obſerve, that it is not our intention to fill our pages with a tedious, unintereſting, catalogue of barbarous languages, ſpoken by ſavage and inconſiderable tribes, of which little, or perhaps nothing, more is known than barely their names. Such an enumeration would ſwell the article without communicating one ſingle new idea to the reader's antecedent ſtock. We ſhall therefore confine our inquiries to ſuch languages as have been uſed by conſiderable ſtates and ſocieties, and which of conſequence have acquired a high degree of celebrity in the regions of the eaſt.

4 Variety of dialects before the deluge, What was the antediluvian language, or whether it was divided into a variety of dialects as at this day, can only be determined by the rules of analogy; and theſe will lead us to believe, that whatever might have been the primitive language of mankind, if human nature was then conſtituted as it is at preſent, a great variety of dialects muſt of neceſſity have ſprung up in the ſpace of near 2000 years. If we adopt the Moſaic account of the antediluvian events, we muſt admit that the deſcendants of Cain for ſome ages lived ſeparated from thoſe of Seth. Their manner of life, their religious ceremonies, their laws, their form of government, were probably different, and theſe circumſtances would of courſe produce a variety in their language. The poſterity of Cain were an inventive race. They found out the art of metallurgy, muſic, and ſome think of weaving; and in all probability many other articles conducive to the eaſe and accommodation of life were the produce of their ingenuity. A people of this character muſt have paid no ſmall regard to their words and modes of expreſſion.
5 eſpecially among the children of Cain. Whereever muſic is cultivated, language will naturally be improved and refined. When new inventions are introduced, a new race of words and phraſes of neceſſity ſpring up, correſponding to the recent ſtock of ideas to be intimated. Beſides, among an inventive race of people, new vocables would be continually fabricated, in order to ſupply the deficiencies of the primitive language, which was probably ſcanty in words, and its phraſeology unpoliſhed. The Cainites, then, among their other improvements, cannot well be ſuppoſed to have neglected the cultivation of language.

Many conjectures have been hazarded both by ancient and modern authors with reſpect to the origin of writing; an art nearly connected with that of ſpeaking. According to Pliny*, "the Aſſyrian letters had always exiſted; ſome imagined that letters had been in-

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* Nat. hiſt. lib. vii. cap. 56.

6 Origin of writing.

vented by the Egyptian Mercury; others aſcribed the honour of the invention to the Syrians." Some contend, that letters were an antediluvian invention, preſerved among the Chaldeans or Aſſyrians, who were the immediate deſcendants of Noah, and inhabited thoſe very regions in the neighbourhood of which the ark reſted, and where that patriarch afterwards fixed his reſidence. This circumſtance, they think, affords a ſtrong preſumption that the uſe of letters was known before the deluge, and tranſmitted to the Aſſyrians and Chaldeans by Noah their progenitor, or at leaſt by their immediate anceſtors of his family. Others, with much probability, conclude that letters were of Divine origin, and were firſt communicated at Sinai.

The deſcendants of Seth, according to the oriental tradition, were chiefly addicted to agriculture and tending of cattle. They devoted a great part of their time to the exerciſes of piety and devotion. From this circumſtance they came to be diſtinguiſhed by the title of the (A) *ſons of God*. According to this deſcription, the Sethites were a ſimple (B), unimproved race of people till they mingled with the race of Cain; after which period they at once adopted the improvements and the vices of that wicked family.

It is not, however, probable, that all the deſcendants of Seth, without exception, mingled with the Cainites. That family of which Noah was deſcended had not incorporated with the race of Cain: it was, according to the ſacred hiſtorian, lineally deſcended from Seth, and had preſerved the worſhip of the true God, when, it is probable, the greateſt part of mankind had apoſtatiſed and become idolaters (C). Along with the true religion, the progenitors of Noah had preſerved that ſimplicity of manners and equability of character which had diſtinguiſhed their remote anceſtors. Agriculture and rearing cattle had been their favourite occupations. Accordingly we find, that the patriarch Noah, immediately "after the deluge," became a huſbandman, and "planted a vineyard." The choſen patriarchs, who doubtleſs imitated their pious anceſtors, were ſhepherds, and employed in rearing and tending cattle. Indeed there are ſtrong preſumptions that the Chaldeans, Aſſyrians, Syrians, Canaanites, and Arabians, in the earlieſt ages followed the ſame profeſſion.

From this deduction, we imagine it is at leaſt probable, that the anceſtors of Noah perſiſted in the obſervance of the ſame ſimplicity of manners which had been handed down from Adam to Seth, and from him to Enoch, Methuſelah, Lamech, and from this laſt to Noah. According both to ſcripture and tradition, innovations were the province of the Cainites, while the deſcendants of Seth adhered to the primitive and truly patriarchal inſtitutions.

7 The original language preſerved in the family from which Noah ſprung.

If theſe premiſes are allowed the merit of probability, we may juſtly infer that the language of Noah, whatever it was, differed very little from that of Adam (D); and that if it is poſſible to aſcertain the language of the former, that of the latter will of courſe be diſcovered. We ſhall then proceed to throw together a few obſervations relating to the language of Noah, and leave our readers to judge for themſelves. We believe it will be ſuperfluous to ſuggeſt, that our intention in the courſe of this deduction, is, if poſſible, to trace the origin and antiquity of the Hebrew tongue: and to try to diſcover whether that language, or any of its ſiſter dialects, may claim the honour of being the original language of mankind.

Whatever may have been the dialect of Noah and his family, that ſame dialect, according to the Moſaic account, muſt have obtained, without any alteration, till the era of the building of the tower of Babel.—Upon this occaſion a dreadful convulſion took place; the language of mankind was confounded, and men were *ſcattered abroad upon the face of all the earth*.

8 Confuſion at the tower of Babel.

How far this cataſtrophe (E) extended, is not the buſineſs of the preſent inquiry to determine. One thing is certain beyond all controverſy, namely, that the languages of all the nations which ſettled near the centre of population were but ſlightly affected by its influence. A very judicious writer has obſerved *, that 3000 years after, the inhabitants of thoſe countries exhibited a very ſtrong reſemblance of cognation, "in their *language*, manner of living, and the lineaments of their bodies. At the ſame time he obſerves, that the reſemblance in all thoſe particulars was moſt remarkable among the inhabitants of Meſopotamia." This obſervation, with reſpect to language, will, we doubt not, be vouched by every one of our readers who has acquired even a ſuperficial knowledge of the languages current in thoſe quarters, at a very early period.

* Strabo.

It appears, then, that the languages of the Armenians, Syrians, Aſſyrians, Arabians, and probably of the Chanaanim, did not ſuffer materially by the confuſion of tongues. This obſervation may, we imagine, be extended to many of the dialects (F) ſpoken by the people who ſettled in thoſe countries not far diſtant

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(A) From this paſſage (Gen. ch. vi. ver. 2) miſunderſtood, originated the abſurd idea of the connection between angels and mortal women. See *Joſeph. Antiqui. Jud.* l. 1. cap. 4. See *Euſeb. Chron.* lib. 1. All the fathers of the church, almoſt without exception, adopted this fooliſh notion. See alſo *Philo. Jud.* p. 198. ed. Turn. Paris 1552.

(B) The orientals, however, affirm that Seth, whom they call *Edris*, was the inventor of aſtronomy.

(C) We think it highly probable that idolatry was eſtabliſhed before the flood; becauſe it prevailed almoſt immediately after that cataſtrophe. See POLYTHEISM.

(D) For the firſt language communicated to Adam, see the article on LANGUAGE: alſo *Shuckford's Connect.* Vol. I. l. ii. p. 111. *et ſeq.*

(E) Joſephus and the fathers of the church tell us, that the number of languages produced by the confuſion of tongues was 72; but this is a mere rabbinical legend.

(F) The languages of the Medes, Perſians, Phœnicians, and Egyptians, very much reſembled each other in their original complexion; and all had a ſtrong affinity to the Hebrew, Chaldean, Syriac, &c. See Walton's *Proleg*;

ſtant from the region where the ſacred hiſtorian has fixed the original ſeat of mankind after the deluge. The inference then is, that if Noah and his family ſpoke the original language of Adam, as they moſt probably did, the judgment which affected the confuſion of tongues did not produce any conſiderable alteration in the language of ſuch of the deſcendants of Noah as ſettled near the region where that patriarch had fixed his reſidence after he quitted the ark.

9 Only a part of mankind engaged in building the tower,

But ſuppoſing the changes of language produced by the cataſtrophe at the building of the tower as conſiderable as has ever been imagined, it does not, after all, appear certain that all mankind without exception were engaged in this impious project. If this aſſertion ſhould be well founded, the conſequence will be, that there was a choſen race who did not engage in that enterpriſe. If there was ſuch a family, ſociety, or body of men, it will follow, that this family, ſociety, &c. retained the language of its great anceſtor without change or variation. That ſuch a family did actually exiſt, is highly probable, for the following reaſons:

1. We think there is reaſon to believe, that Ham, upon the heavy curſe denounced upon him by his father ‡, retired from his brethren, and fixed his reſidence elſewhere. Accordingly, we find his deſcendants ſcattered far and wide, at a very great diſtance from the Gordyæan mountains, where the ark is generally ſuppoſed to have reſted immediately after the flood. Some of them we find in Chaldea, others in Arabia Felix, others in Ethiopia (G), others in Canaan, and others in Egypt; and, finally, multitudes ſcattered over all the coaſt of Africa. Between thoſe countries were planted many colonies of Shemites, in Elam, Aſſyria, Syria, Arabia, &c. We find, at the ſame time, the deſcendants of Shem and Japheth ſettled, in a great degree, contiguous to each other. This diſperſion of the Hamites, irregular as it is, can ſcarce, we think, have been accidental; it muſt have been owing to ſome uncommon cauſe, and none ſeems more probable than that aſſigned above. If, then, the deſcendants of Ham ſeparated early, and took different routs, as from their poſterior ſituations it appears they did, they could not all be preſent at the building of the tower.

‡ Gen. ix. 25.

10 and thoſe not the deſcendants of Shem.

2. It is not probable that the deſcendants of Shem were engaged in this undertaking, ſince we find that they were not *ſcattered abroad upon the face of all the earth*. The children of Shem were ‖ Elam, Aſhur, Arphaxad, Lud, and Aram. Elam ſettled near the mouth of the river Tigris, in the country which, by Gentile writers, was called *Elymais*. Above him, on the ſame river, lay the demeſne of Aſhur on the weſtern ſide. In like manner, upon the ſame river, above him was ſituated Aram, who poſſeſſed the country of Aramea; and oppoſite to him was Arphaxad, or Arbaces or Arbaches, and his country was denominated *Arphachitis*. Lud, as ſome think, ſettled in Lydia, among the ſons of Japhet; but this opinion ſeems to be without foundation (H). Here, then, there is diſperſion, but ſuch as muſt have originated from the nature of the thing. The four, or rather the five, brothers, all ſettled contiguous, without being *ſcattered abroad upon the face of the whole earth*. Beſides, there was no confuſion of language among theſe tribes: they continued to uſe one and the ſame *lip* through many ſucceeding generations.

‖ Chap. x. verſe 22.

11 The language of Adam preſerved in the family of Shem,

From theſe circumſtances, it appears that the poſterity of Shem were not involved in the guilt of the builders of the tower, and of conſequence did not undergo their puniſhment. If, then, the language of the Shemites was not confounded upon the erection of the tower, the preſumption is, that they retained the language of Noah, which, in all probability, was that of Adam. Some dialectical differences would in proceſs of time creep in, but the radical fabric of the Language would remain unaltered.

3. The poſterity of Shem appear in general to have cultivated the paſtoral life. They imitated the ſtyle of living adopted by the antediluvian poſterity of *Seth*. No ſooner had Noah deſcended from the ark, than he became *Iſh ha Adamah*, a man of the earth; that is, a huſbandman, and planted a vineyard. We find that ſome ages after, Laban the Syrian had flocks and herds; and that the chief wealth of the patriarch Abraham and his children conſiſted in their flocks and herds. Even his Gentile deſcendants, the Iſhmaelites and Midianites, ſeem to have followed the ſame occupation. But people of this profeſſion are ſeldom given to changes: their wants are few, and of conſequence they are under few or no temptations to deviate from the beaten track. This circumſtance renders it probable, that the language of Noah, the ſame with that of Adam, was preſerved with little variation among the deſcendants of Arphaxad down to Abraham.

12 down to Abraham.

We have obſerved above, that Ham upon the curſe denounced againſt him by his father, very probably left the ſociety of his other brothers, and emigrated elſewhere, as Cain had done in the antediluvian world. There is a tradition ſtill current in the Eaſt, and which was adopted by many of the Chriſtian fathers (I), that Noah, in the 930th year of his life, by divine appointment,

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Proleg.; Gale's *Court of the Gent.* vol. 1. l. 1. ch. 11. page 70. *et ſeq.*; Boch. *Phaleg* and *Canaan paſſ.* To theſe we may add the Greek language, as will appear more fully below.

(G) Joſephus informs us, that all the nations of Aſia called the Ethiopians *Cuſhim*, l. 1. cap. 7.

(H) The ancient name of Lydia was *Mæonia*. See Strabo *Caſaub* l. 13. page 586. chap. 7. *Rhod.* 577. The Lydians were celebrated for inventing games; on which account they were nicknamed by the Æolian Greeks λυδοι, *Lydi* or *Ludi*, from the Hebrew words *lutz, ludere, illudere, deridere*. We find (Ezek. chap. xxvii. ver. 10.) the men of Elam and the men of Lud joined in the defence of Tyre; which ſeems to intimate, that the Elamites and Ludim were neighbours. If this was actually the caſe, then Lud ſettled in the ſame quarter with his brothers.

(I) *Epiph.* vol. i. page. 5. *ibid.* pag. 709. where our learned readers will obſerve ſome palpable errors about *Rhinocorura*, &c. Euſeb. *Chron.* pag. 10. Syncellus, pag. 89. Cedrenus, *Chron. Paſch.* &c.

ment, did, in the moſt formal manner, divide the whole terraqueous globe among his three ſons, obliging them to take an oath that they would ſtand by the deciſion. Upon this happened a migration at the birth of Peleg, that is, about three centuries after the flood. It is affirmed, that Nimrod the arch-rebel diſregarded this partition, and encroached upon the territory of Aſhur, which occaſioned the firſt war after the flood.

The Greeks had acquired ſome idea of this partition, which they ſuppoſed to have been between Jupiter ‡, Neptune, and Pluto. Plato ſeems to have heard of it (K): " For (ſays he) the gods of old obtained the dominion of the whole earth, according to their different allotments. This was effected without any contention, for they took poſſeſſion of their ſeveral provinces in a fair and amicable way, by lot." Joſephus §, in his account of the diſperſion of mankind, plainly inſinuates a divine deſtination; and Philo Judeus (L) was of the ſame opinion before him.

In conſequence of this arrangement, the ſons of Shem poſſeſſed themſelves of the countries mentioned in the preceding pages: the poſterity of Japhet had ſpread themſelves towards the north and weſt; but the Hamites, who had ſeparated from their brethren in conſequence of the curſe, not chooſing to retire to their quarters, which were indeed very diſtant from the place where the ark reſted, ſeized upon the land of Canaan (M). Perhaps, too, it might be ſuggeſted by ſome malicious ſpirits, that the aged patriarch was dealing partially, when he aſſigned Ham and his poſterity a quarter of the world to inhabit not only remote from the centre of population, but likewiſe ſequeſtered from the reſt of mankind (N).

Be that as it may, the children of Ham removed eaſtward, and at length deſcending from the Carduchean or Gordyæan mountains, directed their courſe weſtward, and arrived at the plains of Shinar, which had been poſſeſſed by the Aſhurim ever ſince the era of the firſt migration at the birth of Peleg. The ſacred hiſtorian informs us, that the whole *earth* " was of one language and of one ſpeech;" that in journeying from the eaſt, they lighted upon the plain of Shinar, and dwelt there. In this paſſage we find no particular people ſpecified; but as we find Nimrod, one of the deſcendants of Ham, ſettled in that country, we are ſure that they were the offſpring of that patriarch. It would not, we think, be eaſy to aſſign a reaſon how one branch of the family of Ham came to plant itſelf in the midſt of the ſons of Shem by any other means but by violence.

13 The tower of Babel built by the children of Ham.

It is indeed generally ſuppoſed, that Nimrod, at the head of a body of the children of Ham, made war upon Aſhur, and drove him out of the country of Shinar; and there laid the foundation of that kingdom, the beginning of which was Babel: that this chief, ſupported by all the Cuſhites, and a great number of apoſtates from the family of Shem and Japhet who had joined him, refuſed to ſubmit to the divine ordinance by the mouth of Noah, with reſpect to the partition of the earth; and that he and his adherents were the people who erected the celebrated tower, in conſequence of a reſolution which they had formed to keep together, without repairing to the quarters aſſigned them by the determination of heaven. This was the crime which brought down the judgment of the Almighty upon them, by which they were *ſcattered abroad upon the face of all the earth.* The main body of the children of Shem and Japhet were not engaged in this impious undertaking; their language, therefore, was not confounded, nor were they themſelves ſcattered abroad. Their habitations were contiguous; thoſe of the Shemites towards the centre of Aſia; the dwellings of Japhet were extended towards the north and north-weſt; and the languages of both theſe families continued for many ages without the leaſt variation, except what time, climate, laws, religion, new inventions, arts, ſciences, and commerce, &c. will produce in every tongue in a ſucceſſion of years.

The general opinion then was, that none but the progeny of Ham and their aſſociates were preſent at the building of the tower, and that they only ſuffered by the judgment (O) conſequent upon that attempt. There are even among the Pagans ſome alluſions to the diviſion of the world among the three ſons of Noah. Many of the learned have imagined that this patriarch was *Saturn;* and that his three ſons were *Jupiter, Neptune,* and *Pluto,* as has been obſerved above.

Bero-

‡ Calymach. Hym. Hom. Iliad, lib. xv.

§ Ant. Jud. lib. i. c. 5.

(K) Critias, vol. 3. pag. 109. *Serr.* Apollodorus mentions a time when the gods reſpectively ſelected particular cities and regions, which they were to take under their peculiar protection.

(L) L. 10. p. 236. Turn. Paris 1552. We have a plain alluſion to this diſtribution (Deut. ch. xxxii. ver. 7.) " When the moſt High divided to the nations their inheritance, when he ſeparated the ſons of Adam, he ſet the bounds of the people, according to the number of the children of Iſrael; for the Lord's portion is his people; Jacob is the lot of his inheritance." From this paſſage it appears, that the whole was arranged by the appointment of God, and that the land of Canaan was expreſsly reſerved for the children of Iſrael. St Paul, Acts ch. xvii. ver. 26. ſpeaks of this divine arrangement, " God made of one blood all nations of men, for to dwell on all the face of the earth; and determined the bounds of their habitation."

(M) the ark, according to the moſt probable accounts, reſted upon mount Ararat in Armenia.

(N) We think it is by no means improbable that Noah, well knowing the wickedneſs of the family of Ham, and eſpecially their inclination to the idolatry of the antediluvians, might actually intend to ſeparate them from the reſt of mankind.

(O) Some learned men have imagined that this confuſion of language, which the Hebrew calls of *Lip,* was only a temporary failure of pronunciation, which was afterwards removed. This they are led to conclude, from the agreement of the languages of theſe people in after times.

* Euſeb. Chron.

† Euſeb. Prep. Ev. lib. 9.

Beroſus*, in his hiſtory of the Babylonians, informs us, that Noah, at the foot of Mount Baris or Luban, where the ark reſted, gave his children their laſt inſtructions, and then vaniſhed out of ſight. It is now generally believed that the Xithruſus of Beroſus was Noah. Eupolemus†, another Heathen writer, tells us, "that the city Babel was firſt founded, and afterwards the celebrated tower; both which were built by ſome of thoſe people who eſcaped the deluge. They were the ſame with thoſe who in after times were exhibited under the name of *giants*. The tower was at length ruined by the hand of the Almighty, and thoſe giants were ſcattered over the whole earth." This quotation plainly intimates, that according to the opinion of the author, only the raſcally mob of the Hamites, and their apoſtate aſſociates, were engaged in this daring enterprize.

Indeed it can never be ſuppoſed that Shem, if he was alive at that period, as he certainly was, would co-operate in ſuch an abſurd and impious undertaking. That devout patriarch, we think, would rather employ his influence and authority to divert his deſcendants from an attempt which he knew was undertaken in contradiction to an expreſs ordinance of Heaven: and it is ſurely very little probable that Elam, Aſhur, Arphaxad, and Aram, would join that impious confederacy, in oppoſition to the remonſtrances of their father.

The building of the tower, according to the moſt probable chronology, was undertaken at a period ſo late, that *all mankind* could not poſſibly have concurred in the enterprize.

‡ Epiph. Hæreſ. lib. 1.

Many of the fathers were of opinion, that Noah ſettled in Armenia, the country where the ark reſted; and that his deſcendants did not leave that region for five generations ‡, during the ſpace of 659 years. By this period the human race muſt have been ſo amazingly multiplied, that the plains of Shinar could not have contained them. According to the Samaritan Pentateuch, and the Septuagint verſion, Peleg was born in the 134th year of his father Eber. Even admitting the vulgar opinion, that the tower was begun to be built, and the diſperſion conſequent upon that event to have taken place at this era, the human race would have been by much too numerous to have univerſally concurred in one ſign.

From theſe circumſtances, we hope it appears that the whole maſs of mankind was not engaged in building the tower; that the language of all the human race was not confounded upon that occaſion; and that the diſperſion reached only to a combination of Hamites, and of the moſt profligate part of the two other families, who had joined their wicked confederacy.

14 Therefore the original language preſerved in the other two families.

We have purſued this argument to conſiderable length, becauſe ſome have inferred, from the difference in languages exiſting at this day, that mankind cannot have ſprung from two individuals; becauſe, from the connection ſtill exiſting among languages, ſome have been bold enough to queſtion the fact, though plainly recorded in ſacred hiſtoy; and laſtly, becauſe we imagine that ſome of our readers, who do not pretend to peruſe the writings of the learned, may be gratified by ſeeing the various opinions reſpecting the confuſion of tongues, and the diſperſion of mankind, collected into one maſs, equally brief, we hope, and intelligible: and this view of theſe opinions, with the foundations on which they reſpectively reſt, we think may ſuffice to prove, that the language of Noah was for ſome ages preſerved unmixed among the deſcendants of both Shem and Japhet.

To gratify ſtill farther ſuch of our curious readers as may not have acceſs to more ample information, we ſhall in this place exhibit a brief detail of the circumſtances which attended this fatal attempt. The people engaged in it have been held up as a profligate race. The Almighty himſelf denominates them "*the children of men*," which is the very appellation by which the antediluvian ſinners were characterized; *the ſons of God ſaw the daughters of men*, &c. Their deſign in raiſing this edifice was "*to make them a name, and to prevent their being ſcattered abroad upon the face of the whole earth**."

* Gen. chap. xi.

Whatever reſolution the reſt of mankind might take, they had determined to maintain themſelves on that ſpot. The tower was intended as a centre of union, and perhaps as a fortreſs of defence. Such a ſtupendous fabric, they imagined, would immortalize their memory, and tranſmit the name of their confederacy with eclat (P) to future ages. This deſign plainly intimates, that there was only a party concerned in the undertaking, ſince, had all mankind been engaged in it, the purpoſe would have been fooliſh and futile. Again, they intended, by making themſelves *a name*, to prevent their being ſcattered abroad upon the face of the earth. This was an act of rebellion in direct contradiction to the divine appointment, which conſtituted their crime, and brought down the judgment of Heaven upon their guilty heads. The conſequence of the confuſion of languages was, that the projectors left off to build (Q), and were actually ſcattered abroad, contrary to their intention.

15 Pagan tradition concerning the tower of Babel.

Abydenus, in his Aſſyrian annals, records, that the (R) "tower was carried up to heaven; but that the gods ruined it by ſtorms and whirlwinds, and overthrew it upon the heads of thoſe who were employed in the work, and that the ruins of it were called *Babylon*,

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(P) Many fooliſh and abſurd notions have been entertained concerning this ſtructure. Some have imagined that they meant to take ſhelter there in caſe of a ſecond deluge; others, that it was intended for idolatrous purpoſes; others, that it was to be employed as an obſervatory. Its dimenſions have likewiſe been moſt extravagantly magnified. Indeed Strabo, l. 16. mentions a tower of immenſe ſize remaining at Babylon in his time, the dimenſions of which were a ſtadium every way. This, however, ſeems to have been the remains of the temple of Bel or Belus.

(Q) For a deſcription of the tower, ſee the article Babel.

(R) See the Greek original of this quotation, Euſeb. Chron. lib. 1. page 13.

bylon. Before this there was but one language ſubſiſting among men: but now there aroſe πολυθρηφωνη, *a manifold ſpeech;* and he adds, that a war ſoon after broke out between (s) Titan and Cronus." (T) The Sybilline oracles give much the ſame account of this early and important tranſaction.

* Philip. lib. 18. oap. 3.

"Juſtin * informs us, that the Phœnicians who built Tyre were driven from Aſſyria by an earthquake. Theſe Phœnicians were the deſcendants of Mizraim the youngeſt ſon of Ham; and were, we think, confederates in building the tower, and were driven away by the cataſtrophe that enſued. Many other alluſions to the diſperſion of this branch of the family occur in Pagan authors, which the limits to be obſerved in an inquiry of this nature oblige us to omit. Upon the whole, we think it probable that the country of Shinar lay deſolate for ſome time after this revolution; for the dread of the judgment inflicted upon the original inhabitants would deter men from ſettling in that inauſpicious region. At laſt, however, a new colony arrived, and Babel, or Babylon, became the capital of a flouriſhing kingdom.

† Bochar. Phaleg. lib. 1. cap. 10.

‡ Odyſſ. l. 11. verſ. 571.

Our readers, we believe, will expect that we ſhould ſay ſomething of Nimrod the mighty hunter, who is generally thought to have been deeply concerned in the tranſactions of this period. According to moſt authors, both ancient and modern, this patriarch was the leader of the confederates who erected the tower, and the chief inſtigator to that enterprize. But if the tower was built at the birth of Pheleg, according to the Hebrew computation, that chief was † either a child, or rather not born at that period (U). The Seventy have pronounced him a giant, as well as a huntſman. They have tranſlated the Hebrew word *gebur*, which generally ſignifies *ſtrong*, *mighty*, by the word Γιγας *giant;* an idea which we imagine thoſe tranſlators borrowed from the Greeks. The antediluvian giants are called *Nephelim* and *Rephaim*, but never *Geburim.* The Rabbinical writers, who juſtly hated the Babylonians, readily adopted this idea (X); and the fathers of the church, and the Byzantine hiſtorians, have univerſally followed them. He has been called *Nimrod*, *Nebrod*, *Nymbroth*, *Nebroth*, and *Nebris*. Not a few have made him the firſt *Bacchus*, and compounded his name of *Bar*, a ſon, and *Cuſh*, that is, the ſon of *Cuſh.* Some have imagined that he was the Orion of the Pagans, whoſe ſhade is ſo nobly deſcribed by Homer ‡. But the etymology of this laſt name implies ſomething (Y) honourable, and very unſuitable to the idea of the *tyrant Nimrod.* It muſt be obſerved, however, that we find nothing in Scripture to warrant the ſuppoſition of his having been a tyrant; ſo far from it, that (Z) ſome have deemed him a benefactor to mankind. See NIMROD.

* Chron. lib. 1. pag. 14.

† Gen. x. Ezek. xxvii.

The beginning of this prince's kingdom was Babel. Euſebius gives us firſt * a catalogue of ſix kings of the Chaldæans, and then another of five kings of Arabian extraction, who reigned in Chaldæa after them. This might naturally enough happen, ſince it appears that the inhabitants of thoſe parts of Arabia which are adjacent to Chaldea were actually Cuſhites, of the † ſame family with the Babylonians.

‡ Joseph. Ant. lib. 1, cap. 6.

§ Gen. chap. xxii. verſe 22.

‖ Gen. chap. xi. verſe 28.

The Cuſhites, however, were at laſt ſubdued, perhaps partly expelled Chaldea by the *Chaſidim*, who probably claimed that territory as the patrimony of their progenitors. That the Chaſidim were neither *Cuſhites*, nor indeed *Hamites*, is obvious from the name. The Hebrews, and indeed all the Orientals ‡, denominated both the people who inhabited the eaſtern coaſt of Arabia *Cuſhim*, and alſo the Ethiopians who ſprung from the laſt mentioned people. Had the later inhabitants of Chaldea been the deſcendants of Cuſh, the Jewiſh writers would have called them *Cuſhim*, We find they called the Phœnicians *Chanaanim*, the Syrians *Aramim*, the Egyptians *Mizraim*, the Greeks *Jonim*, &c. The Chaſidim, therefore, or modern inhabitants of Chaldea, were poſitively deſcended of one Cheſed or Chaſed; but who this family-chief was, it is not eaſy to determine. The only perſon of that name whom we meet with in early times is the fourth ſon of Nahor §, the brother of Abraham; and ſome have been of opinion that the Chaldeans were the progeny of this ſame Cheſed. This appears to us highly probable, becauſe both Abram and Nahor were ‖ natives of *Ur* of the Chaſidim. The former, we know, in conſequence of the divine command, removed to *Haran*, afterwards *Charræ;* but the latter remained in *Ur*, where his family multiplied, and, in proceſs of time, became maſters of the country which they called the land of the Chaſidim, from *Cheſed* or *Chaſed*, the name of their anceſtor. This account is the more probable, as we find the other branches of Nahor's family ſettled in the ſame neighbourhood (A).

16 Origin of the name Chaldæ.

How the Greeks came to denominate theſe people χαλδαιοι *Chaldæi*, is a queſtion rather difficult to be reſolved; but we know that they always affected to diſtinguiſh people and places by names derived from their own language. They knew a rugged, erratic nation (B) on the banks of the river Thermodon, in the territory of Pontus, bordering on Armenia the Leſs.

(S) This war was probably carried on between the leaders of the Hamites and Aſhur upon their invaſion.

(T) Theoph. ad Antol. l. 2. page 107. ed. Paris 1636.

(U) Gen. chap. 10. verſe 8, 9. "This man began to be a *giant* upon the earth; he was the giant hunter before the Lord God.—As Nymbrod the *giant* hunter before the Lord.

(X) See Mr Bryant's Analyſis, vol. 3. page 34. et ſeq.

(Y) Orion is compounded of the Hebrew *Or* "light," and *ion* "one of the names of the ſun;" and Orion was probably one of the names of that luminary.

(Z) See Shuckford's Connect. vol. 1. l. 3. page 179, 180. Alſo the authors of the Univer. Hiſt. vol. 1.

(A) Huz gave name to the country of Job; Elihu, one of Job's friends, was a Buzite of the kindred of Ram or Aram, another of the ſons of Nahor. Aram, whoſe poſterity planted Syria cava, was the grandſon of Nahor by Kemuel. Hence it appears probable that Job himſelf was a deſcendant of Nahor by Huz his firſt born.

(B) See Euſtat. in Dion. Perieg. ver. 768. Strabo, l. 12. page 543. Caſaub. As the Chalybes were famous for manufacturing

Leſs. Theſe, in ancient times, were called *Alybes*, or *Chalybes*, becauſe they were much employed in forging and poliſhing iron. Their neighbours, at length, gave them the name of *Chald* or *Caled*, which imports, in the Armenian dialect, *fierce*, *hardy*, *robuſt*. This title the Greeks adopted, and out of it formed the word χαλδαιοι "Chaldeans."

The Moſaic hiſtory informs us (c), that Aſhur went out of *that land* (Shinar) and built Nineveh and ſeveral other conſiderable cities. One of the ſucceſſors of Aſhur was the celebrated Ninus, who firſt broke the peace of the world [*], made war upon his neighbours, and obliged them by force of arms to become his ſubjects, and pay tribute. Some authors make him the immediate ſucceſſor of Aſhur, and the builder of Nineveh. This we think is not probable; Euſebius, as we have obſerved above, gives a liſt of ſix Arabian princes who reigned in Babylon. Theſe we take to have been the immediate ſucceſſors of Nimrod, called *Arabians;* becauſe theſe people were Cuſhites. Ninus might be reputed the firſt king of the Aſſyrians, becauſe he figured beyond his predeceſſors; and he might paſs for the builder of Nineveh, becauſe he greatly enlarged and beautified that city. We therefore imagine, that Ninus was the fifth or ſixth in ſucceſſion after Aſhur.

[*] Juſtin, l. 1. cap. 1.

Ninus, according to Diodorus Siculus [†], made an alliance with Ariæus king of the Arabians, and conquered the Babylonians. This event, in our opinion, put an end to the empire of the Hamites or Cuſhim in Shinar or Babylonia. The author obſerves, that the Babylon which figured afterwards did not then exiſt. This fact is confirmed by the prophet Iſaiah [‡]: "Behold the land of the Chaſidim; this people was not till Aſhur founded it for them that dwell in the wilderneſs. They ſet up the towers thereof, &c." After Babylonia was ſubdued by the Aſſyrians under Ninus, the capital was either deſtroyed by that conqueror or deſerted by the inhabitants. At length it was reedified by ſome one or other of the Aſſyrian monarchs, who collected the roving Chaſidim, and obliged them to ſettle in the new city. Theſe were ſubject to the Aſſyrian empire till the reign of Sardanapalus, when both the Medes and Babylonians rebelled againſt that effeminate prince.

[†] Lib. 2.

[‡] Ch. xxiii. verſ. 13.

The Chaſidim were celebrated by all antiquity for their proficiency in aſtronomy, aſtrology, magic, and curious ſciences. Ur or Orchoe (D) was a kind of univerſity for thoſe branches of learning. Such was their reputation in thoſe ſtudies, that over a great part of Aſia and Europe a Chaldean and an aſtrologer were ſynonymous terms. Theſe ſciences, according to the tradition of the Orientals, had been invented by Seth, whom they call *Edris;* and had been cultivated by his deſcendants downward to Noah, by whom they were tranſmitted to Shem, who conveyed them to Arphaxad and his poſterity.

To us it appears probable, that the religious ſentiments tranſmitted from Noah through the line of Shem, were kept alive in the family of Arphaxad, and ſo handed down to the families of Serug, Nahor, Terah, Abram, Nahor II. and Haran, &c. The Jewiſh Rabbins, and all the Perſian and Mahomedan writers, make Abraham contemporary with Nimrod; who, ſay they, perſecuted him moſt cruelly for adhering to the true religion. That theſe two patriarchs were contemporary, is very improbable, ſince Nimrod was the third generation after Noah, and Abram the tenth. Abram has been inveſted by the rabbinical writers with every department of learning. According to them, he tranſported from Charræ into Canaan and Egypt, aſtronomy, aſtrology, mathematics, geography, magic, alphabetical writing, &c. &c.

17 Legendary tales concerning Abraham.

After the Babyloniſh captivity, when the Jews were diſperſed over all the eaſt, and began to make *proſelytes of the gate* among the Pagans, wonderful things were reported of Abram with reſpect to his acquirements in human erudition, as well as his ſupereminence in virtue and piety. Theſe legendary tales were believed by the proſelytes, and by them retailed to their connections and acquaintances. But certainly the holy man either was not deeply verſed in human ſciences, or did not deem them of importance enough to be communicated to his poſterity; ſince the Jews are, on all hands, acknowledged to have made little progreſs in theſe improvements. To think of raiſing the fame of Abraham, by claſſing him with the philoſophers, betrays an extreme defect in judgment. He is intitled to praiſe of a higher kind; for he excelled in piety, was the father of the faithful, the root of the Meſſiah,

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manufacturing iron, ſo were they celebrated for making the choiceſt pieces of armour. They excelled in making κλιϐανοι, or coats of mail, or brigantines uſed by the braveſt of the Perſian horſemen. Bochart Phaleg, l. 3. cap. 12 and 13, has proved that the word *Cheliba* ſignifies "ſcales of braſs or ſteel." From the word *Cheliba*, the Greeks formed their χαλλυϐες, *Chalybes*. Xenoph, Cyrop. l. 3. page 43. Steph. repreſents the Chaldeans, who inhabited a mountainous country bordering upon Armenia, as a very fierce warlike people. Ib. page 107. we have an example of their rapacious character. Id. ib. l. 4. page 192. Hen. Steph. we have an account of their bravery and of their arms. Another inſtance of their rapacity occurs in their plundering the cattle of Job.

(c) A diſpute has ariſen about the ſenſe of verſe x. chap. 10. Out of that land went forth Aſhur, and builded Nineveh. Some approve our tranſlation, which we think is juſt; others, conſidering that the inſpired writer had been juſt ſpeaking of Nimrod and the beginning of his kingdom, are of opinion that it ſhould be tranſlated, And out of this land *He* (that is Nimrod) went into Aſhur and builded Nineveh. This they make a military expedition, and a violent irruption into the territory of Aſhur.

(D) Ur or Orchoe was ſituated between Niſibis and Corduena. See Ammianus Marcel. Expeditio Juliana, l. 15. It lay not far from the river Tigris. Strabo, l. 16 page 739, tells us that the Chaldean philoſophers were divided into different ſects, the Orcheni, and Borſippeni, and ſeveral others. Diod. Sicul. likewiſe, lib. ii. page 82. Steph. gives an exact detail of the functions, profeſſion, and eſtabliſhment of the Chaldeans, to which we muſt refer our curious readers.

ſiah, and the friend of God. Before theſe, all other titles vaniſh away. Such of our readers, however, as have leiſure enough, and at the ſame time learning enough to enable them to conſult the rabbinical legends, will be furniſhed with a full and ample detail of his imaginary exploits and adventures. Others, who are either not willing or not qualified to peruſe the writings of the rabbins, may conſult Dr Hyde* de Relig. vet. Perſ. and the authors of the Univerſal Hiſtory †, where they will find materials ſufficient to gratify their curioſity. We ſhall only obſerve, in addition to what we have already ſaid, that the Perſians, Chaldeans, and Arabians, pretended that their religion was that of Abraham; that honourable mention is made of him in the Koran; and that the name of Abraham or Ibrahim was celebrated over all the eaſt. See ABRAHAM.

* Chap. ii.
† Vol. I.

IN the progreſs of this diſquiſition, we have ſeen that the language of Noah was, in all probability, the ſame or nearly the ſame with that of Adam. Additions and improvements might be introduced, but ſtill the radical ſtamina of the language remained unchanged. It has likewiſe, we hope, appeared, that the confuſion of language at the building of the tower of Babel was only partial, and affected none but the rebellious crew of the race of Ham and the apoſtate part of the families of Shem and Japhet. We have concluded, that the main body of the race of Shem, at leaſt, were neither diſperſed nor their language confounded; and that conſequently the deſcendants of that patriarch continued to ſpeak their paternal dialect or the uncorrupted language of Noah. To theſe arguments we may take the liberty to add another, which is, that in all probability the worſhip of the true God was preſerved in the line of Arphaxad, after the generality of the other ſects had lapſed into idolatry. Out of this family Abraham was taken, in whoſe line the true religion was to be preſerved. Whether Abraham was an idolator when he dwelt in Chaldea, the ſcripture does not inform us, though it ſeems to be evident that his father was. One thing, however, is certain, namely, that Jehovah (E) appeared to him, and pronounced a bleſſing upon him before he left Ur of the Chaldees. This circumſtance no doubt indicates, that this patriarch had made uncommon advances in piety and virtue, even prior to his emigration. The progenitors of his family had been diſtinguiſhed by adhering to the true religion. About this time, however, they began to degenerate, and to adopt the zabiiſm of their apoſtate neighbours. It was then that Abraham was commanded by Heaven to "leave his kindred and his father's houſe, and to travel into a land which was to be ſhown him." The Almighty intended that the true religion ſhould be preſerved in his line, and therefore removed him from a country and kindred, by the influence of whoſe bad example his religious principles might be endangered. His family had only of late apoſtatized; till that period they had preſerved both the language and religion of their venerable anceſtors.

18 The Hebrew and Chaldean originally the ſame and the firſt language ſpoken on earth.

But however much Abraham might differ from the other branches of his family in his religious ſentiments, his language was certainly in uniſon with theirs. The conſequence of this unqueſtionable poſition is, that the language which he carried with him into Canaan was exactly the ſame with that of his family which he relinquiſhed when he began his peregrinations. But if this be true, it will follow, that the language afterwards denominated Hebrew, and that of the Chaſedim or Chaldeans were originally one and the ſame. This poſition, we think, will not be controverted. There is then an end of the diſpute concerning the original language of mankind. We have advanced ſome preſumptive proofs in the preceding pages, that the language of Adam was tranſmitted to Noah, and that the dialect of the latter was preſerved in the line of Arphaxad downwards to the family of Abraham: and it now appears that the Hebrew and Chaldean were originally ſpoken by the ſame family, and of courſe were the ſame between themſelves, and were actually the firſt language upon earth, according to the Moſaic hiſtory. Numberleſs additions, alterations, improvements, we acknowledge, were introduced in the courſe of 2000 years; but ſtill the original ſtamina of the language were unchanged. Our readers will pleaſe to obſerve, that the Orientals are not a people *given to change*; and that this character, in the earlieſt ages, was ſtill more prevalent than the preſent. This aſſertion, we preſume, needs no proof.

In confirmation of theſe preſumptive arguments, we may add the popular one which is commonly urged upon this ocaſion, viz. that the names of antediluvian perſons and places mentioned by the ſacred hiſtorian, are generally of Hebrew original, and ſignificant in that language. Some of them, we acknowledge, are not ſo; but in this caſe it ought to be remembered, that a very ſmall part of that language now exiſts, and that probably the radicals from which theſe words are deſcended are among the number of thoſe which have long been loſt.

SECT. I. *The Hebrew Language.*

19 Characteriſtics of the Hebrew Language.

HAVING thus proved the priority of the Hebrew to every other language that has been ſpoken by men, we ſhall now proceed to conſider its nature and genius; from which it will appear ſtill more evidently to be an original language, neither improved nor debaſed by foreign idoms. The words of which it is compoſed are ſhort, and admit of very little flexion. The names of places are deſcriptive of their nature, ſituation, accidental circumſtances, &c. Its compounds are few, and inartificially joined together. In it we find few of thoſe artificial affixes which diſtinguiſh the other cognate dialects; ſuch as the Chaldean, Syrian Arabian, Phœnician, &c. We find in it no traces of improvement from the age of Moſes to the era of the Babyloniſh captivity. The age of David and Solomon was the golden period of the Hebrew tongue: and yet, in our opinion, it would puzzle a critic of the niceſt acumen to diſcover much improvement even during that happy era. In fact, the Jews were by no means an inventive people. We hear nothing of their progreſs in literary purſuits; nor do they ſeem to have been

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(E) Compare Gen. chap. XII. ver. 2. with Acts chap. VII. verſe 4.

been induſtrious in borrowing from their neighbours. The laws and ſtatutes communicated by Moſes were the principal objects of their ſtudies. Theſe they were commanded to contemplate day and night; and in them they were to place their chief delight. The conſequence of this command was, that little or no regard could be paid to taſte, or any other ſubject of philoſophical inveſtigation. Every unimproved language abounds in figurative expreſſions borrowed from ſenſible objects. This is in a peculiar manner the characteriſtic of the language in queſtion; of which it would be ſuperfluous to produce inſtances, as the fact muſt be obvious even to the attentive reader of the Engliſh Bible.

In the courſe of this argument, we think it ought to be obſerved, and we deem it an obſervation of the greateſt importance, that if we compare the other languages which have claimed the prize of originality from the Hebrew with that dialect, we ſhall quickly be convinced that the latter has a juſt title to the preference. The writers who have treated this ſubject, generally bring into competition the Hebrew, Chaldean, Syrian, and Arabian. Some one or other of theſe has commonly been thought the original langage of mankind. The arguments for the Syrian and Arabian are altogether futile. The numerous improvements ſuperinduced upon theſe languages, evidently prove that they could not have been the original language. In all cognate dialects, etymologiſts hold it as a maxim, that the leaſt improved is likely to be the moſt ancient.

20
How it was changed into what is called the Chaldean.

We have obſerved above, that the language of Abraham and that of the Cheſedim or Chaldeans were originally the ſame; and we are perſuaded, that if an able critic ſhould take the pains to examine ſtrictly theſe two languages, and to take from each what may reaſonably be ſuppoſed to have been improvements or additions ſince the age of Abraham, he will find intrinſic evidence ſufficient to convince him of the truth of this poſition. There appear ſtill in the Chaldean tongue great numbers of (F) words the ſame with the Hebrew, perhaps as many as mankind had occaſion for in the moſt early ages; and much greater numbers would probably be found if both languages had come down to us entire. The conſtruction of the two languages is indeed ſomewhat different; but this difference ariſes chiefly from the ſuperior improvement of the Chaldean. While the Hebrew language was in a manner ſtationary, the Chaldean underwent progreſſive improvements; was mellowed by antitheſes, rendered ſonorous by the diſpoſition of vocal ſounds, acquired a copiouſneſs by compounds, and a majeſty by affixes and prefixes, &c. In proceſs of time, however, the difference became ſo great, that the Iſraelites did not underſtand the Chaldean language at the era of the Babyloniſh captivity. This much the prophet* intimates, when he promiſes the pious Jews protection "from a fierce people; a people of a deeper ſpeech than they could perceive; of a ſtammering tongue, that they could not underſtand."

* Iſaiah. ch. xxxiii. verſ. 19.

The priority of the Chaldean tongue is indeed contended for by very learned writers. Cambden† calls it the mother of all languages; and moſt of the fathers were of the ſame opinion. Amira‡ has made a collection of arguments, not inconſiderable, in favour of it: and Myriceus§, after him, did the ſame. Erpenius‖, in his Oration for the Hebrew tongue, thought the argument for it and the Chaldean ſo equal, that he did not chooſe to take upon him to determine the queſtion.

† Brit.

‡ Præf. ad Gram. Syr.

§ Præf. ad Gram. Chald.

‖ Oratio de lingua Heb. xii.

21
Reaſons for maintaining the priority of the Hebrew.

Many circumſtances, however, concur to make us aſſign the propriety to the Hebrew, or rather to make us believe that it has ſuffered feweſt of thoſe changes to which every living tongue is more or leſs liable. If we ſtrip this language of every thing obviouſly adventitious, we ſhall find it extremely ſimple and primitive. 1. Every thing maſoretical, ſuppoſing the vowels and points (G) eſſential, was certainly unknown in its original character. 2. All the prefixed and affixed letters were added time after time, to give more compaſs and preciſion to the language. 3. The various voices, moods, tenſes, numbers, and perſons of verbs, were poſterior improvements; for in that tongue, nothing at firſt appeared but the indeclinable radix. 4. In the ſame manner, the few adjectives that occur in the language, and the numbers and regimen of nouns, were not from the beginning. 5. Moſt of the Hebrew nouns are derived from verbs; indeed many of them are written with the very ſame letters. This rule, is very general; for few verbs are derived from nouns, and none from prepoſitions. 6. All the verbs of that language, at leaſt all that originally belonged to it, uniformly conſiſt of three letters, and ſeem to have been at firſt pronounced as diſſyllables. If we anatomize the Hebrew language in this manner, we ſhall reduce it to to very great ſimplicity; we ſhall confine it to a few names of things, perſons, and actions; we ſhall make many of its words monoſyllables, and give it the true characters of an original language. If at the ſame time we reflect on the ſmall number of (H) radical words in that dialect, we ſhall be more and more convinced of its originality.

It will not be expected that we ſhould enter into a minute diſcuſſion of the grammatical peculiarities of this ancient language. For theſe we muſt refer our readers to the numerous and elaborate grammars of that tongue, which are every where eaſily to be found. We ſhall only make a few ſtrictures, which naturally preſent themſelves, before we diſmiſs the ſubject.

The generality of writers who have maintained the ſuperior

(F) Moſt of the Chaldean names mentioned in Scripture are pure Hebrew words compounded; ſuch as *Nebuchadnezzar*, *Nebuzaradan*, *Rabſhakeh*, *Rabmag*, *Belſhazzar*, *Rabſaris*, *Nahar*, *Malabtha*, *Phrat* or *Pharad*, *Baroſus*, *Carchemiſh*, *Ur*, *Cutha*, Heb. *Cuſh*, &c. All theſe words, and a multitude of others which we could mention, approach ſo near the Hebrew dialect, that their original is diſcernible at firſt ſight. Moſt of theſe are compounds, which the limits preſcribed will not allow us to decompound and explain.

(G) The futility of theſe points will be proved in the following part of this ſection.

(H) The radical words in the Hebrew language, as it now ſtands, are about 5000.

22
All languages in the eaſt originally the ſame.

ſuperior antiquity of the Hebrew language, have at the ſame time contended that all other languages of Aſia, and moſt of thoſe of Europe, have been derived from that tongue as their ſource and matrix. We, for our part, are of opinion, that perhaps all the languages in the eaſtern part of the globe are derived from it, and were originally one and the ſame; and that the differences which afterwards diſtinguiſhed them ſprung from climate, caprice, inventions, religions, commerce, conqueſts, and other accidental cauſes, which will occur to our intelligent readers. We have endeavoured to prove, in the preceding pages, that all mankind were not concerned in the building of the fatal tower, nor affected by the puniſhment conſequent upon that attempt: and we now add, that even that puniſhment was only temporary; ſince we find, that thoſe very Hamites or Cuſhim, who are allowed to have been affected by it, did certainly afterwards recover the former organization of their *lip*, and differed not more from the original ſtandard than the deſcendants of Japhet and Shem.

The Jewiſh rabbis have pretended to aſcertain the number of languages generated by the vengeance of Heaven at the building of Babel. They tell us that mankind was divided into 70 nations and 70 languages, and that each of theſe nations had its tutelar or guardian angel. This fabulous legend is founded on the number of the progeny of Jacob at the time when that patriarch and his family went down into Egypt. Others attribute its origin to the number of the ſons and grandſons of Noah, who are enumerated Gen. chap. x.

The fathers* of the church make the languages at the confuſion to amount to 72; which number they complete by adding Cainan and Eliſhah, according to the Septuagint, who are not mentioned in the Hebrew text. This opinion, they think, is ſupported by the words of Moſes, when he ſaith, that† "when the Moſt High divided to the nations their inheritance, when he ſeparated the ſons of Adam, he ſet the bounds of the people according to the number of the tribes of Iſrael." That is, ſay they, he divided them into 72 nations, which was the number of the children of Iſrael when they came into Egypt. The Targum of Ben-Uzziel plainly favours this interpretation; but the Jeruſalem Targum intimates that the number of nations were only 12, according to the number of the tribes of Iſrael. This paſſage, however, ſeems to refer to the tribes of the Chanaanim; and imports, that the Almighty aſſigned to the different ſepts of that family ſuch a tract of land as he knew would make a ſufficient inheritance for the children of Iſrael‡. Others have increaſed the different languages of the diſperſion to 120; but the general opinion has fixed them to 70 or 72. Our readers need ſcarce be put in mind that theſe opinions are futile and abſurd; neither founded in Scripture, profane hiſtory, or common ſenſe. At the ſame time, it muſt not be omitted, that, according to Horapollo §, the Egyptians held, that the world was divided into 72 habitable regions: and that, in conſequence of this tradition, they made the cynocephalus the emblem of the world, becauſe that in the ſpace of 72 days that animal pines away and dies.

23
Origin of the name Hebrew.

It has been made a queſtion, whether the Hebrew language was denominated from Heber the progenitor of Abraham, or from a word which in that tongue imports *over*, *beyond*. Moſt of the Chriſtian fathers, prior to St Origen, believed that both the Gentile name *Hebrew*, and the name of the language, were derived from the name of the patriarch; but that learned man imagined, that Abraham was called the *Hebrew*, not becauſe he was a deſcendant of Heber, but becauſe he was a transfluvianus, or from beyond the river Euphrates. The learned Bochart * has ſtrained hard to prove the former poſition; but to us his arguments do not appear deciſive. We are rather inclined to believe, that Abraham was called *Chibri*, (Hebrew), from the ſituation of the country from which he emigrated when he came to the country of Chanaan; and that in proceſs of time that word became a Gentile appellation, and was afterwards applied to his poſterity (1) often by way of reproach, much in the ſame manner as we ſay a *Northlander*, a *Norman*, a *Tramontane*, &c.

Here we may be indulged an obſervation, namely, that Abraham, a Hebrew, lived among the Chaldeans, travelled among the Chanaanites, ſojourned among the Philiſtines, lived ſome time in Egypt; and in all appearance converſed with all thoſe nations without any apparent difficulty. This circumſtance plainly proves, that all theſe nations at that time ſpoke nearly the ſame language. The nations had not yet begun to improve their reſpective dialects, nor to deviate in any great meaſure from the monoſyllabic tongue of the Hebrews. With reſpect to the language of Chanaan, afterwards the Phœnician, its ſimilarity to the Hebrew is obvious from the names of gods, men, cities, mountains, rivers, &c. which are the very ſame in both tongues, as might be ſhown in numberleſs caſes, were this a proper place for etymological reſearches.

Before we diſmiſs this part of our ſubject, we would wiſh to gratify our unlearned readers with a brief account of the Hebrew letters, and of the Maſoretical points which have been in a manner ingrafted on theſe letters. In the courſe of this deduction, we ſhall endeavour to follow ſuch authors as are allowed to have handled that matter with the greateſt accuteneſs, learning, and perſpicuity. If, upon any occaſion, we ſhould be tempted to hazard a conjecture of our own, it is cheerfully ſubmitted to the candour of the public.

Much has been written, and numberleſs hypotheſes propoſed, with a view to inveſtigate the origin of *alphabetical writing*. To give even an abridged account of all theſe, would fill many volumes. The moſt plauſible, in our opinion, is that which ſuppoſes that the primary characters employed by men were the figures of material objects analogous to thoſe of the Mexicans, ſo often mentioned by the authors who have

* Clem. Alex. Strom. Euſeb. Chron. lib. 1. Epiphan. Hæreſ. Auguſt. &c.

† Deut. ch. xxxii. verſe 8.

‡ Pacanini Epiſcop. Bercun. apud Hieron in Catalogo. Epiſt. 22.

§ 14 page 25. Hoeſch.

* Phaleg, lib. 1. c. 15.

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(1) The Egyptians might not eat bread with the Hebrews, for that is an abomination to the Egyptians. The Philiſtines (Samuel I. *paſſ.*) always call the Iſraelites *Hebrews* by way of reproach.

24 Origin of alphabetic writing.

have written the hiſtory of that people at the era of the Spaniſh invaſion of their country. As this plan was too much circumſcribed to be generally uſeful, hieroglyphical figures were in proceſs of time invented as ſubſidiaries to this contracted orthography. In this ſcheme, we imagine, the proceſs was ſomewhat more extenſive. A *lion* might be ſketched, to import fierceneſs or valour; an *ox*, to denote ſtrength; a *ſtag*, to ſignify ſwiftneſs; a *hare*, to intimate timorouſneſs, &c.

The next ſtep in this proceſs would naturally extend to the inventing and appropriating of a few arbitrary characters, for repreſenting abſtract ideas, and other relations, which could not be well aſcertained by the methods abovementioned. Theſe arbitrary ſigns might readily acquire a currency by compact, as money and medals do over a great part of the world.—Upon this plan we imagine the ancient Chineſe formed their language.

But neither the picture nor the hieroglyphic, nor the method of denoting *ideas* by arbitrary characters appropriated by compact, could ever have arrived at ſuch perfection as to anſwer all the purpoſes of ideal communication. The grand deſideratum then would be to fabricate characters to repreſent ſimple ſounds, and to reduce theſe characters to ſo ſmall a number as to be eaſily learned and preſerved in the memory. In this attempt the Chineſe have notoriouſly failed; their letters, or rather their characters, are ſo numerous, that few, if any, of their moſt learned and induſtrious authors, have been able to learn and retain the whole catalogue. Indeed thoſe people are not able to conceive how any combinations of 20 or 30 characters ſhould be competent to anſwer all the purpoſes of written language.

Many different nations have claimed the honour of this invention. The Greeks aſcribed it to the Phœnicians; and conſequently uſed the word φοινικιζειν*, *to act the Phœnician*, in the ſame ſenſe with αναγινωσκειν, *to read;* and conſequently the poet † aſcribes the invention to the ſame ingenious people. The Greeks borrowed their letters from the Phœnicians, and of courſe looked up to them as the inventors.

* Heſych.

† Lucan.

Others have attributed the invention to the Egyptians. That people aſcribed every uſeful and ingenious invention to their Thyoth, or Mercury Triſmegiſtus. Plato ſeems to have believed this tradition (K), and pretends to record a diſpute between the king of Egypt that then reigned and this perſonage, with reſpect to the influence that the art of alphabetic writing might poſſibly have upon the improvements of mankind in ſcience and liberal arts. Diodorus the Sicilian ‡ gives a ſimilar hiſtory of the ſame invention, but carries it back to the reign of Oſiris.

‡ Bibl. l. 1. pag. 10. Steph.

Pliny informs us ‖, that Gellius attributed letters to the ſame Egyptian Mercury, and others to the Syrians; but that for "his part, he thought that the Aſſyrian letters were eternal." That learned Roman then imagined, that the Aſſyrian letters had exiſted at a period prior to all the records of hiſtory; which was in fact the caſe. By the Aſſyrian letters, he muſt mean the Chaldaic, and by the Syrian probably the Hebrew. The earlieſt Greek hiſtorians generally confound the Jews with the Syrians. Herodotus, enumerating the people who had * learned circumciſion from the Egyptians, mentions the Syrians of Paleſtine; and elſewhere he tells us, that Necho † beat the Syrians, and took Cadytis, a large and populous city belonging to that people. Hence it is evident that the Syrian alphabet, or the Syrian letters, were the ſame with the Hebrew. That the Aſſyrian or Chaldaic and Hebrew languages were the ſame, has, we hope, been fully proved already: that their letters were the ſame in their original ſtructure, can ſcarce be controverted. Theſe letters, we think, were antediluvian: whether, to uſe the expreſſion of Plato, they were dictated by ſome god, or fabricated by ſome man divinely inſpired. As this opinion may admit ſome diſpute, we ſhall take the liberty to ſubjoin our reaſons.

‖ Nat. Hiſt. lib. 7. c. 56.

* Lib. 2. c. 104.

† Ibid. c. 159.

25 Antediluvian.

1. It appears that the era of this invention is buried in impenetrable obſcurity. Had an invention of ſuch capital importance to mankind been made in the poſtdiluvian ages, we imagine the author would have been commemorated in the hiſtorical annals of the country where he lived (L).

2. The art of writing in alphabetical characters, according to the ſacred records, was practiſed at ſo early a period, that there was not a long enough interval between that and the deluge to give birth to that noble invention. If we conſider the ſtate of the world during ſome ages after that diſaſtrous event, we ſhall quickly be convinced that little reſpite could be found from the labour and induſtry indiſpenſably requiſite to provide the neceſſaries, and only a few of the conveniencies, of life. Such a ſtate of things was certainly moſt unfavourable to the invention of thoſe arts and improvements which contribute nothing towards procuring the accommodations of life. The conſequence is obvious.

Moſes has recorded the hiſtory of the creation, of a few of the capital tranſactions of the antediluvian world, the birth, the age, the death, of the lineal deſcendants of Seth. He has preſerved the dimenſions of the ark, the duration of the univerſal deluge, its effects upon man and all terreſtrial animals, the population of the world by the poſterity of Noah, the age, &c. of the patriarchs of the line of Shem, from which his own anceſtors had ſprung. To this he has ſubjoined the petty occurrences which diverſified the lives of Abraham, Iſaac, and Jacob, and their deſcendants. Whence did the hiſtorian derive his information? Moſt probably either from written records then exiſting, or from divine inſpiration. Tradition is a fallible guide; and in many caſes the accounts are ſo minutely preciſe, as to defy the power of that ſpecies of conveyance. The inſpired author might probably have extracted

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(K) See *Phædrus*, page 1240. See alſo page 374. *Phil.*

(L) It is true, the Egyptians attribute the invention to their Thoth, and the Phœnicians to their Hercules, or Melicerta or Baal; but theſe were only imaginary perſonages.

tracted his abridgment from written memoirs, or hiſtories of the tranſactions of his anceſtors regularly tranſmitted from the moſt early periods. Theſe annals he probably abridged, as Ezra did afterwards the hiſtory of the Kings of Iſrael. If this was the caſe, as it moſt probably was, the art of writing in alphabetical letters muſt have been known and practiſed many ages before Moſes. It has indeed been contended, that the Jewiſh decalogue, inſcribed upon two tables of ſtone, was the very firſt ſpecimen of alphabetical writing. The arguments adduced in proof of this fact are lame and inconcluſive (m). Had that been the caſe, ſome notice muſt have been taken of ſo palpable a circumſtance. Moſes wrote out his hiſtory, his laws, and his memoirs; and it appears plainly from the text, that all the learned among his countrymen could read them. Writing was then no novel invention in the age of the Jewiſh legiſlator, but current and generally known at that era.

(m) The moſt ingenious and plauſible of thoſe arguments which have fallen under our obſervation, is given by Mr Johnſon vicar of Cranbrook, a writer of great learning and piety, who flouriſhed in the beginning of the preſent century, and whoſe works deſerve to be more generally known than we have reaſon to think they are at preſent. After endeavouring to prove that alphabetical writing was not practiſed before the era of Moſes, and expatiating upon the difficulty of the invention, this excellent ſcholar attempts to ſhow, that the original Hebrew alphabet was actually communicated to the Jewiſh legiſlator at the ſame time with the two tables of the law. "I know not (ſays he) any juſt cauſe why the law ſhould be *written by God*, or by an *angel* at his command, except it were for want of a man that could well perform this part. This could give no addition of authority to the law, eſpecially after it had been publiſhed in that aſtoniſhing and miraculous manner at Mount Sinai. The true writing of the original was indeed perfectly adjuſted, and preciſely aſcertained to all future ages, by God's giving a copy of it under his own hand: but this, I conceive, had been done altogether as effectually by God's dictating every word to Moſes, had he been capable of performing the office of an amanuenſis." The learned writer goes on to ſuppoſe, that it was for the purpoſe of *teaching Moſes the alphabet*, that God detained him forty days in the mount; and thence he concludes, that the Decalogue was the firſt writing in alphabetical characters, and that thoſe characters were a divine, and not a human invention.

It is always raſh, if not ſomething worſe, to conceive reaſons not aſſigned by God himſelf, for any particular tranſaction of his with thoſe men whom he from time to time inſpired with heavenly wiſdom. That it was *not* for the purpoſe of teaching Moſes the alphabet that God detained him forty days in the mount, when he gave him the two tables of the law, ſeems evident from his detaining him juſt as many days when he gave him the ſecond tables after the firſt were broken. If the legiſlator of the Jews had not beeen ſufficiently inſtructed in the art of reading during his firſt ſtay in the mount, he would have been detained longer; and it is not conceivable, that though in a fit of pious paſſion he was ſo far thrown off his guard as to break the two tables, his mind was ſo totally unhinged by the idolatry of his countrymen, as to forget completely an art which, by the ſuppoſition, the Supreme Being had ſpent *forty days* in teaching him! "But if Moſes could, at his firſt aſcent into the mount, perform the office of an amanuenſis, why are the original tables ſaid to have been written by the finger of God, and not by him who wrote the ſecond?" We pretend not to ſay why they were written by God rather than man; but we think there is ſufficient evidence, that by whomſoever they were written, the characters employed were altogether unknown. The Hebrew alphabet, without the Maſoretic points, is confeſſedly defective; and every man who is in any degree acquainted with the language, and is not under the influence of inveterate prejudice, will readily admit that thoſe points are no improvement. But we cannot, very well ſuppoſe an art invented by infinite wiſdom, to fall ſhort of the utmoſt perfection of which it is capable: an alphabet communicated to man by God, would undoubtedly have been free both from defects and from redundancies; we may ſuppoſe it would have had a diſtinct character for every ſimple ſound, and been at leaſt as perfect as the Greek or the Roman.

But we need not fill our pages with reaſonings of this kind againſt the hypotheſis maintained by Mr Johnſon. We know that "Moſes wrote all the words of the Lord," *i. e.* the ſubſtance of all that had been delivered in *Exod.* xx, xxi, xxii, xxiii. before he was called up into the mount to receive the table of ſtone; nay, that he had long before been commanded by God himſelf, to "write in a book" an account of the victory obtained over Amalek (*Exod.* xvii. 14). All this, indeed, the learned writer was aware of; and to reconcile it with his hypotheſis, he frames another, more improbable than even that which it is meant to ſupport. "It is not unreaſonable (ſays he) to believe that God had written theſe tables of ſtone, and put them in mount Horeb, from the time that by his angel he had there firſt appeared to Moſes; and that, therefore all the time after, while he kept Jethro's ſheep thereabouts, he had free acceſs to thoſe tables, and purſued them at diſcretion." But if belief ſhould reſt upon evidence, we beg leave to reply, that to believe all this would be in the higheſt degree unreaſonable: for there is not a ſingle hint in Scripture of the tables having been written at ſo early a period, or upon ſuch an occaſion, as God's firſt appearance to Moſes in the burning buſh. We know how reluctant Moſes was to go upon the embaſſy to which he was then appointed; and it is ſtrange, we think paſſing ſtrange, that when he records ſo faithfully his own backwardneſs, and the means made uſe of by God to reconcile him to the arduous undertaking, he ſhould make no mention of theſe important tables, if at that period he had known any thing of their exiſtence. Beſides all this, is it not wonderful, if Moſes had been practiſing the art of writing, as our author ſuppoſes, from the time of the burning buſh to the giving of the law, he ſhould then have ſtood in need of *forty days* teaching from God, to enable him to *read* with eaſe the firſt tables, and of other forty, to enable him to *write* the ſecond? This gave ſuch a mean view of the natural capacity of the Hebrew legiſlator as renders the hypotheſis which implies it wholy incredible. *See a Collection of Diſcourſes*, &c. *in two volumes, by the reverend John Johnſon*, A. M. *vicar of Cranbrook in Kent.*

The patriarch Job lived at an earlier period (n). In that book we find many alluſions to the art of writing, and ſome paſſages which plainly prove its exiſtence. This ſhows that alphabetical characters were not confined to the choſen ſeed, ſince Job was in all probability a deſcendant of Huz, the eldeſt ſon of Nahor * the brother of Abraham. From this circumſtance, we think we may fairly conclude, that this art was known and practiſed in the family of Terah the father of Abraham.

* Gen. xxii. 20, &c.

26 Traditions to this purpoſe.

There was certainly a tradition among the Jews in the age of Joſephus, that writing was an antediluvian invention †. That hiſtorian pretends, that the deſcendants of Seth erected two pillars, the one of ſtone and the other of brick, and inſcribed upon them their aſtronomical obſervations and other improvements.— This legend ſhows that there did exiſt ſuch an opinion of the antiquity of the art of writing.

† Antiq. lib. i. cap. 3.

4. There muſt have been a tradition to the ſame purpoſe among the Chaldeans, ſince the writers who have copied from Beroſus, the celebrated Chaldean hiſtorian (o), ſpeak of alphabetical writing as an art well known among the antediluvians. According to them, Oannes the Chaldean legiſlator gave his diſciples "an inſight into *letters* and ſcience. This perſon alſo *wrote* concerning the generation of mankind, of their different purſuits, of civil polity, &c. Immediately before the deluge (ſay they) the god Cronus appeared to Siſuthrus or Xiſuthrus, and commanded him to commit to *writing* the beginning, improvement, and concluſion of all things down to the preſent term, and to bury theſe accounts ſecurely in the temple of the Sun at Seppara." All theſe traditions may be deemed fabulous in the main; but ſtill they evince that ſuch an opinion was current, and that though the uſe of letters was not indeed eternal (p), it was, however, prior to all the records of hiſtory; and of courſe, we think, an antediluvian diſcovery.

27 The original alphabet preſerved in the family of Noah.

This original alphabet, whatever it was, and however conſtructed, was, we think, preſerved in the family of Noah, and from it conveyed down to ſucceeding generations. If we can then diſcover the original Hebrew alphabet, we ſhall be able to inveſtigate the primary ſpecies of letters expreſſive of thoſe articulate ſounds by which man is in a great meaſure diſtinguiſhed from the brute creation. Whatever might be the nature of that alphabet, we may be convinced that the ancient Jews deemed it ſacred, and therefore preſerved it pure and unmixed till the Babyloniſh captivity. If, then, any monuments are ſtill extant inſcribed with letters prior to that event, we may reſt aſſured that theſe are the remains of the original alphabet.

There have, from time to time, been dug up at Jeruſalem, and other parts of Judea, coins and medals, and medallions, inſcribed with letters of a form very different from thoſe ſquare letters in which the Hebrew Scriptures are now written.

28 The ſame with the Samaritan;

When the Samaritan Pentateuch was diſcoverered (q), it evidently appeared that the inſcriptions on thoſe medals and coins were drawn in genuine Samaritan characters. The learned Abbé Barthelemi, in his * diſſertation "on the two medals of Antigonus king of Judea, one of the later Aſmonean princes, proves that all the inſcriptions on the coins and medals of Jonathan and Simon Maccabeus, and alſo on his, were invariably in the Samaritan character, down to the 40th year before the chriſtian era."

* Mem. de l'Academ. de l'Inſcrip. &c.

29 Which afterwards gave place to the Chaldaic,

It were eaſy to prove, from the Miſhna and Jeruſalem talmud, that the Scriptures publicly read in the ſynagogues to the end of the ſecond century were written in the Samaritan character, we mean in the ſame character with the Pentateuch in queſtion. As the ancient Hebrew, however, ceaſed to be the vulgar language of the Jews after their return from the Babyloniſh captivity, the copies of the Bible, eſpecially in private hands, were accompanied with a Chaldaic paraphraſe; and at length the original Hebrew character fell into diſuſe, and the Chaldaic was univerſally adopted.

It now appears that the letters inſcribed on the ancient coins and medals of the Jews were written in the Samaritan form, and that the Scriptures were written in the very ſame characters: we ſhall therefore leave it to our readers to judge whether (conſidering the implacable hatred which ſubſiſted between theſe two nations) it be likely that the one copied from the other; or at leaſt that the Jews preferred to the beautiful letters uſed by their anceſtors, the rude and inelegant characters of their moſt deteſted rivals. If, then, the inſcriptions on the coins and medals were actually in the characters of the Samaritan Pentateuch (and it is abſurd to ſuppoſe that the Jews borrowed them from the Samaritans), the conſequence plainly is, that the letters of the inſcriptions were thoſe of the original Hebrew alphabet, coeval with that language, which we dare to maintain was the firſt upon earth.

It may, perhaps, be thought rather ſuperfluous to men-

(n) We have ſeen a manuſcript, which may one day ſee the light, in which it is ſhown, with great probability, that Job was nearly cotemporary with the patriarch Jacob.

(o) Apollodorus, Alexander Polyhiſtor, Abydenus. See *Syncellus*, cap. 39. *et ſeq.* *Euſeb. Chron.* l. 1. page 3.

(p) Plin. Nat. Hiſt. l. 7. page 413.——*Ex quo apparet æternus literarum uſus.*

(q) The celebrated Archbiſhop Uſher was the firſt who brought the Samaritan Pentateuch into Europe. In a letter to Ludovicus Capellus "he acknowledges, that the frequent mention he had ſeen made of it by ſome authors, would not ſuffer him to be at reſt till he had procured five or ſix copies of it from Paleſtine and Syria.

mention, that the Samaritan coloniſts, whom the kings of Aſſyria planted in the cities of Samaria (r), were natives of countries where Chaldaic letters were current, and who were probably ignorant of the Hebrew language and characters. When thoſe coloniſts embraced the Jewiſh religion, they procured a copy of the Hebrew Pentateuch written in its native character, which, from ſuperſtition, they preſerved inviolate as they received it; and from it were copied ſucceſſively the others which were current in Syria and Paleſtine when Archbiſhop Uſher procured his.

From the reaſons above exhibited, we hope it will appear, that if the Hebrew alphabet, as it appears in the Samaritan Pentateuch, was not the primitive one, it was at leaſt that in which the Holy Scriptures were firſt committed to writing.

30 Which was introduced by Ezra.

Scaliger has inferred, from a paſſage in Euſebius *, and another in St Jerom †, that Ezra, when he reformed the Jewiſh church, tranſcribed the Scriptures from the ancient characters of the Hebrews into the ſquare letters of the Chaldeans. This, he thinks, was done for the uſe of thoſe Jews who, being born during the captivity, knew no other alphabet than that of the people among whom they were educated.—This account of the matter, though probable in itſelf, and ſupported by paſſages from both Talmuds, has been attacked by Buxtorf with great learning and no leſs acrimony. Scaliger, however, has been followed by a crowd of learned men (s), whoſe opinion is now pretty generally eſpouſed by the ſacred critics.

* Chron. in anno 3740.
† Præf. 1. Reg.

Having ſaid ſo much concerning the Hebrew alphabet in the preceding pages, we find ourſelves laid under a kind of neceſſity of hazarding a few ſtrictures on the vowels and Maſoretic points; the *firſt* eſſential, and the *laſt* an appendage, of that ancient language. The number of the one, and the nature, antiquity, and neceſſity of the other, in order to read the language with propriety and with diſcrimination, have been the ſubject of much and often illiberal controverſy among philological writers. To enter into a minute detail of the arguments on either ſide, would require a complete volume: we ſhall, therefore, briefly exhibit the ſtate of the controverſy, and then adduce a few obſervations, which, in our opinion, ought to determine the queſtion.

31 The Hebrew vowels.

The controverſy then is, whether the Hebrews uſed any vowels; or whether the points, which are now called by that name, were ſubſtituted inſtead of them? or if they were, whether they be as old as Moſes, or were invented by Ezra, or by the Maſſorites (t)? This controverſy has exerciſed the wits of the moſt learned critics of the two laſt centuries, and is ſtill far enough from being determined in the preſent. The Jews maintain, that theſe vowel points (u) were delivered to Moſes along with the tables of the law; and conſequently hold them as ſacred as they do the letters themſelves. Many Chriſtian authors who have handled this ſubject, though they do not affirm their divine original, nor their extravagant antiquity, pretend, however, that they are the only proper vowels in the language, and regulate and aſcertain its true pronunciation. Though they differ from the Jews with reſpect to the origin of theſe points, they yet allow them a pretty high antiquity, aſcribing them to Ezra and the members of the great ſynagogue.

32 The Maſoretic points a modern invention,

At length, however, about the middle of the 16th century, Elias Levita, a learned German Jew who then flouriſhed at Rome, diſcovered the deluſion, and made it appear that theſe appendages had never been in uſe till after the writing of the talmuds, about 500 years after Chriſt. This innovation raiſed Elias a multitude of adverſaries, both of his own countrymen and Chriſtians. Among the latter appeared the two Buxtorfs, the father and the ſon, who produced ſome cabbaliſtical books of great antiquity (x), at leaſt in the opinion of the Jews, in which there was expreſs mention of the points. The Buxtorfs were anſwered by Capellus and other critics ‡, till Father Morinus §, having examined all that had been urged on both ſides, produced his learned diſſertation on that ſubject; againſt which there has been nothing replied of any conſequence, whilſt his work has been univerſally admired, and his opinion confirmed by thoſe that have beaten the ſame field after him.

‡ Walton, Dupin, and Voſſius.
§ Diſſert. Bibl.

According to this learned father, it plainly appears that neither Origen, nor St Jerome, nor even the compilers of the talmuds, knew any thing of what has been called the vowel points; and yet theſe books, according to the ſame author were not finiſhed till the ſeventh century. Even the Jewiſh rabbis who wrote during the eighth and ninth centuries, according to him, were not in the leaſt acquainted with theſe points. He adds, that the firſt veſtiges he could trace of them were in the writings of *rabbi Ben Aſher* chief of the weſtern, and of *rabbi Ben Naphtali* chief of the eaſtern, ſchool, that is, about the middle of the tenth century; ſo that they can hardly be ſaid to be older than the beginning of that period.

(r) 2 Kings, chap. xvii. ver. 24. And the king of Aſſyria brought men from Babylon, and from Cuthah, and from Avah, and from Hamath, and from Sepharvaim, and placed them in the cities of Samaria." Babylon, and Cuthah, and Avah, were neighbouring cities, and undoubtedly both ſpoke and wrote in the Chaldaic ſtyle. The natives of Hamath ſpoke the Syriac, which at that time differed very little from the Chaldaic.

(s) Caſaubon, Grotius, Voſſius, Bochart, Morin, Brerewood, Walton, Prideaux, Huet, and Lewis Capel, always a ſworn enemy to Buxtorf. All, then, have maintained the ſame ground with Scaliger: how truly, appears above.

(t) The term *maſorah* or *maſſoreth* ſignifies "tradition;" and imports the unwritten canon by which the reading and writing of the ſacred books was fixed.

(u) Theſe points are 14 in number, whoſe figures, names, and effects, may be ſeen in moſt Hebrew grammars.

(x) Theſe books are the *Bahir*, *Zahar*, and the *Kizri*. As for the Kizri, the Jews make it about 1900 years old; and the other about a century later. But the fidelity of the Jews in ſuch matters cannot be relied upon.

Some learned men (y) have aſcribed the invention of the vowel points in queſtion to the rabbis of the ſchool of Tiberias: which, according to them, flouriſhed about the middle of the ſecond century. This opinion is by no means probable, becauſe it appears plain from hiſtory, that before that period all the Jewiſh ſeminaries in that province were deſtroyed, and their heads forced into exile. Some of theſe retired into Babylonia, and ſettled at Sora, Naherda, and Pombeditha, where they eſtabliſhed famous univerſities. After this era there remained no more any rabbinical ſchools in Judæa, headed by profeſſors capable of undertaking this difficult operation, nor indeed of ſufficient authority to recommend it to general practice, had they been ever ſo thoroughly qualified for executing it.

33
The matres lectionis.

Capellus and father Morin, who contend for the late introduction of the vowel-points, acknowledge that there can certainly be no language without vocal ſounds, which are indeed the ſoul and eſſence of ſpeech; but they affirm that the Hebrew alphabet actually contains vowel characters, as well as the Greek and Latin and the alphabets of modern Europe. Theſe are *aleph*, *he*, *vau*, *jod*. Theſe they call the *matres lectionis*, or, if you pleaſe, the parents of reading. To theſe ſome, we think, very properly, add *ain* or *oin*, *ajin*. Theſe, they conclude, perform exactly the ſame office in Hebrew that their deſcendants do in Greek. It is indeed agreed upon all hands, that the Greek alphabet is derived from the Phœnician, which is known to be the ſame with the Samaritan or Hebrew. This poſition we ſhall prove more fully when we come to trace the origin of the Greek tongue. Hitherto the analogy is not only plauſible, but the reſemblance preciſe. The Hebrews and Samaritans employed theſe vowels exactly in the ſame manner with the Greeks; and ſo all was eaſy and natural.

34
Objections anſwered.

But the aſſerters of the Maſoretic ſyſtem maintain, that the letters mentioned above are not vowels but conſonants or aſpirations, or any thing you pleaſe but vocal letters. Theſe they endeavour to prove from their uſe among the Arabians, Perſians, and other oriental nations: But to us it appears abundantly ſtrange to ſuppoſe that the Greeks pronounced *beta*, *gama*, *delta*, &c. exactly as the Hebrews and the Phœnicians did, and yet at the ſame time did not adopt their mode of pronunciation with reſpect to the five letters under conſideration. To this argument we think every objection muſt undoubtedly yield. The Greeks borrowed their letters from the Phœnicians; theſe letters were the Hebrew or Samaritan. The Greeks wrote and (z) pronounced all the other letters of their alphabet, except the five in queſtion, in the ſame manner with their originals of the eaſt: if they did ſo, it obviouſly follows that the Greek and oriental office of theſe letters was the ſame.

Another objection to reading the Hebrew without the aid of the Maſoretic vowel points, ariſes from the conſideration, that without theſe there will be a great number of radical Hebrew words, both nouns and verbs, without any vowel intervening amongſt the conſonants, which is certainly abſurd. Notwithſtanding this ſuppoſed abſurdity, it is a well known fact, that all the copies of the Hebrew ſcriptures, uſed in the Jewiſh ſynagogues throughout the world, are written or printed without points. Theſe copies are deemed ſacred, and kept in a coffer with the greateſt care, in alluſion to the ark of the teſtimony in the tabernacle and temple. The prefect, however, reads the portions of the law and hagiographa without any difficulty. The ſame is done by the remains of the Samaritans at this day. Every oriental ſcholar knows that the people of theſe countries look upon conſonants as the ſtamina of words. Accordingly, in writing letters, in diſpatches upon buſineſs, and all affairs of ſmall moment, the vowels are generally omitted. It is obvious, that in every original language the ſound of the vowels is variable and of little importance. Such was the caſe with the Hebrew tongue: Nor do we think that the natives of the country would find it a matter of much difficulty to learn to read without the help of the vowels. They knew the words beforehand, and ſo might readily enough learn by practice what vowels were to be inſerted.

When the Hebrew became a dead language, as it certainly was in a great meaſure to the vulgar after the return from the Babyloniſh captivity; ſuch ſubſidiaries might, we think, have been uſeful, and of courſe might poſſibly have been adopted for the uſe of the vulgar: but the ſcribe, the lawyer, and the learned rabbi, probably diſdained ſuch beggarly elements. We ſhall in this place hazard a conjecture, which, to us at leaſt, is altogether new. We imagine that the Phœnicians, who were an inventive, ingenious people, had, prior to the age of Cadmus, who firſt brought their letters into Greece, adopted the more commodious method of inſerting the vowels in their proper places: whereas the Jews, zealouſly attached to the cuſtoms of their anceſtors, continued to write and read without them. In this manner the Gephuræi ‡, who were the followers of Cadmus, comunicated them to the Iones their neighbours. We are convinced that the materials of the Greek tongue are to be gleaned up in the eaſt; and upon that ground have often endeavoured to trace the origin of Greek words in the Hebrew, Phœnician, Chaldean, and Arabian languages. Reading without the vowel points we have ſeldom failed in our ſearch; but when we followed the method of reading by the Maſoretic points, we ſeldom ſucceeded; and this, we believe, every man of tolerable erudition who will make a trial will find by experience to be true. This argument appears to us ſuperior to every objection. Upon this baſis, the moſt learned Bochart has erected his etymological fabric, which will be admired by the learned and ingenious as long as philology ſhall be cultivated by men.

* Herod. lib. i. cap. 56.

35
Proof that the Maſoretic points are modern.

(y) See Buxtorf the father, in Tiber. cap. 5, 6, 7. Buxtorf the ſon de Antiq. Punct. P. II. 11.

(z) This is ſo true, that according to Heſychius and Sudias, φοινικιζειν, to act the Phœnician, ſignified "to read."

It has been urged by the zealots for the Maſoretic ſyſtem, that the Arabians and Perſians employ the vowel points. That they do ſo at preſent is readily granted but whether they did ſo from the beginning ſeems to be the queſtion. That Arabia was overſpread with Jewiſh exiles at a very early period, is abundantly certain. It was natural for them to retire to a land where they would not hear of war nor the ſound of the trumpet. Accordingly we find that, prior to the age of the Arabian impoſtor, Arabia ſwarmed with Jewiſh ſettlements. From theſe Jews, it is highly probable that their neighbours learned the uſe of the points in queſtion; which in the courſe of their conqueſts the Saracens communicated to the Perſians. It has been alleged with great ſhow of reaſon, that without the vowel points, it is often impoſſible to develope the genuine ſignification of many words which occur frequently in the language: many words of different and ſometimes oppoſite ſignifications are written with exactly the ſame conſonants. Without the points then, how are we to know the diſtinction? In anſwer to this objection, we beg leave to obſerve, that, during the firſt period of a language, it is impoſſible that there ſhould not occur a number of ſimilar ſounds of different ſignifications. This is ſurely to be attributed to the poverty of the language. When a few terms have been once fabricated, men will rather annex new ſignifications to old terms, than be at the expence of time or thought to invent new ones. This muſt have been the caſe with the Hebrew in particular; and indeed no language on earth is without inſtances of this inconveniency, which, however, in a living tongue, is eaſily overcome by a difference of accent, tone, geſture, pronunciation; all which, we think, might obviate the difficulty.

From the preceding arguments, we think ourſelves authorized to infer that the Maſora is a novel ſyſtem, utterly unknown to the moſt ancient Jews, and never admitted into thoſe copies of the Scriptures which were deemed moſt ſacred and moſt authentic by that people.

With reſpect to the original introduction of the points, we agree with the learned and judicious * Dr Prideaux, who imagines that they were gradually introduced after the Hebrew became a dead language, with a view to facilitate the learning to read that language, more eſpecially among the vulgar. By whom they were introduced, we think, cannot eaſily be determined; nor is it probable that they were all introduced at once, or by one and the ſame perſon. They have been aſcribed to Ezra by many, for no other reaſon that we can diſcover but to enhance their authenticity, and becauſe the ſentiment is analogous to the other articles of reformation eſtabliſhed by that holy prieſt. If our curious reader ſhould not be ſatisfied with the preceding detail, we muſt remit him to Capellus and Morinus on the one ſide, and the two Buxtorfs, Schultens, and Dr James Robertſon profeſſor of oriental languages in the univerſity of Edinburgh, on the other. This learned orientaliſt, in his diſſertation prefixed to his *Clavis Pentateuchi*, has collected and arranged, with a true ſpirit of critiſciſm, every thing that has been advanced in favour of the Maſoretical ſyſtem.—*Si Pergama dextra defendi poſſent, etiam hæc defenſa fuiſſent.*

36
From Origen's Hexapla.

St Origen, who flouriſhed about the beginning of the 3d century, was a profound Hebrew ſcholar. He publiſhed a moſt laborious and learned work, which is generally called the *Hexapla*, becauſe it conſiſted of ſix columns; the firſt of which contained the Hebrew text; the ſecond the ſame text, but written in Greek characters; the third column exhibited the verſion of Aquila; the fourth, that of Symmachus; the fifth, the Septuagint; and the ſixth, the verſion of Theodotian. In ſome fragments of that vaſt work which are ſtill extant, we have a ſpecimen of the manner in which the Hebrew was pronounced in the third century, by which it appears that it was very different from that which reſults from obſerving the Maſoretical points. The following is an inſtance copied from the beginning of Geneſis.

According to ORIGEN.	*According to the* MASORITES.
Brêſith bara Elôeim eth aſamaim oueth aares.	Bereſhith bara Elohim eth aſhamajim veeth aaretz.
Ouaares aietha Thôau ouboou ouôſekh al phne Theôm ouroueê elôeim maraepheth al phne amaim.	Veäaretz ajetha thoou vaboou, vekhoſhek gnal pené theom verouakh elohim merakhepheth gnal pené hammâim.
Ouiômer elôeim iei ôr ouiei ôr.	Vaiomer elohim jehi or, vajehi or.
Ouiar elôeim eth aôr khi tôb ouiabdêl elôeim bên aôr oubên aôſekh.	Vajare elohim eth aor ki tob vajabedel elohim bein aor oubein hakhoſhek.

37
And the practice of the ancient Greeks.

Upon the whole, we preſume to give it as our opinion, that in the moſt early periods, the vowels *aleph*, *he*, *jod* or *yod*, *vaw* or *waw* and perhaps *oin* or *ajin*, were regularly written wherever they were ſounded. This to us appears plain from the practice of the ancient Greeks. It is agreed on all hands that the Samaritan and Phœnician alphabets were the ſame; and that the former was that of the Jews originally. The Phœnicians certainly wrote the vowels exactly, for ſo did the Greeks who copied their alphabet; If the Phœnicians wrote their vowels, ſo then did the Jews of the age of Cadmus; but Cadmus was contemporary with ſome of the earlieſt judges of Iſrael; the conſequence is evident, namely, that the Jews wrote their vowels as late as the arrival of that Coloney-chief in Greece. We ought naturally to judge of the Hebrew by the Chaldaic, Syriac, and Arabian, its ſiſter dialects. All theſe languages in ancient times had their vowels regularly inſerted; and why not the Hebrew in the ſame manner with the reſt?

As theſe firſt vowels, which were coeval with the other letters, often varied in their ſound and application, the points, in all appearance, were firſt invented and employed to aſcertain their different ſounds in different connections. Other marks might be invented to point out the various tones of voice, like the τονοι or accents, with which the vowels were to be enounced, as was done among the latter Greeks. In proceſs of time, in order to promote celerity of writing, the vowels were omitted, and the points ſubſtituted in their place.

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* Con. Part I. Book i.

Before we conclude our obſervations on the Hebrew language, we ought, perhaps, to make an apology for omiting to interlard our details with quotations from the two Talmuds, the Miſhna, the Gemara, the Cabbalas, and a multitude of rabbinical writers which are commonly cited upon ſuch an occaſion. We believe we could have quoted almoſt numberleſs paſſages from the two Buxtorfs, Father Morin, Capellus, and other Hebrew critics, with no great trouble to ourſelves, and little emolument to the far greater part of our readers. But our opinion is, that ſuch a pedantic diſplay of philological erudition would probably have excited the mirth of our learned and rouſed the indignation of our unlearned, readers. Our wiſh is to gratify readers of both deſcriptions, by contributing to the edification of one claſs without diſguſting the other.

We cannot, we imagine, handſomely take leave of the ſacred language without giving a brief detail of thoſe excellencies which, in our opiuion, give it a juſt claim to the ſuperiority over thoſe other tongues which have ſometimes contended with it for the prize of antiquity: and of theſe the following in our apprehenſion deſerve particular notice.

38 Excellencies of the Hebrew language.

If this language may claim any advantage over its antagoniſts, with reſpect to its being rather a mother than a daughter to any of them, it is undoubtedly in conſequence of its ſimplicity, its purity, its energy, its fecundity of expreſſions and ſignifications. In all theſe, notwithſtanding its paucity of words, it excels the vaſt variety of other languages which are its cognate dialects. To theſe we may add the ſignificancy of the names, both of men and brutes; the nature and properties of the latter of which are more clearly and more fully exhibited by their names in this than in any other tongue hitherto known. Beſides, its well authenticated antiquity and the venerable tone of its writings ſurpaſs any thing left upon record in any other dialect now extant in the world. Theſe extraordinary qualities excite our admiration at preſent under every diſadvantage; and from this circumſtance we may infer its incomparable beauty in the age of the Jewiſh legiſlator, and what effects it would naturally produce, could we know it now as it was ſpoken and written in the days of David and Solomon.

As far, however, as we underſtand it in its preſent mutilated condition, and are able to judge of its character from thoſe few books that have come down to our time, we plainly perceive that its genius is ſimple, primitive, natural, and exactly conformable to the character of thoſe uncultivated patriarchs who uſed it themſelves, and tranſmitted it to their deſcendants in its native purity and ſimplicity. Its words are comparatively few, yet conciſe and expreſſive; derived from a very ſmall number of radicals, without the artificial compoſition of modern languages. No tongue, ancient or modern, can rival it in the happy and rich fecundity of its verbs, reſulting from the variety and ſignificancy of its conjugations; which are ſo admirably arranged and diverſified, that by changing a letter or two of the primitive, they expreſs the various modes of acting, ſuffering, motion, reſt, &c. in ſuch a preciſe and ſignificant matter, that frequently in one word they convey an idea which, in any other language, would require a tedious paraphraſe. Theſe poſitions might eaſily be illuſtrated by numerous examples; but to the Hebrew ſcholar theſe would be ſuperfluous, and to the illiterate claſs neither intereſting nor entertaining.

To theſe we may add the monoſyllabic tone of the language, which, by a few prefixes and affixes without affecting the radix, varies the ſignification almoſt at pleaſure, while the method of affixing the perſon to the verb exhibits the gender of the object introduced. In the nouns of this language there is no flexion except what is neceſſary to point out the difference of gender and number. Its caſes are diſtinguiſhed by articles, which are only ſingle letters at the beginning of the word: the pronouns are only ſingle letters affixed; and the prepoſitions are of the ſame character prefixed to words. Its words follow one another in an eaſy and natural arrangement, without intricacy or tranſpoſition, without ſuſpending the attention or involving the ſenſe by intricate and artificial periods. All theſe ſtriking and peculiar excellencies combined, plainly demonſtrate the beauty, the ſtability, and antiquity of the language under conſideration.

We would not, however, be thought to inſinuate that this tongue continued altogether without changes and imperfections. We admit that many radical words of it were loſt in a courſe of ages, and that foreign ones were ſubſtituted in their place. The long ſojourning of the Iſraelites in Egypt, and their cloſe connection with that people, even *quoad ſacra*, muſt have introduced a multitude of Egyptian vocables and phraſes into the vulgar dialect at leaſt, which muſt have gradually incorporated with the written language, and in proceſs of time have become parts of its eſſence. In Egypt, the Iſraelites imbibed thoſe principles of idolatry which nothing leſs than the final extirpation of their polity could eradicate. If that people were ſo obſtinately attached to the Egyptian idolatry, it is not very probable that they would be averſe from the Egyptian language. Beſides, the Scripture informs us, that there came up out of Egypt *a mixed multitude;* a circumſtance which muſt have infected the Hebrew tongue with the dialect of Egypt. As none of the genuine Hebrew radicals exceed three letters, whatever words exceed that number in their radical ſtate may be juſtly deemed of foreign extraction.

Some Hebrew critics have thought that verbs conſtitute the radicals of the whole language; but this opinion appears to us ill founded: for though many Hebrew nouns are undoubtedly derived from verbs, we find at the ſame time numbers of the latter deduced from the former.

39 Hutchinſonianiſm.

Before we conclude our detail of the Hebrew tongue, a few of our readers may poſſibly imagine that we ought to give ſome account of the Hutchinſonian ſyſtem; a ſyſtem ſo highly in vogue not many years ago. But as this allegorical ſcheme of interpretation is now in a manner exploded, we ſhall beg leave to remit our curious Hebraiſt to Mr Holloway's Originals, a ſmall book in 2 vols 8vo, but replete with multifarious erudition, eſpecially in the Hutchinſonian ſtyle and character.—*Fides ſit penes auctorem.*

Sect. *The Arabic Language.*

43 Arabic language originally Hebrew.

We now proceed to give ſome account of the Arabian language, which is evidently one of the ſiſter dialects of the Hebrew. Both, we imagine, were originally the ſame; the former highly improved and enlarged; the latter in appearance, retaining its original ſimplicity and rude aſpect, ſpoken by a people of a genius by no means inventive. In this inquiry, too, as in the former we ſhall ſpare ourſelves the trouble of deſcending to the grammatical minutiæ of the tongue; a method which we are perſuaded, would neither gratify our learned nor edify our unlearned readers. To thoſe who are inclined to acquire the firſt elements of that various, copious, and highly improved tongue, we beg to recommend *Erpenii Rudimenta Ling. Arab. Golii Gram. Arab.* the Diſſertations of Hariri, tra ſlated by the elder Schultens; Mr Richardſon's Perſic and Arabic Gram. &c.

We have pronounced the Hebrew and Arabian ſiſter dialects; a relation which, as far as we know, has been ſeldom controverted: but we think there is authentic hiſtorical evidence that they were poſitively one and the ſame, at a period when the one as well as the other appeared in its infant unadorned ſimplicity. The following detail will, we hope, fully authenticate the truth of our poſition.

2 Gen. x. 25.

"Unto Eber (ſays the Scripture*) were born two ſons. The name of one was Peleg, becauſe in his days the earth was divided: and his brother's name was Joktan," or rather Yoktan. This laſt ſays the ſacred hiſtorian, "had thirteen ſons; and their dwelling reached from Meſha (Mocha) to Sephar (A)," a mount of the eaſt. According to this account, the deſcendants of Yoktan poſſeſſed all the maritime coaſt of Arabia from Meſha (Mocha) to mount Sephar towards the eaſt of that peninſula. Moſes, deſcribing the rivers of paradiſe, tells us, that one of the branches of that river ‡ "encompaſſed the whole land of Havilah, where there was great ſtore of gold." Havilah was the twelfth ſon of Yoktan, whom the Arabians call Kobtan; and conſequently his territory was ſituted towards the eaſtern limit of the poſſeſſions of the poſterity of the youngeſt ſon of Eber. Yoktan or Kobtan was too young to be concerned in the building of the tower; and conſequently retained the language of his family, which was undoubtedly the Hebrew. His deſcendants muſt have carried the ſame language into their reſpective ſettlements, where it muſt have been tranſmitted to ſucceeding generations. The original language of all the tribes of the Arabians who inhabit a vaſt tract of country along the ſouthern ſhore, according to this deduction, was that of their father Kobtan, that is, the Hebrew. Indeed, the moſt learned Arabians of modern times unanimouſly acknowledge this patriarch as the founder of their language as well as of their nation.

† Gen. ii. 11

The other diſtricts of Arabia were peopled by the offspring of Abraham. The Iſhmaelites, the poſterity of that patriarch by Hagar, penetrated into the very centre of the peninſula; incorporated, and in proceſs of time became one people with the Kobtanites. Another region was poſſeſſed of the children of the ſame holy man by Cheturah his ſecond wife. The Moabites, Ammonites, Edomites, Amalekites, &c. who ſettled in the various regions of Arabia Petræa, were all branches of Abraham's family, and uſed the ſame language with their great progenitor. The Scripture indeed ſpeaks of people who inhabited the country laſt mentioned prior to the branches of Abraham's family; but theſe, according to the ſame hiſtory were extirpated by the former. The concluſion then is, if we credit the Moſaic account, that all the inhabitants of the three diviſions of Arabia did, in the earlieſt periods, univerſally uſe the Hebrew tongue.

There was, we are ſenſible, a region of Arabia inhabited by the Cuſhim, or deſcendants of Cuſh. This diſtrict was ſituated on the confines of Babylonia. Our tranſlators have confounded this country with the modern Ethiopia; and have conſequently aſcribed the exploits of the Arabian Cuſhim to the Ethiopians. The Arabian kings of Babylon were of thoſe Cuſhim. Theſe were conquered and expelled Babylonia by the Chaſidim. Theſe ſpoke the Chaldean dialect, as will appear when we come to ſpeak of that of the Abyſſinians. Here the candid reader is deſired to reflect that the Hebrew and Chaldaic are cognate dialects.

The foregoing proofs, deduced from the Moſaic hiſtory, will be corroborated by a maſs of internal evidence in the ſucceeding parts of our inquiry.

41 Gradually deviated from that ſimplicity.

The Arabic tongue, originally pure Hebrew, was in proceſs of time greatly transformed and altered from its ſimple unſophiſticated ſtate. The Arabians were divided into many different tribes; a circumſtance which naturally produced many different dialects. Theſe, however, were not of foreign growth. No foreign enemy ever conquered thoſe independent hords. The Perſians, Greeks, and Romans, ſometimes attempted to invade their territories; but the roughneſs of the ground, the ſcarcity of forage, the penury of water, and their natural bravery, always protected them. They were indeed once invaded by the Abyſſinians or Ethiopians with ſome ſhow of ſucceſs; but theſe invaders were in a ſhort time expelled the country. Their language, of conſequence, was never adulterated with foreign words or exotic phraſes and idioms. Whatever augmentations or improvements it received were derived from the genius and induſtry of the natives, and not from adventitious or imported acquiſitions. From this circumſtance we may juſtly infer, that the Arabian tongue was a long time ſtationary, and of courſe differed in no conſiderable degree from its Hebrew archetype. The learned Schultens, in his commentary on Job, hath ſhown, to the conviction of every candid inquirer, that it is impoſſible to underſtand that ſublime compoſition without having recourſe to the Arabic idioms. That patriarch was a Chuzite. His country might be reckoned a parts of Arabia. His three friends were actually Arabians,

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(A) Sephar, in the Septuagiht Σοφηρα: and in ſome editions Σωφηρα hence probably Σωφειρ, *Crig. in Job.* cap. xxii. ver. 14. φασιδε τινες των Ερμηνεω Σωφειρ την Αφρικην ειναι.

Arabians, being the deſcendants of Iſhmael and Eſau. His country bordered upon that of the predatory Chaldeans, who were an Arabian banditti. When we conſider all theſe circumſtances *in cumulo*, we are ſtrongly inclined to believe that the book of Job was actually written in Arabic, as the language ſtood at that period; which, according to the moſt probable opinion, could not have been later than the age of Moſes. The learned are generally agreed that this whole book, the three firſt chapters excepted, is a poetical compoſition, replete with the moſt brilliant and moſt magnificent imagery, the boldeſt, the juſteſt, and moſt gorgeous tropes and alluſions, and a grandeur of ſentiment wholly divine. Whoever has read the poetical compoſitions of the modern Arabians, on divine ſubjects, with any degree of taſte, will, we flatter ourſelves, diſcover a ſtriking ſimilarity both of diction and ſentiment. Be this as it may, we think there is no reaſon to conclude that the Arabic dialect deviated much from the Hebrew ſtandard prior to the Chriſtian era.

42
The two principal dialects of Arabia:
43

Of thoſe different dialects which prevailed among the various tribes among which the peninſula of Arabia was divided, the principal were the Hemyaret and the Koreiſh. Though ſome of theſe were tributary to the Tobbas, or Hemyarat ſovereign of Arabia Felix, yet they took no great pains to cultivate the language of that province, and of courſe theſe people did not thoroughly underſtand it. As for the independent tribes, they had no temptation to cultivate any other language than their own.

The Koreiſh tribe was the nobleſt and the moſt learned of all the weſtern Arabs; and the kaaba, or ſquare temple of Mecca, was before the era of Mohammed ſolely under the their protection This temple drew annually a great concourſe of pilgrims from every Arabian tribe, and indeed from every other country where the Sabian religion prevailed. The language of the Koreiſh was ſtudied with emulation by the neighbouring tribes. Numbers of the pilgrims were people of the firſt rank, and poſſeſſed all the ſcience peculiar to their country or their age. Great fairs were held during their reſidence at Mecca, and a variety of gay amuſements filled up the intervals of their religious duties. In theſe entertainments literary compoſitions bore the higheſt and moſt diſtinguiſhed rank; every man of genius conſidering not his own reputation alone, but even that of his nation or his tribe, as intereſted in his ſucceſs. Poetry and rhetoric were chiefly eſteemed and admired; the firſt being looked upon as highly ornamental, and the other as a neceſſary accompliſhment in the education of every leading man. An aſſembly at a place called *Ocadh*, had been in conſequence eſtabliſhed about the end of the ſixth century, where all were admitted to a rivalſhip of genius.

43
The dialect of the Koreiſh became the politeſt, and why.

The merits of their reſpective productions were impartially determined by the aſſembly at large; and the moſt approved of their poems, written on ſilk, in characters of gold, were with much ſolemnity ſuſpended in the temple as the higheſt mark of honour which could be conferred on literary merit. Theſe poems were called the *Moallabat*, "ſuſpended," or *Modhabebat*, "golden." Seven of theſe are ſtill preſerved in many European libraries.

From this uncommon attention to promote emulation, and refine their language, the dialect of the Koreiſh became the pureſt, the richeſt, and the moſt polite, of all the Arabian idioms. It was ſtudied with a kind of predilection; and about the beginning of the ſeventh century it was the general language of Arabia, the other dialects being either incorporated with it, or ſliding gradually into diſuſe. By this ſingular idiomatic union the Arabic has acquired a prodigious fecundity; whilſt the luxuriance of ſynonymes, and the equivocal or oppoſite ſenſes of the ſame or ſimilar words, hath furniſhed their writers with a wonderful power of indulging, in the fulleſt range, their favourite paſſion for antitheſis and quaint alluſion. One inſtance of this we have in the word *veli*; which ſignifies a *prince*, a *friend*, and alſo a *ſlave*. This ſame word, with the change of one letter only, becomes *vali*; which, without equivocation, imports a *ſovereign*. Examples of this kind occur in almoſt every page of every Arabic dictionary.

44
This ſuperiority modern.

But all thoſe advantages of this incomparable language are merely modern, and do not reach higher than the beginning of the ſixth century. Prior to that era, as we have obſerved above, a variety of dialects obtained; and as the Arabs were by their ſituation in a manner ſequeſtered from all the reſt of mankind, it may not perhaps be ſuperfluous to enquire briefly into the cauſe and origin of this inſtantaneous and univerſal change.

For a courſe of more than 20 centuries the Arabians had been ſhut up within the narrow limits of their own peninſula, and in a great meaſure ſecluded from the reſt of the world. Their commerce with India was purely mercantile, and little calculated to excite or promote intellectual improvements. They traded with the Egyptians from time immemorial; but ſince the invaſion and uſurpation of the paſtor kings, every ſhepherd, that is, every Arabian, was an abomination to the Egyptians. From that quarter, therefore, they could not derive much intellectual improvement. Beſides, when an extenſive territory is parcelled out among a number of petty ſepts or clans, the feuds and conteſts which originate from interfering intereſts and territorial diſputes, leave but little time, and leſs inclination, for the culture of the mind. In theſe circumſtances, the millitary art alone will be cultivated, and the profeſſion of arms alone will be deemed honourable. Of conſequence, we find that, in the general opinion, poetry, rhetoric, and the profeſſion of arms, were the only ſciences cultivated by the people in queſtion. As for the ſcience of arms, we are convinced that it was both ſtudied and practiſed at a very early period; but as to the two former, we imagine they were very late acquiſitions, and ſprung from ſome circumſtance external and adventitious.

The tribe of the Koreiſh were much engaged in commmerce. They exported frankinceſe, myrrh, caſſia, galbanum, and other drugs and ſpices, to Damaſcus, Tripoli, Palmyra, and other commercial cities of Syria and its neighbourhood. Upon theſe occaſions the Arabian traders muſt have become acquainted with the Greek language, and perhaps with the more amuſing and affecting parts of the Grecian literature. They might hear of the high renown of Homer and Demoſthenes; and it is not impoſſible that ſome of them might be able to read their compoſitions. Every body knows with what unremitting ardour the learned Arabs, under the firſt khaliffs, peruſed and tranſlated the philoſophical works of the Grecian ſages. The very ſame ſpirit might animate their predeceſſors, though they wanted learning, and perhaps public encouragement, to arouſe their exertions. From this quarter, we think the Arabs may have learned to admire, and then to imitate, the Grecian worthies.

45
Inſtitution at Mecca ſimilar to the Olympic games.

The Ptolemies of Egypt were the profeſſed patrons of commerce as well as of learning. Under theſe princes all nations were invited to trade with that happy country. The Arabs, now no longer fettered by Egyptian jealouſy, carried their precious commodities to Alexandria; where the Grecian literature, though no longer in its meridian ſplendor, ſhone however with a clear unfaded luſtre. The court of the firſt Ptolemies was the retreat of all the moſt celebrated geniuſes of Greece and of the age; in a word, Alexandria was the native land of learning and ingenuity. Here the ingenious Arab muſt have heard the praiſes of learning inceſſantly proclaimed; muſt have been often preſent at the public exhibitions of the poets and orators; and even though he did not underſtand them exactly, might be charmed with the melody of the diction, and ſtruck with ſurpriſe at their effects on the audience. The reader will pleaſe to reflect, that the Arabian traders were the firſt men of the nation, both with reſpect to birth, learning, and fortune. Theſe wiſe men, to uſe the language of Scripture, inſpired with the natural curioſity of their race, might hear of the celebrated Olympic games, the public recitations before that aſſembly, and the glorious prize beſtowed upon the conquerors. Such information might animate them to inſtitute ſomething parallel at Mecca, with a view to improve their language, and at the ſame time to derive honour and emolument to themſelves. The Koreiſhim might promiſe themſelves the like advantages from the eſtabliſhment of the fair and aſſembly at Ocadh, as the natives of Elis drew from the inſtitution of the Olympic games. For theſe reaſons, we conjecture the literary competitions at the place juſt mentioned were inſtituted at ſo late a period, though the nation had exiſted more than 2000 years before the eſtabliſhment of this anniverſary. Upon the whole, we are inclined to believe, that the Arabs, notwithſtanding all the fine things recorded of them by their own poetical hiſtorians, and believed perhaps too eaſily by thoſe of other countries, were in the days of ignorance like the earlieſt Romans, *latrones et ſemibarbari*. For our part, we think it by no means probable that a people of that character ſhould after ſo long a courſe of years, have ſtumbled upon ſo laudable and ſo beneficial an inſtitution, without taking the hint from ſome foreign one of a ſimilar complexion. This we acknowledge is only a conjecture, and as ſuch it is ſubmitted to the judgment of the reader.

There were, as has been obſerved above, two principal dialects of the original Arabic: the Hamyarite ſpoken by the genuine Arabs, and the Koreiſhite or pure Arabic, which at laſt became the general language of that people. The former of theſe inclined towards the Syriac or Chaldean; the latter being, according to them, the language of Iſhmael, was deeply tinctured with the Hebrew idiom. The oriental writers tell us that Terah, the grandfather of Hamyar, was the firſt whoſe language deviated from the Syriac to the Arabic. Hence, ſay they, the Hamyaritic dialect muſt have approached nearer to the purity of the Syriac, and of conſequence muſt have been more remote from the true genius of the Arabic than that of any of the other tribes. The fact ſeems to ſtand thus: The Hamyarites were neighbours to the Chaldeans and Syrians, and conſequently were connected with thoſe people by commerce, wars, alliances, &c. This circumſtance introduced into their language many phraſes and idioms from both theſe nations. That Terah was concerned in adulterating the dialect of the Hamyarites, is a mere oriental legend, fabricated by the Arabs after they began to peruſe the Hebrew Scriptures. The Koreiſh being ſituated in the centre of Arabia, were leſs expoſed to intercourſe with foreigners, and therefore preſerved their language more pure and untainted.

46
The Koran written in the Koreiſh dialect.

The learned well know, that the Koran was written in the dialect of the Koreiſh; a circumſtance which communicated additional ſplendor to that branch of the Arabian tongue. It has been proved, that the language of the original inhabitants of Arabia was genuine Hebrew; but upon this ſuppoſition a queſtion will ariſe, namely, whether the Arabians actually preſerved their original tongue pure and unſophiſticated during a ſpace of 3000 years, which elapſed between the deluge and the birth of Mohammed? or, whether during that period, according to the ordinary courſe of human affairs, it underwent many changes and deviations from the original ſtandard?

The admirers of that language ſtrenuouſly maintain the former poſition; others, who are more moderate in their attachment, are diſpoſed to admit the latter. Chardin obſerves of the oriental languages in general, that they do not vary and fluctuate with time like the European tongues *. "Ce qu'il y a de plus admirable, dit il, et de plus remarquable, dans ces langues, c'éſt, qu'elles ne changent point, et n'ont point changè du tout, ſoit á l'égard de termes, ſoit à l'égard du tour: rien n'y eſt, ni nouveau ni vieux, nulle bonne façon de parler, n'a ceſſé *d'etre* en credit. L'Alcoran, par exemple, eſt aujourdhui, comme il y a mille années, le modele de plus pure, plus courte, et plus eloquente diction." It is not to our purpoſe to tranſcribe the remaining part of the author's reflection upon this ſubject: From the above it plainly appears that he concludes, that the Arabian tongue has ſuffered no change ſince the publication of the Koran; and at the ſame time inſinuates, that it had continued invariable in its original purity through all ages, from the days of Kobtan to the appearance of that book. Whether both or either of theſe ſentiments is properly authenticated will appear in the ſequel.

47
Means adopted by the Arabs to preſerve the purity of their language.

The learned Dr Robertſon, profeſſor of oriental languages in the univerſity of Edinburgh, informs us, that the Arabians, in order to preſerve the purity of their language, ſtrictly prohibited their merchants, who were obliged to go abroad for the ſake of commerce, all commerce with ſtrange women. We know not where this injunction is recorded, but certainly it was a moſt terrible interdict to an amorous ſon of the deſert. If ſuch a prohibition actually exiſted, we ſuſpect it originated from ſome other ſource than the fear of corrupting their language. Be that as it may, the Doctor,

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* Voyage, vol. 3. p. 43.

tor, as well as the great Schultens, is clearly of opinion, that the language in queſtion, though divided into a great number of ſtreams and canals, ſtill flowed pure and limpid in its courſe.

48 The ſtyle of the Koran now obſolete,

Our readers who are acquainted with the hiſtory of the orientals are already apprized of the ſteady attachment of thoſe people to ancient cuſtoms and inſtitutions. We readily allow, that in the article of Language this ſame predilection is abundantly obvious; but every oriental ſcholar muſt confeſs, that the ſtyle of the Koran is at this day in a manner obſolete, and become almoſt a dead language. This fact, we believe will not be queſtioned. If the Arabian has deviated ſo very conſiderably from the ſtandard of the Koran in little more than 1000 years, and that too after an archetype is aſcertained; by a parity of reaſon we may infer, that much greater deviations muſt have affected the language in the ſpace of 3000 years.

It is univerſally allowed by ſuch as maintain the unſullied purity of the Arabian tongue, that it was originally the ſame with the Hebrew, or with the ancient Syriac and Chaldaic. Let any one now compare the words, idioms, and phraſeology of the Koran with the remains of thoſe three languages, and we think we may venture to affirm that the difference will be palpable. This circumſtance, one would think, indicates in the ſtrongeſt terms a remarkable alteration.

The Arabs themſelves are agreed, that, notwithſtanding the amazing fecundity of their language, vaſt numbers of its radical terms have been irrecoverably loſt. But this loſs could not be ſupplied without either fabricating new words or borrowing them from foreign languages. To the latter method we have ſeen their averſion; and muſt therefore conclude that they adopted the former.

The Chaldeans, Syrians, and Phœnicians, had made innovations on their language at a very early period, even before conqueſts were undertaken: We ſee no reaſon to ſuppoſe that the Arabs did not innovate as well as their neareſt neighbours: the Hamyarites did actually innovate.

49 And reſembling the Hebrew in its phraſeology.

There are, we think, very ſtrong reaſons to believe, that Job was an Arabian, and flouriſhed prior to Moſes, perhaps as early as Jacob. The ſtyle, the genius, the figurative tone of the compoſition; the amazing ſublimity of the ſentiments, the alluſions, the pathos, the boldneſs, the variety, and irregularity; the poetical enthuſiaſm which pervade the whole poem, ſtrongly breathe the Arabian ſpirit: indeed the very diction is peculiar to that ſingle book, and differs widely from that of the Pſalms and every poetical part of the ſacred canon. If we compare this book with Mohammed's Koran, we ſhall ſcarce find any reſemblance of words or phraſeology; but a wonderful ſimilarity of figures, enthuſiaſm, and elevation of ſentiments.

We are then led to conclude, that the Arabic did actually loſe and gain a multitude of vocables between the era of its firſt eſtabliſhment among the deſcendants of Joktan and Iſhmael and the birth of the impoſtor.

The art of writing was introduced among the Arabs at a very late period: Without the aſſiſtance of this art one would think it altogether impoſſible to preſerve any language in its primæval purity and ſimplicity. Our curious readers may here expect ſome account of the Arabic characters: the following detail is the moſt probable one we have been able to collect on that ſubject.

50 Art of writing among the Hamyarites.

It is generally agreed [*], that the art of writing was known among the Hamyarites or Homerites at a very early period. Theſe people were ſovereigns of Arabia during a courſe of many ages. Their character was ſomewhat perplexed and confuſed. It was called *al Moſnad*, from the mutual connection of the letters. The alphabet of theſe people reſembled that of the Hebrews both in the number and order of the letters, and is called *abgad heviz* [†], from the firſt ten letters of the Hebrew alphabet, artificially thrown together. "And this word (ſays the learned Chardin [‡]) *a, b, g, d*, is formed of the four letters which were heretofore the firſt in the Arabian language, as they are ſtill in that of the Hebrews." The ſame traveller is poſitive that theſe were the ancient characters of the Arabs; that they differed from Cuphite letters, which were afterwards introduced; and that they were furniſhed with vowel points. Theſe, we imagine, were the firſt rude ſketches of the Chaldean character, which probably the Hamyarites retained in their priſtine unpoliſhed form, after they had been poliſhed and reduced to a more elegant ſize by the original inventors.

Monuments bearing inſcriptions in theſe characters are, they tell us, ſtill to be ſeen in ſome places of Arabia. Some were engraved on rocks; and to theſe we think it probable that the patriarch Job alludes in thoſe paſſages where he ſeems to intimate an inclination to have his ſufferings recorded in a book, and graven in the rock for ever. All the Arabians agree, that the dialect of the Hamyarites inclined towards the Syriac or Chaldean. This we have imputed to the connection of that people with the Chaldeans, who lived in their neighbourhood. If the Hamyaritic dialect was infected with the Syriac or Chaldaic, there can be no doubt that they derived their letters from the ſame quarter.

51 In Chaldaic characters.

We conclude then, that the Hamyarites knew the art of writing from the earlieſt antiquity, and that the letters they employed were the rude Chaldaic in their unimproved ſtate [§]. Some of the Arabians do indeed hold, that Iſhmael was the firſt author of letters; but that his characters were rude and indiſtinct, without any interval between letters or words, and that theſe were adopted by Kedar and his other children: but this tradition hath met with little credit.

52 Art of writing among the Koreiſhites.

With reſpect to the highly poliſhed Koreiſhites, it is agreed on all hands, that they were unacquainted with the uſe of letters till a few years before the birth of Mohammed. Two difficulties here preſent themſelves. The firſt is, how the Koreiſhite dialect, without the art of writing, happened to excel all the other dialects of the Arabic tongue, aſſiſted by that art, apparently ſo neceſſary for preſerving a language in its original purity. The ſecond is ſtill, we think, rather greater, namely, how the Koreiſh learned that moſt uſeful art at ſo late a period as the ſixth century. It is a well known fact, that ever after the Babyloniſh captivity Arabia ſwarmed with Jewiſh villages, in which the art of writing was generally known; and almoſt at the beginning of the Chriſtian era; multitudes of Chriſtians retired to the ſame country, in order to avoid the perſecutions which they ſuffered in the Roman empire. In theſe circumſtances, we think it rather ſtrange, that the Koreiſhites, highly poliſhed and acute as they were, never thought of laying hold on the opportunity of learning an art ſo very uſeful. Theſe two problems we leave to be ſolved by our more learned readers.

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[*] Pococke's Specim. Hiſt. Arab.

[†] Id. Ibid.

[‡] Vol. iii. p. 153.

[§] Pococke Orat. de Ling. Arab.

But however they be ſolved, it is univerſally acknowledged, that the Koreiſh were ignorant of letters till a few years before the birth of their prophet. Ebn Chalican (B) one of their moſt celebrated hiſtorians, informs us, that Moramer the ſon of Morra, an Anbarian, a native of Anbaris, a city of Irak (C), firſt invented alphabetical characters, and taught his countrymen to uſe them, from whom this noble invention was derived to the Koreiſhites. Theſe letters, though neither beautiful nor convenient, were long uſed by the Arabs. They were denominated *Cuphite*, from *Cupha* a city of Irak. In this character the original copy of the Koran was written. Theſe we think were the original clumſy characters which were retained by the vulgar after the beautiful ſquare Chaldaic letters were invented; and probably uſed by prieſts, philoſophers, and the learned in general. Theſe letters are often at this day uſed by the Arabs for the titles of books and public inſcriptions.

53
Improved about 300 years after Mohammed.

Abauli the ſon of Mocla §, about 300 years after the death of Mohammed, found out a more elegant and more expeditious character. This invention of Abauli was afterwards carried to perfection by Ebn Bowla, who died in the year of the Hegira 413, when Kader was caliph of Bagdad. This character, with little variation, obtains at this day. As we think this article of ſome importance, we ſhall, for the ſake of our unlearned readers, tranſcribe an excellent account of this whole matter from the very learned Schultens.

§ Robert Clav. Pent. p. 35, 36.

"The Cuphic characters, ſays he, which had been brought from the region of the Chaldeans to the province of Hejaz, and to Mecca its capital, in the age of Mohammed, was employed by the Koreiſhites, and in it the koran was firſt written. But as this character was rude and clumſy, in conſequence of its ſize, and ill calculated for expedition, Abauli Ebn Mocla deviſed a more elegant and expeditious one. This perſon was viſir to Haradius the 41ſt caliph, who began to reign in the year of the hegira 322. Accordingly, in the 10th century, under this emperor of the Saracens, the form of the Arabian alphabet underwent a change; and the former clumſy embarraſſed character was made to give way to the poliſhed, eaſy, and expeditious type. Regarding this expedition alone, the author of the invention left very few vowel characters; and as the Hebrew manner of writing admits five long ones and five ſhort in different ſhapes, he taught how to expreſs all the vowels, both long and ſhort, ſuitably to the genius of the language, by three, or rather by two, ſmall points, without any danger of a miſtake: an abbreviation truly deſerving applauſe and admiration: for by placing a very ſmall line above ‿ he expreſſed *a* and *e*; and by placing the ſame below ⁀ he meant to imitate *i* only. To the other ſhort ones, *o* and *u*, he aſſigned a ſmall *waw* above. In order to repreſent the long ones, he called in the *matres lectionis*, the quieſcent letters א, ו, י;" ſo that *phata* with *elif* intimated *a* and *o* long, *i. e. kametz* and *cholem; jod* placed after *keſram* became *tzeri* and *chirek* long. *Waw* annexed to *damma* made *ſchurek*."

In this paſſage, this great orientaliſt acknowledges that the viſir above-mentioned, who carried the Arabian alphabet to the pinnacle of perfection, invented and annexed the vowel points for the ſake of eaſe and expedition in writing; from which we may infer, that prior to the tenth century the Arabians had no vowel points; and conſequently either read without vowels, or contented themſelves with the *matres lectionis* abovementioned.

The deſign of the author of the invention in fabricating theſe points, was confeſſedly eaſe and expedition in writing; a circumſtance which furniſhes a violent preſumption that the Hebrew vowel-points were deviſed and annexed at ſome late period for the very ſame purpoſes.

Some, indeed, have gone ſo far as to affirm that the Arabians were the original fabricators of the vowel-points. The Arabians † (ſays the learned Dr Gregory Sharp) were the original authors of the vowel-points. They invented three, called *fatha*, and *damma*, and *keſra*: but theſe were not in uſe till ſeveral years after Mohammed; for it is certain that the firſt copies of the koran were without them. The rabbis ſtole them from the Arabs." This, however, is carrying the matter too far, ſince it is certain that the Jews were acquainted with the points in queſtion long before the period above mentioned.

† Diſſ. on the Origin and Conſt. of Lang, &c.

Though it is none of our intention to enter into a minute detail of the peculiarities of this noble language, we cannot omit obſerving one thing, which indeed belongs to grammar, but is not generally taken notice of by the Arabic grammarians. The roots of verbs in this dialect are univerſally triliteral; ſo that the compoſition of the 28 Arabian letters would give near 22,000 elements of the language. This circumſtance demonſtrates the ſurpriſing extent of it: for although great numbers of its roots are irrecoverably loſt, and ſome perhaps were never in uſe; yet if we ſuppoſe 10,000 of them, without reckoning quadriliterals to exiſt, and each of them to admit only five variations, one with another, in forming derivative nouns, the whole language would then conſiſt of 50,000 words, each of which may receive a multitude of changes by the rules of grammar.

54
Surpriſing extent of the Arabic language.

Again, the Arabic ſeems to abhor the compoſition of words, and invariably expreſſes very complex ideas by circumlocution; ſo that if a compound word be found in any dialect of that language, we may at once pronounce it of foreign extraction. This is indeed a diſtinguiſhing feature in the ſtructure of this tongue, as well as of ſome of its ſiſter dialects. This circumſtance has, in our opinion, contributed not a little to the amazing fecundity of that language: for as every ingredient in the compoſition of a complex idea requires a

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(B) See this whole detail in Dr Pocock's *Specim. Hiſt. Arab.* p. 250. *et ſeq.*

(C) *Irak*, "Babylonia," from *Erech*, one of the cities built by Nimrod. The Arabians have generally reſtored the ancient names of places. Thus with them Tyre is *Tzur*, Sidon *Seyd*, Egypt *Mezri*, &c.

a word to expreſs it, as many words became neceſſary to complete the language as there were ſimple ideas to be intimated by diſcourſe. Were all the compounds of the Greek language to be diſſolved, as probably once they were, the vocables of that tongue would infinitely exceed their preſent number.

The Arabic authors boaſt moſt unconſcionably of the richneſs and variety of their language. No human underſtanding, ſay they is capacious enough to comprehend all its treaſures. Inſpiration alone can qualify one for exhauſting its ſources §. Ebn Chalawalb, a moſt renowned grammarian of theirs, has ſpent a whole volume upon the various names of the lion, which amount to 500; another on the names of the ſerpent, which make up 200. Mohammed al Firancabodius, affirms that he wrote a book on the uſefulneſs and different denominations of honey, in which he enumerates 80 of them; and after all, he aſſures that he was ſtill far from having exhauſted his ſubject. To excel in a language ſo amazingly copious, was certainly a proof of uncommon capacity, and conſidered as no mean talent even among the Koreiſhites. Hence Mohammed, when ſome people were expreſſing their admiration of the eloquence of the koran, told them that he had been taught by the angel Gabriel the language of Iſhamel, which had fallen into deſuetude.

55
Oratory and poetry of the Arabs.

In a language ſo richly repleniſhed with the choiceſt and moſt energetic terms, both oratory and poetry were cultivated with eaſe. All the difficulty conſiſted in making a choice among words and phraſes equally elegant. We may compare one of thoſe poets or orators to a young gentleman, of a taſte highly refined, walking into a repoſitory where a profuſion of the richeſt and moſt elegant dreſſes are piled up in wild confuſion. Our beau is here diſtreſſed with variety; but to be, able to chooſe the moſt handſome and moſt becoming he muſt have received from nature a ſuperior good taſte; which he muſt likewiſe have cultivated by aſſiduous induſtry, and by aſſociating with the moſt genteel company.

The orations of the Arabs were of two kinds, metrical and proſaic. The former they compared to pearls ſet in gold, and the latter to looſe ones. They were ambitious of excelling in both; and whoever did ſo was highly diſtinguiſhed. His ſucceſs in either of thoſe departments was thought to confer honour, not only on his family, but even on his tribe. In their poems were preſerved the genealogies of their families, the privileges of their tribes, the memory of their heroes, the exploits of their anceſtors, the propriety of their language, the magnificence of banquets, the generoſity of their wealthy chiefs and great men, &c. After all, we cannot avoid being of the unpopular opinion, that this mighty parade of eloquence and poetry did not reach backwards above two centuries before the birth of Mohammed, as it certainly vaniſhed at the era of the propagation of his religious inſtitutions. The two ſucceeding centuries were the reigns of ſuperſtition and bloodſhed. The voice of the muſes is ſeldom heard amidſt the din of arms.

The ancient Arabs, at whatever time poetry began to be in requeſt among them, did not at firſt write poems of conſiderable length. They only expreſſed themſelves in metre occaſionally, in acute rather than harmonious ſtrains. The Proverbs of Solomon, and the book of Eccleſiaſtes ſeem to be compoſed in this ſpecies of verſification. The proſody of the Arabs was never digeſted into rules till ſome time after the death of Mohammed; and this is ſaid to have been done by Al Khalti al Farabidi, who lived in the reign of the caliph Karan of Raſchid.

After ſo many encomiums on the copiouſneſs of the Arabic tongue, one claſs of our readers may poſſibly expect that we ſhould ſubjoin a brief detail of its genius and character; and this we ſhall do with all poſſible brevity.

56
Genius and character of the language.

All the primary or radical words of the language are compoſed of different combinations of conſonants by *triads*; ſo that the various combinations and conjunctions of radicals make more than 10,000, even without including thoſe which may ariſe from the meeting of guttural letters. From this quality of the language has flowed that ſtability of the dialect which has preſerved it pure and entire for ſo many thouſand years, and ſecured it from thoſe changes and that fluctuation to which moſt other tongues are ſubject.

Perhaps notwithſtanding its copiouſneſs and variety, no other language can vie with the one in queſtion in point of perſpicuity and preciſion. It is poſſeſſed of a brevity and rotundity which, amidſt the greateſt variety, enables it to expreſs with clearneſs and energy what could not be expreſſed in any other tongue without tedious circumlocutions. To this purpoſe we ſhall beg leave to tranſcribe a paſſage from Biſhop Pocock's oration on the Arabic language. As we imagine few of our readers who will have the curioſity to peruſe this article can be unacquainted with the Latin tongue, we ſhall give it as it ſtands in the original without a tranſlation:

"Neque in nulla certe laudis parte, mira illa qua, non ſolum verborum in ſignificando, perſpicuitate, ſed in prolatione, elegantiæ et dulcedini caverunt, ſedulitas; quoque, non ſolum accurata, inter literas ex ſignificata proportione, ſenſus vel intenſioni, vel remiſſioni, prout res poſtulaverit, literarum appoſitione, ſubductione, vel juxta organorum, rationem proſpexerunt; ſed et ne quid delicatulus auribus ingratum, ne quid horridum, aut ασυμφωνον reperiatur, effecerunt Hoc in genere eſt, quod nuſpiam in verbo aliquo, genuinæ apud Arabes originis, concurrunt, non intercedente vocalis alicujus motione conſonantes, cum vel tres, vel plures, aliis in linguis frequenter collidantur. Immo neque, ſi adſint, quæ aſperitati remedio ſint, vocales, quas libet temeré tamen committunt conſonantes; ſed ita rei natura poſtulat, ut concurere debeant illa, quæ ſe invicem, ſine aſperitatis inductione conſequi, et inter ſe connecti non poſſint; illi vel ſitus, vel literarum mutatione, eas abjiciendo, inſerendo, emoliendo, aliiſve quibus poſſent modis remedia quærunt; adeo ab omni, quod vel abſonum, vel diſſonum eſt, abhorrent. Quid ſi nobis ſecus videntur, et aſperius ſonare ab Arabibus prolata, illud auribus noſtris, et uſui, non linguæ imputandum, nec mollius illis ſonare noſtra, quam eorum nobis cenſendum. Quin et gutturalium, quæ nobis maxima aſperitatis cauſa videntur, abſentiam, ut magnum in lingua Græca defectum, arguunt Arabes.

The learned Dr Hunt, late profeſſor of the Hebrew and Arabic languages at Oxford, is of the ſame opinion with the very learned prelate, part of whoſe ora-

§ Pocoke's Specimen.

tion we have tranſcribed above, with reſpect to the delicacy and elegance of the Arabian language:—"Nuſquam, mihi credite, (inquit ille) auribus magis parcitur quam in Arabia; nulla lingua a κακοφωνια, alienior quam Arabica. Quamquam enim nonnullæ ejus literæ minus fortaſſe ſuaviter, immo durius etiam ſonuerint, ita tamen Arabes eas temperarunt cum lenibus, duras cum mollibus, graves cum acutis miſcendo, voces inde non minus auribus jucundæ, quam pronunciatu faciles confecerint, totique ſermoni miram ſonorum tam dulcedinem quam varietatem addiderint. Quod quidem orationis modulandæ ſtudium in Corano adeo manifeſtum eſt, ut primi Iſlamiſmi oppugnatores cum librum magica ideo arte ſcriptum dixerint. Non auribus tantum gratus eſt Arabiſmus, ſed et animi conceptibus exprimendis aptus, ſonos ſuos ſententiis ſemper accommodans, et felici verborum junctura eorum naturam depingens."

To theſe we might add quotations from Erpenius's oration on the ſame ſubject, from Golius, Schultens, Hottinger, Bochart, and Sir William Jones; beſides a whole cloud of oriental witneſſes, whoſe extravagant encomiums would rather aſtoniſh than edify the far greater part of our readers. Theſe panegyrics may perhaps be in ſome meaſure hyperbolical; but in general we believe them pretty well founded. At the ſame time we are convinced that the Arabic, however melodious in the ear of a native, ſounds harſh and unharmonious in that of a European.

57 Difficulty of acquiring a thorough knowledge of it.

When we conſider the richneſs and the variety of the Arabic tongue, we are led to conclude, that to acquire a tolerable degree of ſkill in its idioms, is a more difficult taſk than is generally imagined; at leaſt ſome people who have acquired the knowledge of the Greek and Latin, and likewiſe of the more faſhionable modern languages, with facility enough, have found it ſo. Be that as it may, there are two claſſes of men who, in our opinion cannot handſomely diſpenſe with the knowledge of that almoſt univerſal tongue: the gentleman who is to be employed in the political tranſactions of the moſt reſpectable mercantile company upon earth, in the eaſtern parts of the world; and the divine, who applies himſelf to inveſtigate the true purport of the ſacred oracles; without this, the former will often find himſelf embarraſſed in both his civil and mercantile negociations; and the latter will often grope in the dark, when a moderate acquaintance with that tongue would make all ſunſhine round about him.

Bochart, Hottinger, Schultens, Pocock, Hunt, and Robertſon, &c. have taken wonderful pains, and laviſhed a profuſion of learning, in proving the affinity and dialectical cognation between the Hebrew and Arabic. Much of this labour, we think, might have been ſpared. We preſume to affirm, that no perſon tolerably verſed in both languages can read a ſingle paragraph of the Arabic verſion of the New Teſtament, or indeed of the Koran itſelf, without being convinced of the truth of this poſition: it is but ſtripping the latter of its adventitious frippery, and the kindred features will immediately appear.

The learned profeſſors of the univerſity of Leyden were the firſt who entered upon the career of Arabian learning. To them the European ſtudents are principally indebted for what knowledge of that language they have hitherto been able to attain. Though ſeveral Italians have contributed their endeavours, yet the fruit of their labours had been rendered almoſt uſeleſs by more commodious and more accurate works printed in Holland.

The palm of glory, in this branch of literature, is due to Golius, whoſe works are equally profound and elegant; ſo perſpicuous in method, that they may always be conſulted without fatigue, and read without languor. Erpenius's excellent grammar, and his memorable dictionary, will enable the ſtudent to explain the hiſtory of *Taimur* by *Ibni Arabſhah*. If he has once maſtered that ſublime work, he will underſtand the learned *Arabic* better than moſt of the Khatabs of Conſtantinople or of Mecca.

The Arabian language, however, notwithſtanding all its boaſted perfections, has undoubtedly ſhared the fate of other living languages; it has gradually undergone ſuch conſiderable alterations, that the Arabic ſpoke and written in the age of Mohammed may be now regarded as a dead language: it is indeed ſo widely different from the modern language of Arabia, that it is taught and ſtudied in the college of Mecca juſt as the Latin is at Rome.

The dialect of the Highlands of Yemen is ſaid to have the neareſt analogy to the language of the Koran, becauſe theſe Highlanders have little intercourſe with ſtrangers. The old Arabic is through all the Eaſt, like the Latin in Europe, a learned tongue, taught in colleges, and only to be acquired by the peruſal of the beſt authors.

"*Ut folia in ſylvis pronos mutantur in annos*, &c."

SECT. III. *Of the Chaldean, Phœnician, or Ethiopian Abyſſinian, and Egyptian Languages.*

58 Connection of the Chaldean, Phœnician, Ethiopic, and Egyptian languages.

As there is a very ſtrict connection and dialectical analogy among theſe languages, we have arranged them all under one ſection; eſpecially ſince what is obſerved relating to one of them may, without the leaſt ſtraining, be extended to them all. We ſhall begin with the Chaldaic.

The Chaldeans, or Chaſidim, as they are always called in Scripture, were the deſcendants of Cheſed the ſon of Nahor, the brother of Abraham. The deſcendants of this patriarch drove the Cuſhim or Arabians out of Babylonia, and poſſeſſed themſelves of that country at a very early period. As theſe Chaſidim or Chaldeans were the poſterity of Nahor, the deſcendant of Heber, they undoubtedly ſpoke the original Hebrew tongue as well as the other branches of that family. But being an ingenious inventive people, they ſeem to have poliſhed their language with much care and delicacy of taſte.

The only genuine remains of the ancient Chaldaic language are to be found in the Hebrew Scriptures; and thoſe are contained in 268 verſes, of which we have 200 in Daniel, reaching from verſe 4th chapter 2d to chapter 8th excluſive; in Ezra 67, in chapter 4th, 17 verſes; chapter 5th, the ſame number; chapter 6th, 18 verſes; and in chapter 7th, 15: in Jeremiah, chapter 10th, there is extant only one verſe. From theſe fragments, compared with the Hebrew

brew, it painly appears, that the difference between that language and the Chaldaic is ſcarce equal to that between the Doric and Ionic dialects of the Greek.

Whatever might have been the form of the moſt ancient Chaldaic letters, it is generally known that the beautiful ſquare characters, in which the Hebrew Scriptures began to be written after the age of Ezra, were current among them at an era prior to the Babyloniſh captivity. Thoſe elegant characters were probably the invention of the Chaldean academies, which were eſtabliſhed in various parts of that extenſive and fertile country.

59 Chaldean differs little from the Hebrew.

The Chaldean declenſions and conjugations differ ſo little from the Hebrew modifications, that it would be almoſt ſuperfluous to dwell upon them in this ſection. The moſt effectual way to acquire an idea of the ancient, Chaldaic, is to decompound the names confeſſedly of that dialect, which occur in many places of Scripture. By this method of proceeding, its beautiful ſtructure and expreſſive energy will be readily comprehended even by the moſt illiterate claſſes of our readers. At the ſame time, we muſt obſerve, that the Chaldaic and ancient Syriac bore ſo near a reſemblance to each other, that they have generally been claſſed under one head.

The firſt Chaldaic word that occurs in the Old Teſtament is *bara* "*creavit*." This word has all along been aſſigned to the language under conſideration; for what reaſon, we confeſs we are not able to diſcover. The greateſt part of the Hebrew tongue is now loſt. The words *bar*, "a ſon," and *bara* "*creavit*," (rather *filiavit*), may probably be of that number. Another Scripture word which is often quoted, and always aſcribed either to the Syriac or Chaldaic, is *igar* or *jegar ſahadutha*, which ſignifies "a monument of witneſſes." Every body knows, that when Jacob and Laban made their compact, the latter denominated the heap of ſtones reared upon that occaſion in this manner; while the former called it *Galeed*, as we now write and pronounce it. This pronunciation, however, does not appear to us altogether genuine. The word is probably compounded of גל *gal. cumulus*, "a heap," and ער *chad*, *æternitas*, *ſeculum*," eternity, an age:" ſo that גלער *galchad*, or *galaad* as it came to be written afterwards ſignified an "everlaſting heap." Laban then had reſpect to the end for which the monument was erected; but Jacob alluded to its duration. It appears, however, upon this and every other occaſion, when Chaldaic words are mentioned, that א, *a*, was a favourite letter both with the Syrians and Chaldeans. We may likewiſe obſerve, that the ſame people always changed the Hebrew ש *ſhin* into ת *thau*, in order to avoid the ſerpentine ſound of that conſonant.

60 Its proper names pure Hebrew,

The Chaldaic names of gods, men, places, &c. which occur in Scripture, appear to be no other than Hedrew poliſhed and improved. *Bel*, *Belus* in Latin, is evidently בעל *Baal*, or we think rather ב-על *Bechel*. The Phœnicians, and ſometimes the Hebrews, uſed it to ſignify *the moſt high*. The Chaldeans uſed their word *Bel* for the ſame purpoſe; and becauſe this word originally imported the *High One*, they dignified their firſt monarch with that name. They denominated their capital city *Ba-bel* which imports the *temple of Bel*, and afterwards *Babylon*, which intimates *the abode or dwelling of our lord the ſun*. *Nebo* was a name of the moon among the Babylonians, derived from the Hebrew נבא, *nabah*, *vaticinari*, "to prophecy." *Azer* was the planet Mars, from אזר *Azer* or *Ezur*, *accinxit*, "to gird," alluding to the girding on of arms. *Abad* was an Aſſyrian name of the ſun *, a word deduced from the Hebrew אחד *ahad*, *unus*, "one," *Netzar* was the name of an Arabian idol †, which often occurs in the compoſition of Babylonian names. In Arabic it ſignifies an *eagle:* we think, however, that the word is the Hebrew נצר *natzor*, *cuſtodivit*, *ſervavit*, "to keep, to preſerve." To theſe names of deities many more might be added, which the nature of our deſign will not allow us to mention.

Almoſt all the Chaldean proper names which occur either in ſacred or prophane hiſtory are evidently of Hebrew original, or cognate with that language. We ſhall ſubjoin a few examples: *Nabonaſſar* is evidently compounded of *Nabo* and *nazur*, both Hebrew words. *Nabopollazar* is made up of *Nabo-Pul*, the ſame with *Bel* and *Azer* or *Azor*, above explained. *Beleſis* is made up of *Bel* and אשא *Eſha*, "fire." Nebuchadnezzar, Belſhazzar, Beltiſhazzar, Nerigliſſar, Nebuzaradan, Rabmag, Rabſaris, Nergal-Sharezer, Rabſhakeh, Ezarhaddon, Merodach, Evil Merodach, and numberleſs others, are ſo manifeſtly reducible to Hebrew vocables, when decompounded, that the oriental ſcholar will readily diſtinguiſh them.

Names of places in the Chaldaic are likewiſe ſo nearly Hebrew, that nothing but the dialectical tone ſeparates them. Thus *Ur* of the Chaldeans is actually אור *light*, that city being ſacred to the ſun; *Sippora* is plainly the Hebrew word *Zipporah; Carchemiſh*, a city on the Euphrates, is evidently compounded of *Kir* or *Kar* "a city," and *Chemoſh*, a name of the ſun. In ſhort, every Chaldean or old Syrian word now extant, without any difficulty, bewray their Hebrew original. As for their dialectical differences, theſe we remit to the Chaldaic and Syriac grammars and lexicons.

61 Phœnician language derived from the Hebrew,

We now proceed to the conſideration of the Phœnician language, which is known to have been that of the ancient Canaanites. That this was one of the original dialects, and conſequently a cognate of the Hebrew, is univerſally acknowledged. Inſtead therefore of endeavouring to prove this poſition, we may refer our readers to the works of the learned Mr Bochart, where that author has in a manner demonſtrated this point, by deriving almoſt all the names of the Phœnician colonies from the Hebrew, upon the ſuppoſition that the dialect of thoſe people was cloſely connected with that tongue. St Auguſtine *de Civitate Dei*, has obſerved, that even in his time many of the vulgar in the neighbourhood of Carthage and Hippo ſpoke a dialect of the old Punic which nearly reſembled the Hebrew. Procopius, *de bello Goth*. informs us, that there exiſted even in his days in Africa a pillar with this inſcription in Hebrew, "We flee from the face of Joſhua the robber, the ſon of Nun." The names of all the ancient cities built by the Carthaginians on the coaſt of Africa are eaſily reducible to a Hebrew original. The Carthaginian names of perſons mentioned in the Greek and Latin hiſtory, ſuch as Himilco, Hamilcar, Aſdrubal, Hannibal, Hanno, Dido, Anna or Hannah, Sophoniſba, Giſgo, Maherbal, Adherbal, &c. all breathe a Hebrew extraction.

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* Merob lib. 1. c. 23.

† Pococke Specim. Hiſt. Arab.

The Greeks borrowed a great part of their religious worſhip from the people of whoſe language we are treating; of conſequence, the names of moſt of their gods are Phœnician. Almoſt every one of theſe is actually Hebrew, as might eaſily be ſhown. The names of perſons and places mentioned in the fragments of Sanchoniathon, preſerved by Euſebius, are all of Hebrew complexion. The names mentioned in the Hebrew ſcriptures of places which belonged to the Canaanites prior to the invaſion of the Iſraelites under Joſhua, are as much Hebrew as thoſe which were afterwards ſubſtituted in their ſtead. The Punic ſcene in Plautus has been analyſed by Bochart and ſeveral other learned men, by whom the language has been clearly proved to be deduced from the Hebrew, with ſome dialectical variations.

The iſland of Melita (Malta now) was inhabited by a colony of Phœnicians many ages before the Moors took poſſeſſion of it. Among the vulgar of that iſland many Punic vocables are current to this day, all which may be readily traced up to the Hebrew fountain. To theſe we may add many inſcriptions on ſtones, coins, medals, &c. which are certainly Phœnician, and as certainly of Hebrew extraction. We have thrown together theſe few hints without purſuing them to any great length, as we deemed it unneceſſary to dwell long on a point ſo hackneyed and ſo generally acknowledged.

62 Origin of the Ethiopians

Before we proceed to treat of the ancient language of the Ethiopians, we find ourſelves obliged to hazard a few ſtrictures of the origin of that ancient nation. If we can once ſettle that ſingle point, the diſcovery will open an avenue to their primitive dialect, the article about which we are chiefly concerned in the preſent diſcuſſion.

In our Section concerning the Hebrew language, we were led often to mention the patriarch Cuſh the eldeſt ſon of Ham. The poſterity of this family-chief under his ſon Nimrod, poſſeſſed themſelves of Shinar, afterwards denominated *Chaldea*. Theſe were probably the Arabians whoſe kings (according to Euſebius, Africanus, and other ancient chronologers) reigned in Babylon during ſeveral ſucceſſive generations. Thoſe were the Cuſhim or Cuſhites, whom the learned Mr Bryant has conducted over a great part of the world. and to whoſe induſtry and ingenuity he has aſcribed almoſt all the inventions, arts, ſciences, laws, policy, religious, &c. which diſtinguiſhed mankind in the earlieſt ages.

In proceſs of time, the poſterity of Chaſid or Cheſed called *Chaſdim* or *Chaſidim* in the eaſt, and *Chaldeans* in the weſt, drove out the Cuſhim, and ſeized upon their country. The Cuſhim retired weſt-ward, and ſpread themſelves over that part of Arabia ſituated towards the ſouth-eaſt. They probably extended themſelves over all the eaſtern part of that peninſula, from the ſea to the wilderneſs between Arabia and Syria. Thoſe were the Ethiopians mentioned in Scripture by a very pardonable inadvertency of our tranſlators. Theſe, then, we think, were the primitive Cuſhim.

Joſephus informs us *, that all the Aſiatics called the Ethiopians of Africa by the name of *Cuſhim*. This denomination was not given them without good reaſon: it imports at leaſt, that they deemed them the deſcendants of Cuſh; it being the conſtant practice of the orientals in the early ages to denominate nations and tribes from the name of their great patriarch or founder. The name *Cuſhim* muſt then have been given to the Ethiopians, from a perſuaſion that they were the progeny of the ſon of Ham who bore that name. By what route ſoever the Cuſhim penetrated into that region of Africa which was called by their name, it may be taken for granted that they were the deſcendants of Cuſh above mentioned.

It has been obſerved above, that the poſterity of Cuſh poſſeſſed the country of Shinar or Chaldea at a very early period, but were expelled by the Chaſidim or Chaldeans. Upon this cataſtrophe, or perhaps ſomewhat later, a colony from the fugitive Cuſhim tranſported themſelves from the ſouth and ſouth eaſt coaſt of Arabia over the ſea, which lies between that country and Ethiopia. However imperfect the art of navigation might be in that age, the diſtance was ſo ſmall that they might eaſily enough make a voyage croſs that narrow ſea in open boots, or perhaps in canoes. However that may have been, it cannot be doubted that the tribes on both ſides of that branch of the ſea were kindred nations.

63 Their language originally Chaldean

If, then, both the northern and ſouthern Cuſhim ſprung from the ſame ſtock, there can be no doubt that both ſpoke the ſame language. The language of the Babylonian Cuſhim was Chaldaic, and of conſequence that of the Ethiopian Cuſhim was the ſame. We may therefore reſt aſſured, that whatever changes the Ethiopian dialect may have undergone in the courſe of 3000 years, it was originally either Chaldaic, or at leaſt a branch of that language. Scaliger informs us, that the Ethiopians call themſelves Chaldeans; and that, ſays he, not without reaſon, becauſe of thoſe many ſacred and profane books which are extant among them, the moſt elegant and moſt beautiful are written in a ſtyle near that of the Chaldean or Aſſyrian. Marianus Victorius, who was the firſt that reduced the Ethiopic tongue to the rules of grammar, tells us in his *Proœmium*, "that the Ethiopians call their tongue Chaldaic; that it ſprings from the Babylonian; and is very like the Hebrew, Syriac, and Arabic: At the ſame time (he concludes), that this language may be eaſily learned by thoſe who are maſters of the Hebrew." The learned Bochart, and Biſhop Walton in his *Proleg*, are clearly of the ſame opinion.

The vulgar letters of the Ethiopians, according to Diodorus Siculus, were the ſame with the ſacred characters of the Egyptians (D). From this account, if the Sicilian may be truſted, the ſacred letters of theſe people, concerning which ſo many wiſe conjectures

* Antiq. Jud. lib. 1, c. 7.

§ Lib. 3. § p. 101. Step.

(D) We find the ſame obſervation confirmed by Heliodorus (*Ethiop*. lib. x. p. 476.) "The royal letters of the Ethiopians (ſays he) were the ſacred characters of the Egyptians." Caſſiodorus likewiſe aſſures us, "That the letters inſcribed upon the Egyptian obeliſks were Chaldeans." See Sect. *Shanſcrit*.

tures have been formed, were actually Chaldaic. To carry on this inveſtigation a little farther, we may obſerve, that Sir William Jones ſeems to have proved, by very plauſible arguments, that the Shanſcrit characters were deduced from the Chaldaic. This circumſtance affords a preſumption that the Ethiopian Cuſhim were likewiſe concerned with the Egyptians; who, as is remarked in the Section concerning the *Shanſcrit*, probably introduced the religion of the Brahmans into Hindoſtan. This is advanced as a conjecture only; and yet when we conſider the affinity between the Egyptian and Gentoo religions, we are ſtrongly inclined to hope that this ſurmiſe may one day be verified by undeniable facts.

64 Ancient intercourſe between the Ethiopians and Egyptians.

The original Ethiopians were a people highly civilized; their laws, their inſtitutions, and eſpecially their religion, were celebrated far and wide. Homer talks in raptures of the piety of the Ethiopians, and ſends his gods every now and then to revel 12 days with that devout people. The Sicilian adduces a number of very ſpecious arguments to prove that thoſe two nations had ſprung from the ſame ſtock. He mentions a ſimilarity of features, of manners, of cuſtoms, of laws, of letters, of the fabrication of ſtatutes, of religion, as evidences of the relation betwen thoſe two neighbouring nations. There was, every body knows, a communion, as to ſacred rites, between the two countries. The Egyptians ſent annually a deputation of their prieſts, furniſhed with the portable ſtatues of their gods, to viſit the fanes of the devout Ethiopians. Upon this occaſion, a ſolemn religious banquet was prepared, which laſted 12 days, and of which the prieſts of both nations were partakers. It was, we imagine, a kind of ſacramental inſtitution, by which both parties publicly avouched their agreement in the ceremonies of their religion reſpectively. Theſe obſervations plainly ſhow, that the moſt ancient Ethiopians were a people highly civilized; indeed ſo much, that the Egyptians were at one time contented to be their ſcholars. The tone of their language was certainly the ſame with that of the Chaldeans or Arabian Cuſhim, from whom they were deſcended. We know not whether there are any books in the ancient Ethiopic now extant; ſo that it is not eaſy to produce inſtances of its coincidence with the Chaldaic. Diogenes Laertius * informs us, that Thraſyllus, in his catalogue of the books compoſed by Democritus, mentios one, περγ των εν Μεροη ιερων γραμματων, *concerning the ſacred letters in the iſland of Meroe* (E); and another concerning the ſacred letters in Balylon. Had theſe books ſurvived the ravages of time, they would in this age of reſearch and curioſity have determined not only the point under our conſideration, but the affinity of ſacred rites among the Chaldeans, Ethiopians, and Egyptians.

* Lib. 9. p 461. Caſaub.

We have now ſhown that the Ethiopians were a colony of Cuſhites; that the Cuſhites were originally ſovereigns of Shinar or Chaldea, and conſequently ſpoke either Chaldaic or a dialect of that tongue; that their coloniſts muſt have uſed the ſame language; that the ancient Ethiopians were a people highly poliſhed, and celebrated in the moſt early ages on account of their virtue and piety. It has likewiſe appeared, that the common letters of that people were the ſacred characters of the Egyptians. The letters, we imagine, where the Cuphite; for which ſee the Sect. on the *Arabic*. When they were diſcarded, and the modern ſubſtituted in their room, cannot be determined; nor is it we apprehend, a matter of much importance. We ſhall therefore drop that part of the ſubject, and refer our curious and inquiſitive readers to the very learned Job Ludolf's (F) excellent grammar and Dictionary of the Abyſſinian or Geez tongue, where they will find every thing worth knowing on the that ſubject. We ſhall endeavour to gratify our readers with a very brief account of the modern Ethiopic or Abyſſinian tongue; for which both they and we will be obliged to James Bruce, Eſq; that learned, indefatigable, and adventurous traveller; who, by his obſervations on that country, which he made in perſon, often at the hazard of his life, has diſcovered, as it were, a new world both to Europe and Aſia.

65 Modern Ethiopic tongues.

The moſt ancient language of Ethiopia, which we ſhall now call *Abyſſinia* (its modern name), according to that gentleman, was the *Geez*, which was ſpoken by the ancient Cuſhite ſhepherds. This, we ſhould think, approaches neareſt to the old Chaldaic. Upon a revolution in that country, the court reſided many years in the province of Amhara, where the people ſpoke a different language, or at leaſt a very different dialect of the ſame language. During this interval, the *Geez*, or language of the ſhepherds, was dropt, and retained only in writing, and as a dead language: the ſacred Scriptures being in that tongue only ſaved it from going into diſuſe. This tongue is exceedingly harſh and unharmonious. It is full of theſe two letters D and T, in which an accent is put that nearly reſembles ſtammering. Conſidering the ſmall extent of ſea that divides this country from Arabia, we need not wonder that it has great affinity with the Arabic. It is not difficult to be acquired by thoſe who underſtand any other of the oriental languages; and as the roots of many Hebrew words are only to be found here, it ſeems to be abſolutely neceſſary to all thoſe who wiſh to obtain a critical ſkill in that language.

66 Ethiopic alphabet.

The Ethiopic alphabet conſiſts of 26 letters, each of which, by a *virgula* or point annexed, varies its ſound in ſuch a manner as that thoſe 26 form as it were 62 diſtinct letters. At firſt they had but 25 of theſe original letters, the Latin P being wanting; ſo that they were obliged to ſubſtitute another letter in its place. *Paulus*, for example, they call *Taulus*, *Aulus*, or *Caulus*: *Petros*, they pronounced *Ketros*. At laſt they ſubſtituted T, and added this to the end of their alphabet; giving it the force of P, though it was really a repetition of a character rather than the invention of a new one. Beſides theſe, there are 20 others of the nature of diphthongs: but ſome of them are

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(E) Where the capital of Ethiopia was ſituated.

(F) A very learned German, who publiſhed, a grammar and dictionary of the Geez in folio.

are probably not of the ſame antiquity with the letters of the alphabet, but have been invented in later times by the ſcribes for convenience.

The Amharic, during the long baniſhment of the royal family in Shoa, became the language of the court, and ſeven new characters were of neceſſity added to anſwer the pronunciation of this new language; but no book was ever yet written in any other language than *Geez*. There is an old law in the country handed down by tradition, that whoever ſhall attempt to tranſlate the Holy Scripture into Amharic or any other language, his throat ſhall be cut after the manner in which they kill ſheep, his family ſold to ſlavery, and their houſes razed to the ground.

Before we leave this ſubject, we may obſerve that all the ancients, both poets and hiſtorians, talk of a double race of Ethiopians; one in India, and another in Africa. What may have given riſe to this opinion it is not eaſy to diſcover. Perhaps the ſwarthy complexion of both people may have led them to this ſentiment. Euſebius indeed informs us *, that "a numerous colony of people emigrated from the banks of the Indus, and croſſing the ocean, fixed their reſidence in the country now called Ethiopia." For our part, we are rather inclined to believe that the original Ethiopians tranſported themſelves into India, and there perhaps co-operated with the Egyptians in digging the excavations and framing the ſtatues, ſome of which are ſtill to be ſeen in that country, and which we have mentioned in another Section. The Greeks called thoſe people Αιθιοπες, *Æthiopes* we believe, from their ſun-burnt countenance; but indeed they were very little accquainted either with the country or its inhabitants.

* Chron. p. 12.

67
Ancient language of Egypt a ſiſter dialect of Hebrew.

The moſt ancient name of Egypt was *Mizraim*, of conſequence the Arabians ſtill call it *Meſra*. It was likewiſe diſtinguiſhed by other names, ſuch as *Oceana*, *Aeria*, &c. It appears from the ſacred hiſtorian, that it was inhabited by the deſcendants of Mizraim the ſecond ſon of Ham. Mizraim had ſeveral ſons, who, according to the Scripture account, ſettled reſpectively in that country. If we truſt to the ſacred records, there will be little difficulty in aſcertaining the language of the Mizraim. It will appear to be one of the ſiſter dialects of the Hebrew, Phœnician, Arabic, Chaldaic, &c.; and this, to us appears to be the fact. But the origin of that people, their language, religion, laws, and inſtitutions, have been ſo warped and confounded both by their own hiſtorians and thoſe of other countries, that one is ſcarce able to determine what to believe or what to reject. Herodotus, Diodorus Siculus, Strabo, Ptolemy, and moſt other ancient geographers and hiſtorians, are univerſally agreed, that Egypt, at leaſt that part of it called *Delta*, was overflown by the ſea, and conſequently uninhabitable for many cenuries after the diſperſion of mankind. When we conſider the low ſituation of the Delta, and the violent current of the tide from the coaſt of Phœnicia and Paleſtine towards that ſhore, we would be almoſt tempted to adopt this hypotheſis; but the ſacred records avouch the contrary. According to them, we find Egypt a populous, rich, and flouriſhing kingdom, as early as the age of Abraham. Had the Lower Egypt been a pool of ſtagnating water at any time after the general deluge, we think it could not have been drained, cleared, cultivated, and ſtocked with inhabitants, ſo early as the days of Abraham.

Diodorus Siculus, however, is poſitive that the Egyptians§ were a colony of Ethiopians; and this he endeavours to prove by the ſimilarity of features, cuſtoms, laws, religious ceremonies, &c. between the two nations. That there was a conſtant intercourſe of good offices between theſe two branches of the Hamites, cannot be queſtioned; and that they nearly reſembled each other in many reſpects, is too evident to admit of contradiction. The excavations, originally dug out of the ſolid rocks of porphyry and marble, in which the natives reſided before the plains were drained, have been obſerved by a moſt judicious traveller (G) very few years ago. At the ſame time, the moſt accurate and judicious travellers (H) who have viſited that region in modern times, are generally of opinion that the land has gained nothing on the ſea ſince the period when Herodotus wrote his deſcription of that country; from which circumſtance we may be led to conclude, that the idea of the inundation of the Delta is not founded in fact.

§ Lib. 15. paſſim.

But even admitting that the Egyptian Delta has acquired nothing from the ſea ſince the age of Herodotus to the preſent, it certainly does not follow that the region in queſtion was never overflown by that element; ſince there are in many parts of the globe, large tracts of land certainly once covered with ſea, which have continued to this day in the very ſame ſituation in which they were 2000 years ago. We leave the deciſion of this point to the judgment of our readers.

We have already hinted our opinion of the nature of the Egyptian language; but becauſe Egypt is generally thought to have been the native land of hieroglyphics, and becauſe many are of opinion that hieroglyphical characters were prior to the alphabetical, we ſhall hazard a few conjectures with reſpect to that ſpecies of writing.

68
Egyptian hieroglyphics.

The end of ſpeech, in general is to enable men to communicate their thoughts and conceptions one to another when preſent; the uſe of writing is to perform the ſame office when people are at ſo great a diſtance that vocal ſounds cannot mutually reach them. Hieroglyphics are ſaid to have been invented to ſupply this defect. The moſt ancient languages were every where full of tropes and figures borrowed from ſeveral objects. As in that ſtage of ſociety men have not learned to abſtract and generalize, all their ideas are borrowed from ſuch objects as moſt forcibly ſtrike their ſenſes. This circumſtance would naturally ſuggeſt to ſavages the idea of conveying their ſentiments to each other, when abſent, by delineations of corporeal objects. Thus, if a ſavage aſked a loan of his friend's

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(G) See Mr Bruce's Travels, Vol. I,

(H) Mr Bruce, Dr Shaw, Biſhop Pocock, Savary, Volney, &c.

friend's horſe, he might find means to have conveyed to him the figure of that animal; and ſo of others. This was the very loweſt ſpecies of ideal communication, and has been ſtyled *picture-writing*.

Neceſſity would ſoon impel our ſavage correſpondents to fabricate a method more extenſively uſeful, which would likewiſe be ſuggeſted by the conſtant uſe of the metaphorical mode of ſpeech. Some ſavage leader, more ſagacious than the vulgar herd, would obſerve that certain ſenſible objects were fitted according to the rules of analogy, to repreſent certain human paſſions, and even ſome abſtract ideas; and this would be readily enough adopted by the herd as a new improvement. In this caſe a *horn* might be the emblem of *power*, a *ſword* of *bravery*, a *lion* of *fury*, a *fox* of *cunning*, a *ſerpent* of *malice*, &c. By and by artificial ſigns might be contrived to expreſs ſuch ideas as could not readily be denoted by bodily objects. This might be called *ſymbolical writing*. Such was the foundation of the Chineſe characters; and hence that prodigious number of letters of which the written language of that people is compoſed. Farther they could not proceed, notwithſtanding their boaſted inventive powers; and farther, we believe no nation ever did proceed, who had once upon a time no other characters but hieroglyphical. The Mexicans, had arrived at the very loweſt ſtage of hieroglyphical writing, but had not taken one ſtep towards alphabetical. The Hurons employ hieroglyphical ſymbols, but never entertained a ſingle idea of alphabetical. Hieroglyphical characters are the images of objects conveyed to the mind by the organs of viſion; alphabetic are arbitrary artificial marks of ſound, accommodated by compact to convey to the mind the ideas of objects by the organs of hearing. In a word, we think that there is not the leaſt analogy between theſe two ſpecies to conduct from the one to the other: we are therefore of opinion, that hieroglyphical characters were never the vulgar channels of ideal conveyance among civilized people.

69
Were never in vulgar uſe:

We know that in this point we differ from many learned, judicious, and ingenious writers; ſome of whom have taken much pains to inveſtigate the intermediate ſtages through which the fabricators of characters muſt have paſſed in their progreſs from hieroglyphical to alphabetical writing. Theſe writers have adopted a plan analogous to Biſhip Wilkins's project of an artifical language. In this theory, we own, we are led to ſuſpect that they ſuppoſed all mankind were once upon a time *ſavages*, and were left to hammer out words, as well as characters, by neceſſity, ingenuity, experience, practice, &c. For our part, we have endeavoured to prove, in our ſection on the Hebrew language, that alphabetical writing was an antediluvian invention: and we now lay it down as our opinion, that among all thoſe nations which ſettled near the centre of civilization, hieroglyphics were comparatively, a modern fabrication.

The orientals are, at this day, extravagantly devoted to allegory and fiction. Plain unadorned truth with them has no charms. Hence that extravagant medley of fables and romance with which all antiquity is replete, and by which all ancient hiſtory is diſguiſed and corrupted. Every doctrine of religion, every precept of morality, was tendered to mankind in parables and proverbs. Hence, ſays the Scripture, to underſtand a proverb, the words of the wiſe, and their dark ſayings. The eaſtern ſages involved their maxims in this enigmatical dreſs for ſeveral reaſons; to fix the attention of their diſciples; to aſſiſt their memory: to gratify their allegorical taſte; to ſharpen their wit and exerciſe their judgment; and ſometimes perhaps to diſplay their own acuteneſs, ingenuity, and invention.

It was among the ancients an univerſal opinion, that the moſt ſacred arcana of religion, morality, and the ſublime ſciences, were not to be communicated to *uninitiated ralble*. For this reaſon every thing ſacred was involved in allegorical darkneſs.

70
But employed to conceal ſacred doctrines from the uninitiated;

Here, then, we ought to look for the origin of hieroglyphical or picture-writing among the civilized nations of the eaſt. They did not employ that ſpecies of writing becauſe they were ignorant of alphabetical characters, but becauſe they thought fit to conceal the moſt important heads of their doctrines under hieroglyphical figures. The Egyptian prieſts were moſt celebrated for their ſkill in deviſing thoſe emblematical repreſentations; but other nations likewiſe employed them. We learn from the fragments of Beroſus the Chaldean hiſtorian, preſerved by Syncellus and Alexander Polyhiſtor, that the walls of the temple of Belus at Babylon were covered all over with thoſe emblematical paintings. Theſe characters were called ιεροι, becauſe they were chiefly employed to repreſent ſacred objects; and γλυφικα, becauſe they were originally carved or engraved. Their name points to their original uſe. Inſtead of purſuing theſe obſervations, which the nature of our deſign will not permit, we muſt refer our readers to Herodotus, l. ii. Diodorus Sic. l. i. Strabo, l. xvii. Plut. Iſis and Oſiris; and among the Chriſtian fathers, to Clem. Alex. Euſeb. Præp. Evang.; but chiefly to Horapollo's Hieroglyphica.

From this deduction we would conclude, that this ſpecies of writing was an adventitious mode in Egypt, peculiar to the prieſts, and employed chiefly to exhibit things ſacred; and that among all civilized people it did not ſuperſede the uſe of alphabetical characters, nor did the uſe of the latter originate from the former. When alphabetical letters were invented, if indeed they were a human invention, they were antecedent to the other in uſe and extent. The Egyptian prieſts alone knew the true import of thoſe ſacred ſymbols; and communicated that knowledge firſt to their own children from generation to generation, then to the initiated, and laſt of all to the grandees of the nation, all of whom were indeed initiated. The hieroglyphics of Egypt were not then the ſymbols of any ſacred occult language; but ſigns invented by the prieſts and prophets or wiſe men, in order to repreſent their deities, the attributes and perfections of their deities, and the myſterious arcana of their religion, and many other circumſtances relating to objects of importance, which were deemed either too ſacred or too important to be imparted to the vulgar.

71
And poſterior in time to alphabetical characters.

The Egyptians aſcribed the invention of letters to a perſon whom they called *Thoth* *, *Theuth*, or *Thyoth*: the Greeks Ερμης; and the Romans *Mercurius*. Plato † calls him a god, or a godlike man; Diodorus ‡ makes him privy counſellor to Oſiris; Sanchoniathon ap. Euſeb. § connects him with the Phœnician Cronus or Saturn. To this Mercury the Egyptians aſcribe the invention of all the arts and ſciences. He was probably ſome very eminent inventive genius, who flouriſhed during the firſt ages of the Egyptian monarchy, and who perhaps taught the rude ſavages the art of writing.

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* Euſeb. Prep. Ev.

† Phædrus.

‡ Lib. 1.

72 Two kinds of alphabetical characters in Egypt.

According to Diodorus Siculus, the Egyptians had two kinds of letters ‖: the one ſacred the other common; the former the prieſts taught their own children, the latter all learned promiſcuouſly. In the ſacred characters the rites and ceremonies of their religion were couched; the other was accommodated to the ordinary buſineſs of life. Clem. Alexand. mentions three different ſtyles of writing employed by the Egyptians†. "The pupils, who were inſtructed by the Egyptians, firſt learned the order and arrangement of the Egyptian letters, which is called *epiſtolography*, that is, the manner of writing letters; next, the ſacred character, which the ſacred ſcribes employed; laſtly, the hieroglyphic character, one part of which is expreſſed by the firſt elements, and is called *Cyriologic*, that is, *capital*, and the other *ſymbolic*. Of the ſymbolic kind, one part explains properly by imitation; and the other is written tropically, that is, in tropes, and figures; and a third by certain enigmatical expreſſions. Accordingly, when we intend to write the word *ſun*, we deſcribe a circle; and when the moon, the figure of that planet appearing horned, conformable to the appearance of that luminary after the change." In this paſſage we have an excellent deſcription of the three different modes of writing uſed by the Egyptians; the common, the ſacred, and the hieroglyphic. The laſt he deſcribes according to its three diviſions, in exact conformity to our preceding obſervations.

73 The ſacred letters and language of Egypt Chaldaic.

By the deſcription above tranſlated, it plainly appears, that the ſacred character of the Egyptians was entirely different from the hieroglyphic; and by this conſideration we are in a good meaſure juſtified, in ſuppoſing, as we have done all along, that the ſacred letters of the Egyptians were actually the Chaldaic. The inſcriptions on the obeliſks, mentioned by Caſſiodorus, ſo often quoted, were certainly engraved in the ſacred character; and the character in which they were drawn was that above mentioned. If the ſacred letters were Chaldaic, the ſacred language was probably the ſame.

The Egyptians pretended, that the Babylonians derived the knowledge of the arts and ſciences from them; while, on the other hand, the Babylonians maintained, that the former had been tutored by them. The fact is, they both ſpoke the ſame language; uſed the ſame religious rites; had applied with equal ſucceſs to aſtrology, aſtronomy, geometry, arithmetic, and the other ſciences; of courſe a rivalſhip had ariſen between the two nations, which laid the foundation of thoſe oppoſite pretenſions.

The moſt faithful ſpecimen of the vulgar language of the Egyptians, is, we believe, ſtill preſerved in the Coptic, which, however, is ſo replete with Greciſms that it muſt be difficult to trace it out.

Under the Ptolemies, the Greek was the language of the court, and conſequently muſt have diffuſed itſelf over all the country. Hence, we believe, two-thirds of the Coptic are Greek words, diverſified by their terminations, declenſions, and conjugations only. To be convinced of the truth of this, our learned and curious readers need only conſult Chriſtian Sholtz's Egyptian and Coptic grammar and dictionary, corrected and publiſhed by Godfred Woide, Oxford, 1788.

74 The Egyptian and Phœnician languages the ſame.

The Egyptians and Phœnicians were in a manner couſin-germans, and conſequently muſt have ſpoken the ſame language; that is, one of the ſiſter dialects of the Hebrew, Chaldean, Arabian, Cuſhite, &c.—This is not a mere conjecture; it may be realized by almoſt numberleſs examples. It is true, that when Joſeph's brethren went down to Egypt, and that ruler deigned to converſe with them, they could not underſtand the Egyptian idiom which he ſpoke; nor would he, had he been actually an Egyptian, have underſtood them without an interpreter. The only concluſion from this circumſtance is, that by this time the Egyptian had deviated conſiderably from the original language of mankind. The Iriſh and Welch, every body knows, are only different dialects of the Celtic tongue; and yet experience proves, that a native of Ireland and another of Wales cannot well comprehend each other's language, nor converſe intelligibly without an interpreter. The Erſe, ſpoken in the Highlands of Scotland, and the Iriſh are known to be both branches of the old Celtic? yet a Scotch Highlander and an Iriſhman can hardly underſtood each other's ſpeech. By a parity of reaſon, a Hebrew and an Egyptian might, in the age of Joſeph, ſpeak only different dialects of the ſame original tongue, and yet find it difficult to underſtand one another. The fact ſeems to be, the Hebrew dialect had been in a manner ſtationary; from the migration of Abraham to that period; whereas the Egyptian, being ſpoken by a powerful, civiliſed, and highly cultivated people, muſt have received many improvements, perhaps additions, in the courſe of near two centuries.

75 The vulgar letters of Egypt nearly the ſame with the Hebrew or Phœnician.

The deſcendants of Canaan and of Mizraim were ſtrictly connected in their religious ceremonies; they worſhipped the ſame objects namely, the *Hoſt of heaven*; they mourned *Oſiris* and *Adonis* in concert; they carried on a joint commerce, and, we think, ſpoke the ſame language; we may therefore, conclude, that their vulgar letters were nearly the ſame, both in form, diſpoſition, and number. Their original number was probably 16. viz. five vowels, ſix mutes, ſimple and middle, four liquids, and the ſolitary σ.—With theſe, it is likely, was joined a mark of aſpiration, or an *h*, ſuch as we have in the Roman alphabet, and find on ſome Greek monuments. Cadmus was originally an Egyptian; that leader brought a new ſet of letters into Greece. Theſe are generally deemed to be Phœnician. They were nearly the ſame with the ancient Pelaſgic, as will be ſhown in the ſection of the *Greek language*. The latter, we think, were from Egypt, and conſequently the former muſt have been from the ſame quarter. Danaus, Perſeus, Lelex, &c. were of Egyptian extraction; they too adopted the Cadmean characters, without ſubſtituting any of their own.

The Jonim, or Ionians, emigrated from Gaza, a colony of Egyptians; and their letters are known to have differed very little from thoſe of Cadmus and the

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§ Prep. Ev.

‖ Lib. 1.

† Strom. lib. 5.

Pelaſgi. The concluſion, therefore, is, that the vulgar Egyptian letters were the ſame with the Phœnician.

We are abundantly ſenſible that there are found upon Egyptian monuments characters altogether different from thoſe we have been deſcribing. At what time, by what people, and to what language, theſe letters belonged, we will not pretend to determine. The Ethiopians, the Chaldeans, the Perſians, the Greeks, the Romans, the Saracens have, at different times, been ſovereigns of that unhappy country. Perhaps other nations, whoſe memory is now buried in oblivion, may have erected monuments, and covered them with inſcriptions compoſed of words taken from different languages, perhaps, upon ſome occaſions, whimſically deviſed, with a view to perplex the curious antiquaries of future ages. Some of theſe are compoſed of hieroglyphics intermingled with alphabetical characters, artificially deranged, in order to render them unintelligible. Theſe we do not pretend to developoe becauſe the moſt inquiſitive and ſagacious antiquaries are not yet agreed as to their purport and ſignification.

76 Egyptian names of Hebrew original.

We ſhall now go on to ſhow, that moſt part of the names of perſons and places, &c. which have been conveyed down to us, may, in general, be reduced to a Hebrew, Phœnician, Syrian, or Chaldean original. As the firſt of theſe languages is moſt generally known, we ſhall employ it as our archetype or ſtandard beginning with thoſe terms which occur in Scripture.

The word *Pharaoh*, the title of the *melech* or king of Egypt, is, we think, compounded of two terms, which plainly diſcover a Hebrew original. According to an oriental tradition, the firſt who aſſumed this title was the ſovereign of the *royal ſhepherds*; a race of people from Arabia and Phœnicia. They conquered Egypt at an early period, and kept poſſeſſion of it for ſeveral centuries. They gloried in the title ὑκσοι, or ὑκουσοι, which according to Joſephus *con. Apion*, ſignifies "royal ſhepherds." The word *Pharaoh* ſeems to be compounded of פר *Phar*, "a bullock," and רעה *Rachah* "to feed;" hence פרעה *Pharachah*, as we think it ought to be written. The name given to Joſeph is evidently of kin with the Hebrew; for *zaphnath* differs very little from the Hebrew verb *tzaphan*, which ſignifies "to hide, to keep ſecret;" *Paneah* or *Phaneah*, ſignifies much the ſame with the Hebrew *Phanah*, aſpexit: ſo that the name actually intimates *one* who ſees hidden things; which was certainly the very idea the prince intended to convey by giving him that name.

Potiphar, or *Potipherah*, the name of Joſeph's father-in-law, has likewiſe a dialectical affinity with the Hebrew idiom. In that language *Putah* ſignifies "to open, to explain," which was one part of the ſacerdotal office; and *Phar* imparts "a bullock." Potiphar was then prieſt of the bullock, that is, the ox, *apis*, ſacred to the *ſun* (1). This perſon was prieſt or *prince of On*, which according to Cyrillus on Hoſea, was an Egyptian name of that luminary. The Hebrew word *hon* or *chon* ſignifies "power, wealth, ſufficiency:" a very proper epithet for the *ſun*, who was thought to beſtow thoſe bleſſings. The name of Joſeph's wife was *Aſenath* or *Aſnath*, compounded of *Iſhah* "a woman," and *Naith* or *Neit*, an Egyptian name of "Minerva, a votary of Minerva."

Almoſt all the names of cities belonging to Egypt which are mentioned in Scripture are evidently Hebrew. To be ſatisfied as to this poſition, our curious readers may conſult Jamieſon's *Spicilegia*, an excellent book very little known. 77 And ſignificant in that language. The names of moſt of the Egyptian deities are ſignificant in the Hebrew tongue; and in that dialect the names appear to have been impoſed with great judgment and propriety, plainly indicating ſome office aſſigned them, or pointing to ſome peculiar attribute. We ſhall produce a few inſtances.

Oſiris was the great divinity of Egypt; he was certainly the *ſun*. The Egyptians gave their deities a variety of names in alluſion to their various offices and attributes. Jablonſki has in a manner wearied himſelf with tracing the ſignification of this name. In Hebrew we have *Oſhir* "to grow rich, to be enriched." The ſun may be called the great enricher of nature, and therefore might properly be called by a name alluding to that quality. *Iſis* was both the moon and the earth. *Iſhah* is the Hebrew word for *woman*, and Horapollo aſſigns this very derivation. *Anubis* was one of the names of Mercury among the Egyptians: He was always figured with the head of a *dog*. He accompanied *Iſis* in her peregrinations in queſt of Oſiris, and frighted away the wild beaſts from attacking the princeſs. In Hebrew, *Nubah* ſignifies "to bark." Here the analogy, we think is evident. Many Egyptian names begin with *Can*, ſuch as *Canobus*, *Canopus*, &c. The Hebrew word *Cahen* or *Cohen*, *Syr*, *Con* or *Chon*, intimates both a prince and a prieſt. *Ob* or *Aub*, in Hebrew, imports "a bottle, a flaggon," any thing round and prominent like the human belly. In the language of Egypt it was often applied to the ſun, in alluſion to his rotundity. In the temple of *Jupiter Ammon* or *Amon*, in the deſert of Lybia, there was a ſtatue of the god repreſenting the *navel* of the human body, which was probably framed in alluſion to this fancy. Hence the Pythoneſs, or people who, according to the Scripture, had familiar ſpirits, were ſaid to prophecy by the inſpiration of *Ob*, as the Delphic prieſteſs did by that of Apollo. Again, many Egyptian names end with *ſiris*, as Calaſiris, Termoſiris. This termination is no doubt a cognate of the Hebrew and Chaldean *ſar* or *zar*, ſignifying "a prince, or grandee, &c." The river Nile in the Ethiopic dialect is called *Siris*; that is, we believe the *king of rivers*. The ſame flood ſeems to derive the name by which it is generally known, from the Hebrew *nebel*, "a valley, or torrent running down a valley." The ſame river was often called *Oceanus*, a word compoſed of *og*, or *oc*, *och*, which ſignifies "a king, a leader," and the Hebrew *oin* "a fountain; ſo that the word imports the *king of fountains*. The Hebrews always denominated the land of Egypt the

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(1) The Septuagint (Gen. xli. v. 45 and 50.) tranſlate *On* by Ηλιουπολις.

the land of Mizraim; the Egyptians themselves, in later times, ſeem to have called it Αιγυπτος *Ægyptus*, "Egypt," which ſome think is compounded of *Ai*, Hebrew, "an iſland, a country a province," and *Copt* or *Cupt*, "a famous city in that country."

From this ſpecimen, we hope it will appear that the Egyptian language in the more early ages was one of thoſe dialects into which that of the deſcendants of the poſtdiluvian patriarchs was divided, and perhaps ſubdivided, a few centuries after the deluge. Among all thoſe, we believe, ſuch an affinity will be found, as plainly demonſtrates that they originally ſprung from one common ſtock. Here we might eaſily follow the Egyptian language into Greece; and there we are perſuaded we might trace a vaſt number of Egyptian terms into that tongue, which, however, the nature of this inquiry will not permit. If our learned readers ſhould incline to know more of the affinity of the Egyptian tongue with the others ſo often mentioned, they may conſult Bochart's *Chanaan*, Walton's *Proleg*. Gebelin's *Monde Prim*. Jameſon's *Spicilegia*, &c.

Sect. IV. *Of the Perſian Language.*

The Perſian language is divided into the ancient and modern; the former of which is at this day very imperfectly known, the latter is at preſent one of the moſt expreſſive, and at the ſame time one of the moſt highly poliſhed, in the world. We ſhall, in treating of this language, in compliance with the plan we have all along followed, begin with the ancient.

78 At the birth of Mohammed two languages prevalent in Perſia,

When Mohammed was born, and Anu'shi'rav'an, whom he calls the *juſt king*, ſat on the throne of Perſia, two languages were generally prevalent in that empire (k). The one was called *Deri*, and was the dialect of the court, being only a refined and elegant branch of the *Parſi*, ſo called from the province of which *Shiraz* is now the capital; and that of the learned, in which moſt books were compoſed, and which had the name of *Pahlavi*, either from the heroes who ſpake it in former times, or from *pahlu*, a tract of land which included ſome conſiderable cities of *Iran*: The ruder dialects of both were ſpoken by the ruſtics of ſeveral provinces; and many of theſe diſtinct idioms were vernacular, as happens in every kingdom of conſiderable extent.

79 And a more ancient language than either known only to the prieſts,

Beſides the *Parſi*, and *Pahlavi*, a very ancient and obſtruſe tongue was known to the prieſts and philoſophers, called the language of the *zend*, becauſe a book on religious and moral duties which they held ſacred, and which bore that name, had been written in it; while the *Pazend* or comment on that work was compoſed in *pahlavi*, as a more popular dialect. The letters of this book were called *zend*, and the language *zaveſta*.

The Zend and the old *Pahlavi* are now almoſt extinct in *Iran*, and very few even of the Guebres can read it; while the *Parſi* remaining almoſt pure in *Shahnameh*, has, by the intermixture of Arabic words, and many imperceptible changes, now become a new language exquiſitely poliſhed by a ſeries of fine writers both in proſe and verſe, analogous to the different idioms gradually formed in Europe after the ſubverſion of the Roman empire.

80 Parſi language and

The very learned and laborious Sir William Jones is confident that the *Parſi* abounds with words from the Shanſcrit, with no other change than ſuch as may be obſerved in the numerous dialects of India; that very many Perſian imperatives are the roots of Shanſcrit verbs; and that even the moods and tenſes of the Perſian verb ſubſtantive, which is the model of all the reſt, are deducible from the Shanſcrit by an eaſy and clear analogy. From this he infers that the *Parſi*, like the various idiom dialects, is derived from the language of the Bramins. This concluſion, we imagine, is not altogether juſt, ſince by the ſame train of reaſoning we may infer that the Shanſcrit is derived from the *Parſi*.

The ſame learned gentleman adds, that the multitude of compounds in the Perſian language proves that it is not of Arabic but Indian original. This is undoubtedly true; but though the *Parſi* is not of Arabic original, it does not neceſſarily follow that it is of Shanſcrit. We might with the ſame propriety, and with an equal ſhow of reaſon, conclude, that the Greek language is deſcended of the Shanſcrit, becauſe it too abounds with compounds. We may then reſt aſſured, that neither the one nor the other argument adduced by the ingenious preſident proves that the *Parſi* tongue is a deſcendant of the Shanſcrit.

The gentleman ſo often mentioned, aſſures us, that the Zend bears a ſtrong reſemblance to the Shanſcrit; which, however, it might do without being actually derived from it, ſince we believe every oriental ſcholar will find that all the languages from the Mediterranean to the utmoſt coaſt of Hindoſtan exhibit very ſtrong ſignatures of a common original. The Parſi, however, not being the original dialect of Iran or Perſia, we ſhall purſue it no farther at preſent, but return to give ſome account of the Pahlavi, which was probably the primitive language of the country.

81 The Pahlavi.

We have obſerved above, that the Pazend or comment on the Zend was compoſed in the Pahlavi for the uſe of the vulgar. This, according to Sir William, was a dialect of the Chaldaic; and of this aſſertion he exhibits the following proof.

By the nature of the Chaldean tongue, moſt words ended in the firſt long vowel, like *ſhemaiá* "heaven;" and that very word, unaltered in a ſingle letter, we find in the Pazend, together with *lailia* "night," *meyá* "water," *nírá* "fire," *matrá* "rain," and a multitude of others, all Arabic or Hebrew, with a Chaldean termination; ſo *zamar*, by a beautiful metaphor from *pruning trees*, means in Hebrew, to *compoſe verſes*, and thence, by an eaſy tranſition, to *ſing* them; now in Pahlavi we ſee the verb *zamarúniten* "to ſing," with its forms *zamaraunemi* "I ſing," and *zamrunid* "he ſang;" the verbal terminations of the Perſian being added to the Chaldaic root. All theſe words are intregral parts of the language; not adventitious like the Arabic nouns and verbals engrafted on modern Perſian.

(k) The moderns call the empire of Perſia *Iran*; a name unknown to the ancients.

From this reaſoning it plainly appears, 1ſt, that Pahlavi was the ancient language of Perſia; and, 2d, that the ancient Perſian was a cognate dialect of the Chaldean, Hebrew, Arabic, Phœnician, &c. M. Anquetil has annexed to his tranſlation of the *Zendaveſta* two vocabularies in Zend and Pahlavi, which he found in an approved collection of *Rawayat* or *Traditional Pieces* in modern Perſian. His vocabulary of the Pahlavi ſtrongly confirms this opinon concerning the Chaldaic origin of that language. But with reſpect to the Zend, it abounded with vaſt numbers of pure Schanſcrit words, to ſuch a degree, that ſix or ſeven words in ten belonged to that language.

82 Derived from Chaldaic and Shanſcrit, &c.

From this deduction it would appear, that the oldeſt languages of Perſia were Chaldaic and Shanſcrit; and that when they had ceaſed to be vernacular the Pahlavi and Zend were deduced from them reſpectively, and the Parſi either from the Zend, or immediately from the dialect of the Brahmans: but all had perhaps a mixture of tartarian; for the beſt lexicographers aſſert, that numberleſs words in ancient Perſian are taken from the Cimmerians. With reſpect to the laſt of theſe, we cannot help being of opinion, that colonies of people from the neighbourhood of Perſia did tranſport themſelves into Crim Tartary, and perhaps into Europe. Theſe coloniſts brought along with them thoſe vocables which ſtill occur in their dialect. Emigrants from thoſe quarters muſt have found their way into Scandinavia, ſince numberleſs Perſian words are ſtill current in thoſe regions. Perhaps Odin and his followers emigrated from the neighbourhood of Media and Perſia, and brought with them the dialect of the nations from whoſe country they had taken their departure.

83 The Zend from the ame ſource.

With reſpect to the Zend, it might well be a dialect of the Shanſcrit, and was probably a ſacred language; and if ſo, concealed from the vulgar, and reſerved for the offices of religion. If Zoroaſtres, or Zaraduſht as the orientals call him, travelled into Egypt, and was initiated in the myſteries of the Egyptian religion, as ſome pretend he was, he might be inſtructed in the ſacred dialect of that people by the prieſts under whom he ſtudied. When that philoſopher returned into Perſia, and became the apoſtle of a new religion, he might compoſe the volume of his laws and religious inſtitutions in the ſacred language of his Egyptian tutors. This language then became that of the Magi, who concealed it carefully from the knowledge of the uninitiated, as the prieſts did in Egypt and the Brahmans in Hindoſtan.

In our Section on the *Shanſcrit* language, we ſhall give a detail of a number of particulars, which to us ſeem to furniſh a preſumption that the language, in queſtion was imported from Egypt into Hindoſtan. We confeſs there are not ſufficient data to improve theſe preſumptions into abſolute certainty; but we hope the time is at hand when the worthy members of the Aſiatic Society will diſcover abundant materials to aſcertain the truth of this poſition. We are the rather inclined to adopt this hypotheſis, when we conſider the character of Zoroaſtres in connection with that of the Egyptian Cohens and of the Indian Brahmans.

If this opinion ſhould one day appear to be well-founded we do believe the coincidence between the language of the Zend and the Shanſcrit will be eaſily accounted for, without making the Hindoos maſters of Iran or Perſia, and then driving them back to the ſhores of the Ganges. That the nations of Turan or Scythia did actually over-run that country, and make themſelves maſters of a conſiderable part of it at different times is vouched by the records and traditions of the Perſians themſelves. Upon thoſe occaſions a number of Tartarian words might be introduced into the country, and acquire a currency among the inhabitants. As the Annals of Ancient Perſia have been long ſince deſtroyed and conſigned to eternal oblivion, it is impoſſible to aſcertain either the extent or duration of theſe irruptions. Indeed the nature of our deſign does not call for that inveſtigation.

84 Proofs from Scripture of the origin of the Pahlavi.

In order to corroborate the cognation between the Chaldean and Pahlavi languages, we ſhall ſubjoin a few arguments derived from the Moſaic hiſtory, and the other writings of the Old Teſtament. Theſe we believe will be admitted as irrefragable proofs of the poſition above advanced by ſuch as admit the authenticity of thoſe records.

Elam is always allowed to have been the progenitor of the Perſians. This patriarch was the eldeſt ſon of Shem the ſon of Noah; and according to the Moſaic account, his poſterity ſettled in the neighbourhood of the deſcendants of Aſhur, Arphaxad, Lud, and Aram, the other ſons of Shem. The country where they ſettled was denominated *Elymais*[*] as late as the beginning of the Chriſtan era. This name was retained till the Saracens conquered and took poſſeſſion of that country. If this was the caſe, as it certainly was, the Elamites or Perſians ſpoke a dialect of the primary language, which, in the firſt Section, we have proved to have been the Hebrew.

When the four eaſtern monarchs invaded the five cities of the plain in Canaan[†], Chedorlaomer king of Elam was at the head of the confederacy. Amraphel king of Shinar, that is Babylon or Chaldea, was one of the allies: Arioch king of Elazar was another; and Tidal, king of ſome ſcattered nations in the ſame neighbourhood, was the fourth. That Chedorlaomer was principal in this expedition, is obvious from the hiſtorian's detail of the ſecond, where that prince is placed firſt, and the reſt are named *the kings that were with him.* This paſſage likewiſe demonſtrates, that Elam, Shinar, and Elazar, lay contiguous, and were engaged in the ſame cauſe. Wherever the country in queſtion is mentioned in Scripture prior to the era of Daniel and Ezra, it is always under the name of *Elam.* To go about to prove this would be ſuperfluous.

According to Xenophon[‡], the Perſians knew nothing of horſemanſhip before the age of Cyrus: but that hiſtorian informs, that after that monarch had introduced the practice of fighting on horſeback, they become ſo fond of it, that no man of rank would deign to fight on foot. Here it ought to be conſidered, that the hiſtorian above mentioned was now writing a moral, military, and political romance; and therefore introduces this anecdote, in order to exalt the character of his hero: ſo that we are not to ſuppoſe that the people under conſideration were unacquainted with the art of horſemanſhip till that period.

The very name *Phars* or *Pharas* is certainly of He-

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[*] Strabo, lib. 11.

[†] Gen. chap. xiv.

[‡] Cyc lib, 1

brew origin, and alludes to the ſkill that people profeſſed in horſemanſhip. The original ſeems to be *Pharſab, ungula* "a hoof;" and in the Arabic *Pharas* intimates a *horſe*, and *Pharis* a *horſeman*. Conſequently the people were denominated *Parſai*, and the country *Pars*, becauſe they were trained from their infancy to ride the *great horſe*, which indeed they deemed their greateſt honour. This name was perhaps firſt impoſed upon them by the neighbouring nations, and in proceſs of time became their gentile appellation. *Mithras* is generally known to have been the chief divinity of the Perſians; a name which is plainly derived from *Mither* "great." We find in Strabo the Perſian god *Amanas*, which is plainly a cognate of *Hamab* the "ſun or fire." Hence we believe comes *Hamarim*, the "hearths or chapels" where the fire ſacred to the ſun was kept burning; which, we believe, the Greeks called Πυραθεια or "fire-temples." Herodotus * mentions a cuſtom among the Perſians, according to which, when they came to engage an enemy, they caſt a rope with a kind of gin at the end of it on their enemy, and by thoſe means endeavoured to entangle and draw him into their power. The people of Perſia who employed this net or gin were called *Sagartes*, from *ſarags*, *ſharag*, or *ſerig*, a word which in Hebrew, Arabic, and Chaldaic, ſignifies to "hamper or entangle:" hence perhaps the Greek word Σαργανη, a "baſket or net." *Sar* or *zar* in Hebrew, Phœnician, Syriac, &c. ſignifies "a lord, a prince," and hence we have the initial ſyllable of the far-famed *zar-tuſht*, *Zoroaſtres*. In a word, moſt of the Perſian names that occur in the Grecian hiſtories, notwithſtanding the ſcandalous manner in which they have been diſguiſed and metamorphoſed by the Greeks, may ſtill with a little ſkill and induſtry be traced back to a Hebrew, Chaldaic, Syriac, or Phœnician origin. In the books of Daniel, Ezra, Nehemiah, and Eſther, we find a number of Perſian names which are all of a Hebrew or Chaldaic complexion; to inveſtigate theſe at much greater length would be foreign to the deſign of the preſent article. If our curious reader ſhould incline to be more fully ſatisfied as to this point, he may conſult Bochart's *Chanaan*, D'Herbelot's *Bib. Orient.* Walton's *Proleg.* &c.

It now appears, we hope to the entire ſatisfaction of our readers, that the Pahlavi is a remnant of the old Perſian, and that the latter is a cognate branch of the Hebrew, Chaldaic, Syriac, &c. We have likewiſe adduced ſome preſumptive proofs that the Zend was copied from the ſacred language of the Egyptians: we ſhall now endeavour to explain by what changes and revolutions the language firſt mentioned arrived at its preſent ſummit of beauty and perfection.

85
Progreſs of the Perſian language.

We have obſerved above, that the Sythians, whom the old Perſians called Σακαι *Sacæ*, and whom the modern call *Turan*, often invaded and over-ran Perſia at a very early period. The conſequence was, an infuſion of Scythian or Tartarian terms, with which that language was early impregnated. This in all probability occaſioned the firſt deviation from the original ſtandard. The conqueſts of Alexander, and the dominion of his ſucceſſors, muſt, one would imagine, introduce an inundation of Greek words. That event, however, ſeems to have affected the language in no conſiderable degree, at leaſt very few Grecian terms occur in the modern Perſian.

The empire of the *Arſacidæ* or Parthians, we apprehend, produced a very important alteration upon the ancient Perſian. They were a demi-Scythian tribe; and as they conquered the Perſians, retained the dominion of thoſe parts for ſeveral centuries, and actually incorporated with the natives, their language muſt neceſſarily have given a deep tincture to the original dialect of the Perſians. Sir William Jones has obſerved that the letters of the inſcriptions at *Iſtakhr* or Perſepolis bear ſome reſemblance to the old Runic letters of the Scandinavians. Thoſe inſcriptions we take to have been Parthian; and we hope, as the Parthians were a Tartarian clan, this conjecture may be admitted till another more plauſible is diſcovered. The Perſians, it is true, did once more recover the empire; and under them began the reign of the Deri and Parſi tongues; the former conſiſting of the old Perſian and Parthian highly poliſhed; the latter of the ſame languages in their uncultivated vernacular dreſs. In this ſituation the Perſian language remained till the invaſion of the Saracens in 636; when theſe barbarians overran and ſettled in that fine country; demoliſhed every monument of antiquity, records, temples, palaces; every remain of ancient ſuperſtition; maſſacred or expelled the miniſters of the Magian idolatry; and introduced a language, though not entirely new, yet widely differing from the old exemplar.

But before we proceed to give ſome brief account of the modern Perſian, we muſt take the liberty to hazard one conjecture, which perhaps our adepts in modern Perſian may not find themſelves diſpoſed to admit. In modern Perſian we find the ancient Perſian names wonderfully diſtorted and deflected from that form under which they appear in the Scripture, in Cteſias, Megaſthenes, and the other Greek authors. From this it has been inferred that not only the Greeks, but even the ſacred hiſtorians of the Jews, have changed and metamorpoſed them moſt unmercifully, in order to accommodate them to the ſtandard of their own language. As to the Greeks, we know it was their conſtant practice, but we cannot believe ſo much of the Hebrews. We make no doubt of their writing and pronouncing the names of the Perſian monarchs and governors of that nation nearly in the ſame manner with the native Perſians. It is manifeſt, beyond all poſſibility of contradiction, that they neither altered the Tyrian and Phœnician names of perſons and places when they had occaſion to mention them, nor thoſe of the Egyptians when they occurred in their writings. The Babylonian and Chaldaic names which are mentioned in the Old Teſtament vary nothing from the Chaldean original. No reaſon can be aſſigned why they ſhould have transformed the Perſian names more than the others. On the contrary, in Ezra, Nehemiah, and Eſther, we find the Perſian names faithfully preſerved throughout.

86
Nothing now exiſting in Perſic, except the Zend, older than the Saracen conqueſt.

The fact, we imagine, is this: Our modern admirers of the Perſic have borrowed their names of the ancient kings and heroes of that country from romances and fabulous legends of more modern date and compoſition. The archives of Perſia were deſtroyed by the Saracens: nothing of importance was written in that country till two centuries after the era of Mohammed. What ſucceeded was all fiction and romance.

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* Lib. 9. cap. 85.

The authors of theſe entertaining compoſitions either forged names of heroes to anſwer their purpoſe, or laid hold on ſuch as were celebrated in the ballads of their country, or preſerved by vulgar tradition. The names were no doubt very different from thoſe of the ancient kings and heroes of Perſia; and probably many of them had undergone conſiderable changes during the continuance of the Parthian empire. Upon this foundation has the learned Mr Richardſon erected a very irregular fabric, new, and, to uſe his own expreſſion, we think built upon *pillars of ice*. He has taken much pains to invalidate the credit of the Grecian hiſtories of the Perſian empire, by drawing up in battle array againſt their records legions of romantic writers, who were not born till near a thouſand years after the events had taken place; and to complete the probability, who lived 200 years after all the chronicles of the Medes and Perſians had been finally deſtroyed by the fury of the Saracens.

After the deciſive victory obtained over the Perſians at Kodeſſa, their ancient government was overturned, their religion proſcribed, their laws trampled under foot, and their civil tranſactions diſturbed by the forcible introduction of the lunar for the ſolar kalendar; while, at the ſame time, their language became almoſt overwhelmed by an inundation of Arabic words; which from that period, religion, authority, and faſhion, incorporated with their idiom.

87 The moſt flouriſhing period of Perſian literature.

From the ſeventh till the tenth century the Perſian tongue, now impregnated with Arabic words, appears to have laboured under much diſcouragement and neglect. Bagdad, built by Almanſor, became ſoon after the year 762 the chief reſidence of the khalifs, and the general reſort of the learned and the ambitious from every quarter of the empire. At length the acceſſion of the Buyah princes to the Perſian throne marked in the tenth century the great epoch of the revival of Perſian learning. About the year 977 the throne of Perſia was filled by the great Azaduddawla; who firſt aſſumed the title of *Sultan*, afterwards generally adopted by eaſtern princes. He was born in Iſpahan, and had a ſtrong attachment to his native kingdom. His court, whether at Bagdad or in the capital of Perſia, was the ſtandard of taſte and the favourite reſidence of genius. The native dialect of the prince was particularly diſtinguiſhed, and became ſoon the general language of compoſition in almoſt every branch of polite learning. From the end of the tenth till the fifteenth century may be conſidered as the moſt flouriſhing period of Perſian literature. The epic poet Firdauſi, in his romantic hiſtory of the Perſian kings and heroes, diſplays an imagination and ſmoothneſs of numbers hardly inferior to Homer. The whole fanciful range of Perſian enchantment he has interwoven in his poems, which abound with the nobleſt efforts of genius. This bard has ſtamped a dignity on the monſters and fictions of the eaſt, equal to that which the prince of epic poetry has given to the mythology of ancient Greece. His language may at the ſame time be conſidered as the moſt refined dialect of the ancient Perſian, the Arabic being introduced with a very ſparing hand; whilſt Sadi, Jami, Hafez, and other ſucceeding writers, in proſe as well as verſe, have blended in their works the Arabic without reſerve; gaining perhaps in the nervous luxuriance of the one language what may ſeem to have been loſt in the ſofter delicacy of the other. Hence Ebn Fekreddin Anju, in the preface to the Dictionary called *Farhang Jenanguiri*, ſays, that the Deri and the Arabic idioms were the languages of heaven; God communicating to the angels his milder mandates in the delicate accents of the firſt, whilſt his ſtern commands were delivered in the rapid accents of the laſt.

For near 300 years the literary fire of the Perſians ſeems indeed to have been almoſt extinguiſhed; ſince, during that time, hardly any thing of that people which deſerves attention has appeared in Europe: enough, however, has already been produced, to inſpire us with a very high opinion of the genius of the eaſt. In taſte, the orientals are undoubtedly inferior to the beſt writers of modern Europe; but in invention and ſublimity they are excelled, perhaps equalled, by none. The Perſians affect a rhetorical luxuriance, which to a European wears the air of unneceſſary redundance. If to theſe leading diſtinctions we add a peculiar tone of imagery, of metaphor, of illuſion, derived from the difference of government, of manners, of temperament, and of ſuch natural objects as characteriſe Aſia from Europe; we ſhall ſee at one view, the great points of variation between the writers of the eaſt and weſt. Amongſt the oriental hiſtorians, philoſophers, rhetoricians, and poets, many will be found who would do honour to any age or people; whilſt their romances, their tales, and their fables, ſtand upon a ground which Europeans have not yet found powers to reach. We might here quote the Arabian Nights Entertainments, Perſian Tales, Pilpay's Fables, &c.

88 The genius of the modern Perſic.

We ſhall now annex a few ſtrictures on the genius of that noble language; though it is our opinion that the province of the philologiſt is to inveſtigate the origin, progreſs, and final improvement of a language, without deſcending to its grammatical minutiæ or peculiar idiomatic diſtinctions. We have already obſerved, that the tongue under conſideration is partly Arabic and partly Perſian, though the latter generally has the aſcendant. The former is nervous, impetuous, and maſculine; the latter is flowing, ſoft, and luxuriant. Wherever the Arabic letters do not readily incorporate with the Perſian, they are either changed into others or thrown away. Their letters are the Arabic with little variation; theſe being found more commodious and expeditious than the old letters of the Deri and Parſi. Their alphabet conſiſts of 32 letters, which like the Arabic, are read from right to left; their form and order will be learned from any grammar of that language. The letters are divided into vowels and conſonants as uſual. The Arabic characters, like thoſe of the Europeans, are written in a variety of different hands; but the Perſians write their poetical works in the Talick, which anſwers to the moſt elegant of our Italic hands.

89 Reſemblance between Perſian and Engliſh.

There is a great reſemblance betwen the Perſian and Engliſh languages in the facility and ſimplicity of their form and conſtruction: the former, as well as latter, has no difference of terminations to mark the gender either in ſubſtantives or adjectives; all inanimate things are neuter; and animals of different ſexes have either different names, or are diſtinguiſhed by the words *ner* male, and *made* female. Sometimes indeed.

deed a word is made feminine, after the manner of the Arabians, by having *s* added to it.

The Perſian ſubſtantives have but one variation of caſe which is formed by adding a ſyllable to the nominative in both numbers: and anſwers often to the dative, but generally to the accuſative, caſe in other languages. The other caſes are expreſſed for the moſt part by particles placed before the nominative. The Perſians have two numbers, ſingular and plural: the latter is formed by adding a ſyllable to the former.

The Perſian adjectives admit of no variation but in the degrees of compariſon. The comparative is formed by adding *ter*, and the ſuperlative by adding *terin* to the poſitive.

The Perſians have active and neuter verbs like other nations; but many of their verbs have both an active and neuter ſenſe, which can be determined only by the conſtruction. Thoſe verbs have properly but one conjugation, and but three changes of tenſe: the imperative, the aoriſt, and the preterite; all the other tenſes being formed by the help of particles or auxilliary verbs. The paſſive voice is formed by adding the tenſes of the ſubſtantive verb to the participle of the active.

In the ancient language of Perſia there were very few or no irregularities; the imperative, which is often irregular in the modern Perſian was anciently formed from the infinitive, by rejecting the termination *eeden*; for originally all infinitives ended in *den*, till the Arabs introduced their harſh conſonants before that ſyllable, which obliged the Perſians, who always affected a ſweetneſs of pronunciation, to change the old termination of ſome verbs into *ten*, and by degrees the original infinitive grew quite obſolete: yet they ſtill retain the ancient imperative, and the aoriſts which are formed from it. This little irregularity is the only anomalous part of the Perſian language; which nevertheleſs far ſurpaſſes in ſimplicity all other languages ancient or modern.

With reſpect to the more minute and intricate parts of this language, as well as its derivations, compoſitions, conſtructions, &c. we muſt remit our readers to Mininſkie's *Inſtitutiones Linguæ Turicæ cum rudimentis parallelis linguarum Arab. et Perſ.* Sir William Jones's Perſian Grammar; Mr Richardſon's Arabian and Perſian Dictionary; D. Herbelot's *Bibl. Orient.* Dr Hyde *de Relig. vet. Perſ.* &c. Our readers, who would penetrate into the innermoſt receſſes of the Perſian hiſtory, colonies, antiquities, connections, dialects, may conſult the laſt mentioned author, eſpecially chap. xxxv. *De Perſia et Perſarum nominibus, et de Moderna atque veteri lingua Perſica ejuſque dialectis.* In the preceding inquiry we have followed other authors, whoſe accounts appeared to us more natural, and much leſs embarraſſing.

90 Utility of the Arabian and Perſian languages.

To conclude this ſection, which might eaſily have been extended into a large volume, we ſhall only take the liberty to put our readers in mind of the vaſt utility of the Arabian and Perſian languages. Numberleſs events are preſerved in the writings of the orientals which were never heard of in Europe, and muſt have for ever lain concealed from the knowledge of its inhabitants, had not theſe two tongues been ſtudied and underſtood by the natives of this quarter of the globe. Many of thoſe events have been tranſmitted to poſterity in poems and legendary tales like the Runic fragments of the north, the romances of Spain, or the Heroic ballads of Great Britain. Such materials as theſe, we imagine, may have ſuggeſted to Firdanſi, the celebrated heroic poet of Perſia, many of the adventures of his *Shabnamé*: which, like Homer when ſtript of the machinary of ſupernatural beings, is ſuppoſed to contain much true hiſtory, and a moſt undoubted picture of the ſuperſtition and manners of the times. The knowledge of theſe two languages has laid open to Europe all the treaſures of oriental learning, and has enriched the mind of Britons with Indian ſcience as much as the produce of theſe regions has increaſed their wealth and enervated their conſtitution.

91 Perſian poetry.

Before we conclude this ſection, we ſhall ſubjoin a few ſtrictures on the nature of Perſian poetry, in order to render our inquiry the more complete. The modern Perſians borrowed their poetical meaſures from the Arabs: they are exceedingly various and complicated; they conſiſt of 19 different kinds; but the moſt common of them are the *Iambic* or *Trochaic* meaſure, and a metre that chiefly conſiſts of thoſe compounded feet which the ancients called επιτριτους, which are compoſed of iambic and ſpondees alternately. In lyric poetry their verſes generally conſiſt of 12 or 16 ſyllables; they ſometimes, but ſeldom, conſiſt of 14 Some of their lyric verſes contain 13 ſyllables: but the moſt common Perſian verſe is made up of 11; and in this meaſure are written all their great poems, whether upon heroic or moral ſubjects, as the works of Firdauſi and Jami, the Boſtar of Sadi, and the Meſnavi of Gelaleddin. This ſort of verſe anſwers to our common heroic rhyme, which was brought to ſo high a degree of perfection by Pope. The ſtudy of the Perſian poetry is ſo much the more neceſſary, as there are few books or even letters written in that language, which are not interſperſed with fragments of poetry. As to their proſody, nothing can be more eaſy and ſimple. When the ſtudent can read proſe eaſily, he will with a little attention read poetry with equal facility.

SECT. V. *Shanſcrit and Bengaleſe Languages.*

92 The Shanſcrit one of the moſt ancient languages in the world.

THE Shanſcrit, though one of the moſt ancient languages in the world, was little known even in Aſia till about the middle of the preſent century. Since that period, by the indefatigable induſtry of the very learned and ingenious Sir William Jones and the other worthy members of that ſociety of which he has the honour to be preſident, that noble and ancient language has at length been brought to light; and from it vaſt treaſures of oriental knowledge will be communicated both to Europe and Aſia; knowledge which, without the exertions of that eſtabliſhment, muſt have lain concealed from the reſearches of mankind to the end of the world. In this ſection we propoſe to give to our readers ſuch an account of that language as the limits of the preſent article, and the helps we have been able to procure, ſhall permit.

The Shanſcrit language has for many centuries lain concealed in the hands of the bramins of Hindoſtan. It is by them deemed ſacred, and is of conſequence confined ſolely to the offices of religion. Its name imports

Shanſcrit and Bengaleſe Languages.

imports the *perfect language*, or, according to the eaſtern ſtyle, *the language of perfection*; and we believe no language ever ſpoken by man is more juſtly intitled to that high epithet.

The grand ſource of Indian literature, and the parent of almoſt every dialect from the Perſian gulph to the China ſeas, is the Shanſcrit; a language of the moſt venerable and moſt remote antiquity, which, tho' at preſent ſhut up in the libraries of the bramins, and appropriated ſolely to the records of their religion, appears to have been current over moſt of the oriental world. Accordingly traces of its original extent may be diſcovered in almoſt every diſtrict of Aſia. Thoſe who are acquainted with that language have often found the ſimilitude of Shanſcrit words to thoſe of Perſian and Arabic, and even of Latin and Greek; and that not in technical and metaphorical terms, which refined arts and improved manners might have occaſionally introduced, but in the main ground-work of language, in monoſyllables, the names of numbers, and appellations of ſuch things as would be firſt diſcriminated on the immediate dawn of civilization.

93 Traces of Shanſcrit in every diſtrict of Aſia and elſewhere.

The ancient coins of many different and diſtant kingdoms of Aſia are ſtamped with Shanſcrit characters, and moſtly contain alluſions to the old Shanſcrit mythology. Beſides, in the names of perſons and places, of titles and dignities, which are open to general notice, even to the fartheſt limits of Aſia, may be found manifeſt traces of the Shanſcrit. The ſcanty remains of coptic antiquities afford little ſcope for compariſon between that idiom and this primitive tongue; but there ſtill exiſts ſufficient ground to conjecture, that, at a very early period, a correſpondence did ſubſiſt between theſe two nations. The Hindoos pretend, that the Egyptians frequented their country as diſciples, not as inſtructors; that they came to ſeek that liberal education and thoſe ſciences in Hindoſtan, which none of their own countrymen had ſufficient knowledge to impart. Perhaps we may examine the validity of this claim hereafter.

But though numberleſs changes and revolutions have from time to time convulſed Hindoſtan, that part of it which lies between the Indus and the Ganges ſtill preſerves that language whole and inviolate. Here they ſtill offer a thouſand books to the peruſal of the curious; many of which have been religiouſly handed down from the earlieſt periods of human exiſtence.

94 Number of books in that language.

The fundamental part of the Shanſcrit language is divided into three claſſes: *Dhaat*, or roots of verbs, which ſome call primitive elements; *Shubd*, or original nouns; and *Evya*, or particles. The latter are ever indeclinable, as in other languages; but the words comprehended in the two former claſſes muſt be prepared by certain additions and inflexions to fit them for a place in compoſition. And here it is that the art of the grammarian has found room to expand itſelf, and to employ all the powers of refinement. Not a ſyllable, not a letter, can be added or altered but by regimen; not the moſt trifling variation of the ſenſe, in the minuteſt ſubdiviſion of declenſion or conjugation, can be effected without the application of ſeveral rules: all the different forms for every change of gender, number, caſe, perſon, tenſe, mood, or degree, are methodically arranged for the aſſiſtance of the memory, according to an unerring ſcale. The number of the radical or elementary parts is about 700; and to theſe, as to the verbs of other languages, a very plentiful ſtock of verbal nouns owes its origin; but theſe are not thought to exceed thoſe of the Greek either in quantity or variety.

95 Characteriſtics of it.

To the triple ſource of words mentioned above, every term of truly Indian original may be traced by a laborious and critical analyſis. All ſuch terms as are thoroughly proved to bear no relation to any one of the Shanſcrit roots, are conſidered as the production of ſome remote and foreign idiom, ſubſequently ingrafted upon the main ſtock; and it is conjectured, that a judicious inveſtigation of this principle would throw a new light upon the firſt invention of many arts and ſciences, and open a freſh mine of philological diſcoveries. We ſhall now proceed to give as exact an account of the conſtituent parts of this language as the nature of our deſign will permit.

96 It is copious and nervous.

The Shanſcrit language is very copious and nervous. The firſt of theſe qualities ariſes in a great meaſure from the vaſt number of compound words with which it is almoſt overſtocked. "The Shanſcrit (ſays Sir William Jones), like the Greek, Perſian, and German, delights in compounds; but to a much higher degree, and indeed to ſuch exceſs, that I could produce words of more than 20 ſyllables; not formed ludicrouſly like that by which the buffoon in Ariſtophanes deſcribes a feaſt, but with perfect ſeriouſneſs, on the moſt ſolemn occaſions, and in the moſt elegant works." But the ſtyle of its beſt authors is wonderfully conciſe. In the regularity of its etymology it far exceeds the Greek and Arabic; and, like them, has a prodigious number of derivatives from each primary root. The grammatical rules alſo are numerous and difficult, though there are not many anomalies. As one inſtance of the truth of this aſſertion, it may be obſerved, that there are ſeven declenſions of nouns, all uſed in the ſingular, the dual, and the plural numbers, and all of them differently formed, according as they terminate with a conſonant, with a long or a ſhort vowel; and again, different alſo as they are of different genders: not a nominative caſe can be formed to any one of theſe nouns without the application of at leaſt four rules, which vary likewiſe with each particular difference of the nouns, as above ſtated: add to this, that every word in the language may be uſed through all the ſeven declenſions, which is a full proof of the difficulty of the idiom.

The Shanſcrit grammars are called *Beeākĕrun*, of which there are many compoſed by different authors; ſome too abſtruſe even for the comprehenſion of moſt bramins, and others too polix to be ever uſed but as references. One of the ſhorteſt, named the *Sărăſootee*, contains between two and three hundred pages, and was compiled by Anoŏbhōōtēē Seroopĕnām Āchārige, with a conciſeneſs that can ſcarcely be paralleled in any other language.

The Shanſcrit alphabet contains 50 letters; and it is one boaſt of the bramins, that it exceeds all other alphabets in this reſpect: but it muſt be obſerved, that as of their 34 conſonants, near half carry combined ſounds, and that ſix of their vowels are merely the correſpondent long ones to as many which are ſhort, the advan-

97 Shanſcrit alphabet.

tage ſeems to be little more than fanciful. Beſides theſe, they have a number of characters which Mr Halhed calls connected vowels, but which have not been explained by the learned preſident of the Aſiatic Society.

* Plate CCCXC.

The Shanſcrit character uſed in Upper Hindoſtan * is ſaid to be the ſame original letter that was firſt delivered to the people by Brahma, and is now called *Diewnāgur*, or the language of angels, which ſhows the high opinion that the bramins have entertained of that character. Their conſonants and vowels are wonderfully, perhaps whimſically, modified and diverſified; to enumerate which, in this place, would contribute very little either to the entertainment or inſtruction of our readers. All theſe diſtinctions are marked in the *Beids* (L), and muſt be modulated accordingly; ſo that they produce all the effect of a laboured recitative: but by an attention to the muſic of the chant, the ſenſe of the paſſage recited equally eſcapes the reader and the audience. It is remarkable, that the Jews in their ſynagogues chant the Pentateuch in the ſame kind of melody; and it is ſuppoſed that this uſage has deſcended to them from the remoteſt ages.

98 Poetry.

The Shanſcrit poetry comprehends a very great variety of different metres, of which the moſt common are theſe:

The *munnee hurreneh chhund*, or line of 12 or 19 ſyllables, which is ſcanned by three ſyllables in a foot, and the moſt approved foot is the anapæſt.

The *cābee chhund*, or line of 11 ſyllables.

The *anŭſhtoſe chhund*, or line of eight ſyllables.

The poems are generally compoſed in ſtanzas of four lines, called *aſhlogues*, which are regular or irregular.

The moſt common aſhlogue is that of the *anŭſhtoſe chhund*, or regular ſtanza of eight ſyllables in each line. In this meaſure the greateſt part of the *Mŭhābārĕt* is compoſed. The rhyme in this kind of ſtanza ſhould be alternate; but the poets do not ſeem to be very nice in the obſervance of a ſtrict correſpondence in the ſounds of the terminating ſyllables, provided the feet of the verſe are accurately kept.

This ſhort *anŭſhtoſe aſhlogue* is generally written by two verſes in one line, with a pauſe between; ſo the whole then aſſumes the form of a long diſtich.

The irregular ſtanza is conſtantly called *anyăchhund*, of whatever kind of irregularity it may happen to conſiſt. It is moſt commonly compounded of the long line *cābee chhund* and the ſhort *anŭſhtoſe chhund* alternately; in which form it bears ſome reſemblance to the moſt common lyric meaſure of the Engliſh.

To purſue this ſubject to greater length is ſcarce poſſible for us, as matters ſtand at preſent. Our readers muſt ſuſpend their curioſity till more volumes of the *Aſiatic Reſearches* are publiſhed, where we make no doubt the whole myſtery of this extraordinary language will be plainly unfolded.

Perhaps our readers may feel a curioſity to be informed of the origin of this oriental tongue. If we believe the bramins themſelves, it was coeval with the race of man, as was obſerved towards the beginning of this ſection. The bramins, however, are not the only people who aſcribe a kind of eternity to their own particular dialect. We find that the Shanſcrit in its primitive deſtination was appropriated to the offices of religion. It is indeed pretended, that all the other dialects ſpoken in Hindoſtan were emanations from that fountain, to which they might be traced back by a ſkilful etymologiſt. This, we think, is an argument of no great conſequence, ſince we believe that all the languages of Europe, by the ſame proceſs, may be deduced from any one of thoſe current in that quarter of the globe. By a parity of reaſon, all the different dialects of Hindoſtan may be referred to the language in queſtion. Indeed, if we admit the authority of the Moſaic hiſtory, all languages whatſoever are derived from that of the firſt man. It is allowed that the language under conſideration is impregnated with Perſian, Chaldaic, Phœnician, Greek, and even Latin idioms. This, we think, affords a preſumption that the Shanſcrit was one of thoſe original dialects which were gradually produced among the deſcendants of Noah, in proportion as they gradually receded from the centre of population. What branch or branches of that family emigrated to Hindoſtan, it is not eaſy to determine. That they were a party of the deſcendants of Shem is moſt probable, becauſe the other ſepts of his poſterity ſettled in that neighbourhood. The ſum then is, that the Hindoos were a colony conſiſting of the deſcendants of the patriarch Shem.

99 Origin of this tongue.

It appears, however, by almoſt numberleſs monuments of antiquity ſtill exiſting, that at a very early period a different race of men had obtained ſettlements in that country. It is now generally admitted, that colonies of Egyptians had peopled a conſiderable part of Hindoſtan. Numberleſs traces of their religion occur everywhere in thoſe regions. The very learned preſident himſelf is poſitive, that veſtiges of thoſe ſacerdotal wanderers are found in India, China, Japan, Tibet, and many parts of Tartary. Thoſe coloniſts, it is well known, were zealous in propagating their religious ceremonies wherever they reſided, and whereever they travelled. There is at the ſame time even at this day a ſtriking reſemblance between the ſacred rites of the vulgar Hindoos and thoſe of the ancient Egyptians. The prodigious ſtatues of Salſette and Elephanta fabricated in the Egyptian ſtyle; the vaſt excavations hewn out of the rock in the former; the wooly hair of the ſtatues, their diſtorted attitudes, their groteſque appearances, their triple heads, and various other configurations—plainly indicate a foreign original. Theſe phenomena ſuit no other people on earth ſo exactly as the ſons of Mizraim. The Egyptian prieſts uſed a ſacred character, which none knew but themſelves; none were allowed to learn except their children and the choice of the initiated. All theſe features mark an exact parallel with the bramins of the Hindoos. Add to this, that the dreſs, diet, luſtrations, and other rites of both ſects, bore an exact reſemblance to each other. Sir William Jones hath juſtly obſerved, that the letters of the Shanſcrit, ſtript of all adventitious appendages, are really the ſquare Chaldaic cha-

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(L) The books which contain the religion of the bramins.

characters. We learn from Caſſiodorus* the following particulars: "The height of the obeliſks is equal to that of the circus; now the higher is dedicated to the ſun, and the lower to the moon, where the ſacred rites of the ancients are intimated by Chaldaic ſignatures by way of letters." Here then it is plain that the ſacred letters of the Egyptians were Chaldaic, and it is allowed that thoſe of the bramins were of the ſame complexion; which affords a new preſumption of the identity of the Shanſcrit with thoſe juſt mentioned.

That the Egyptians had at a very early period penetrated into Hindoſtan, is univerſally admitted. Oſiris, their celebrated monarch and deity, according to their mythology, conducted an army into that country; taught the natives agriculture, laws, religion, and the culture of the vine, &c. He is ſaid at the ſame time to have left colonies of prieſts, as a kind of miſſionaries, to inſtruct the people in the ceremonies of religion. Seſoſtris, another Egyptian potentate, likewiſe over-ran Hindoſtan with an army, and taught the natives many uſeful arts and ſciences. When the paſtor-kings invaded and conquered Egypt, it is probable that numbers of the prieſts, in order to avoid the fury of the mercileſs invaders who demoliſhed the temples and perſecuted the miniſters of religion, left their native country, and tranſported themſelves into India. Theſe, we ſhould think, were the authors both of the language and religion of the bramins. This dialect, as imported by the Egyptians, was probably of the ſame contexture with the ſacred language of that people, as it appeared many ages after. The Indians, who have always been an inventive and induſtrious race of men, in proceſs of time cultivated, improved, diverſified, and conſtructed that language with ſuch care and aſſiduity, that it gradually arrived at that high degree of perfection in which at preſent it appears.

Had the learned preſident of the Aſiatic Society (m) when he inſtituted a compariſon between the deities of Hindoſtan on the one ſide and of Greece and Italy on the other, examined the analogy between the gods of Hindoſtan and thoſe of Egypt, we think he would have performed a piece of ſervice ſtill more eminent. Having firſt demonſtrated the ſimilarity between the divinities of India and Egypt, he might then have proceeded to inveſtigate the reſemblance of the Egyptian and Phœnician with thoſe of Greece and Rome. By this proceſs a chain would have been formed which would have conducted his reader to comprehend at one view the identity of the Zabian worſhip almoſt throughout the world.

We foreſee that it will be objected to this hypotheſis, that all the dialects of Hindoſtan being clearly reducible to the Shanſcrit, it is altogether impoſſible that it could have been a foreign language. To this we anſwer, that at the early period when this event is ſuppoſed to have taken place, the language of the poſterity of the ſons of Noah had not deviated conſiderably from the primitive ſtandard, and conſequently the language of the Egyptians and the Hindoos was nearly the ſame. The Shanſcrit was gradually improved: the language of the vulgar, as is always the caſe, became more and more different from the original archetype; but ſtill retained ſuch a near reſemblance to the mother-tongue as proved the verity of its extraction.

100 Bengaleſe language derived from the Shanſcrit.

To the preceeding account of the Shanſcrit language we ſhall annex a few ſtrictures on the language of Bengal, which we believe is derived from the other, and is in moſt common uſe in the ſouthern parts of Hindoſtan.

Though moſt of the ancient oriental tongues are read from right to left, like the Hebrew, Chaldaic, Arabic, &c. yet ſuch as properly belong to the whole continent of India proceed from left to right like thoſe of Europe. The Arabic, Perſian, &c. are the grand ſources whence the former method has been derived; but with theſe, the numerous original dialects of Hindoſtan have not the ſmalleſt connection or reſemblance.

The great number of letters, the complex mode of combination, and the difficulty of pronunciation, are conſiderable impediments to the ſtudy of the Bengal language; and the careleſſneſs and ignorance of the people, and the inaccuracy of their characters, aggravate theſe inconveniencies. Many of their characters are ſpurious; and theſe, by long uſe and the hurry of buſineſs, are now almoſt naturalized into the language.

101 Bengal alphabet.

The Bengal alphabet, like that of the Shanſcrit, from which it is derived, conſiſts of 50 letters, whoſe form, order, and ſound, may be learned from Mr Halhed's grammar of the Bengal language. The vowels are divided into long and ſhort, the latter of which are often omitted in writing. Moſt of the oriental languages are conſtructed upon the ſame principle, with reſpect to the omiſſion of the ſhort vowels. The Hebrews had no ſign to expreſs it before the invention of the Maſoretic points; in Arabic it is rarely inſerted unleſs upon very ſolemn occaſions, as in the Koran; in the modern Perſian it is univerſally omitted: ſo to all the conſonants in the Shanſcrit, the ſhort vowel is an invariable appendage, and is never ſignified by any diacritical mark; but where the conſtruction requires that the vowel ſhould be dropped, a particular ſtroke is ſet under the letter. It is in vain to pretend, in a ſketch like this, to detail the ſound and pronunciation of theſe letters· this muſt be acquired by the ear and by practice.

102 Genders, &c. of this language.

In the Bengal language there are three genders, as in Greek, Arabic, &c. The authors of this threefold diviſion of genders, with reſpect to their precedence, appear to have conſidered the neuter as a kind of reſiduum reſulting from the two others, and as leſs worthy or leſs comprehenſive than either (ſee Section of the *Greek*). The terminations uſually applied upon this occaſion are *aa* for the maſculine, and *ee* for the feminine. In Shanſcrit as in Greek and Latin, the names of all things inanimate have different genders, founded on vague and incomprehenſible diſtinctions: the ſame is the caſe with the Bengal.

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* Lib. iii. epiſt. 2. et. 51.

(m) See that gentleman's diſcourſe, *Reſearches*, Vol. I.

103 Peculiarities of Shanſcrit and Bengaleſe nouns.

A Shanſcrit noun, on its firſt formation from the general root, exiſts equally independent of caſe as of gender. It is neither nominative, nor genitive, nor accuſative; nor is impreſſed with any of thoſe modifications which mark the relation and connection between the ſeveral members of a ſentence. In this ſtate it is called an *imperfect* or *crude* noun. To make a nominative of a word, the termination muſt be changed and a new form ſupplied. Thus we ſee, that in the Shanſcrit, at leaſt the nominative has an equal right with any other inflexion to be called a caſe. Every Shanſcrit noun has ſeven caſes, excluſive of the vocative; and therefore comprehends two more than even thoſe of the Latin. Mr Halhed above mentioned details all the varieties of thoſe with great accuracy, to whoſe Grammar we muſt refer our readers. The Bengal has only four caſes beſides the vocative: in which reſpect it is much inferior to the other.

It would be difficult to account for the variety of words which have been allotted to the claſs of pronouns by European grammarians. The firſt and ſecond perſon are chiefly worthy of obſervation: theſe two ſhould ſeem to be confined to rational and converſable beings only: the third ſupplies the place of every object in nature; wherefore it muſt neceſſarily be endued with a capacity of ſhifting its gender reſpectively as it ſhifts the ſubject; and hence it is in Shanſcrit frequently denominated an adjective. One of the demonſtratives *hic* or *ille* uſually ſerves for this purpoſe; and generally the latter, which in Arabic has no other name than *dhemeer le ghaayb*, "the pronoun of the abſentee," for whoſe name it is a ſubſtitute.

104 Bengaleſe pronouns.

In moſt languages where the verb has a ſeparate inflection for each perſon, that inflection is ſufficient to aſcertain the perſonality; but in Bengal compoſitions, though the firſt and ſecond perſons occur very frequently, nothing is more rare than the uſage of the pronoun of the third; and names of perſons are inſerted with a conſtant and diſguſting repetition, to avoid, as it ſhould ſeem, the application of the words HE and SHE. The ſecond perſon is always ranked before the firſt, and the third before the ſecond. The perſonal pronouns have ſeven caſes, which are varied in a very irregular manner. Leaving theſe to the Bengalian grammar, we ſhall proceed to the *verb*.

The Shanſcrit, the Arabic, the Greek and Latin verbs, are furniſhed with a ſet of inflections and terminations ſo comprehenſive and ſo complete, that by their form alone they can expreſs all the different diſtinctions both of perſons and time. There ſeparate qualities in them are perfectedly blended and united. Thus by their root they denote a particular act, and by their inflexion both point out the time when it takes place and the number of the agents. In Perſian, as in Engliſh, the verb admits but of two forms, one for the preſent tenſe and one for the aoriſt; and it is obſervable, that while the paſt tenſe is provided for by a peculiar inflexion, the future is generally ſupplied by an additional word conveying only the idea of time, without any other influence on the act implied by the principal verb. It is alſo frequently neceſſary that the different ſtate of the action, as perfect or imperfect, be further aſcertained in each of the tenſes, paſt, preſent, and future. This alſo, in the learned languages, is performed by other variations or inflections, for which other verbs and other particles are applied in the modern tongues of Europe and Perſia.

105 Middle voice of Shanſcrit verbs.

Every Shanſcrit verb has a form equivalent to the middle voice of the Greek, uſed through all the tenſes with a reflective ſenſe, and the former is even the moſt extenſive of the two in its uſe and office; for in Greek the reflective can only be adopted intranſitively when the action of the verb deſcends to no extraneous ſubject; but in Shanſcrit, the verb is both reciprocal and tranſitive at the ſame time.

Neither the Shanſcrit, nor the Bengaleſe, nor the Hindoſtanic, have any word preciſely anſwering to the ſenſe of the verb *I have*, and conſequently the idea is always expreſſed by *eſt mihi*; and of courſe there is no auxillary form in the Bengal verb correſpondent to *I have written*, but the ſenſe is conveyed by another mode. The verb ſubſtantive, in all languages, is defective and irregular, and therefore the Shanſcrit calls it a *ſemi-verb*. It is curious to obſerve that the preſent tenſe of this verb, both in Greek and Latin, and alſo in the Perſian, appears plainly to be derived from the Shanſcrit. In the Bengaleſe, this verb has but two diſtinctions of time, the preſent and the paſt; the terminations of the ſeveral perſons of which ſerve as a model for thoſe of the ſame tenſe in all other verbs reſpectively.

106 Characteriſtics of the Bengaleſe verbs.

Verbs of the Bengal language may be divided into three claſſes, which are diſtinguiſhed by their penultimate letter. The ſimple and moſt common form has an open conſonant immediately preceding the final letter of the infinitive. The ſecond is compoſed of thoſe words whoſe final letter is preceded by another vowel or open conſonant going before it. The third conſiſts entirely of cauſals derived from verbs of the firſt and ſecond conjugations. The reader will eaſily gueſs at the impoſſibility of proſecuting this ſubject to any greater length: we ſhall therefore conclude with a few remarks collected from the grammar ſo often mentioned, which we apprehend may be more amuſing, if not more inſtructing.

The Greek verbs in μι are formed exactly upon the ſame principle with the Shanſcrit conjugations, even in the minuteſt particulars. Inſtances of this are produced in many verbs, which from a root form a new verb by adding the ſyllable *mi*, and doubling the firſt conſonant. This mode furniſhes another preſumption of the Egyptian origin of the Shanſcrit. Many Greeks travelled into Egypt: many Egyptian colonies ſettled in Greece. By one or other of thoſe channels the foregoing innovation might have been introduced into the Greek language.

To form the paſt tenſe, the Shanſcrit applies a ſyllabic augment, as is done in the Greek: the future has for its characteriſtic a letter analogous to that of the ſame tenſe in the Greek, and it omits the reduplication of the firſt conſonant. It may be added, that the reduplication of the firſt conſonant is not conſtantly applied to the preſent tenſe of the Shanſcrit more than to thoſe of the Greek.

The natural ſimplicity and elegance of many of the Aſiatic languages are greatly debaſed and corrupted by the continual abuſe of auxiliary verbs; and this inconvenience has evidently affected the Perſian, the Hindoſtan, and the Bengal idioms.

Shanſcrit and Bengaleſe Language.

The infinitives of verbs in the Shanſcrit and Bengaleſe are always uſed as ſubſtantive nouns. Every body knows that the ſame mode of arrangement very often occurs in the Greek.

In the Shanſcrit language, as in the Greek, there are forms of infinitives and of particles comprehenſive of time; there are alſo other branches of the verb that ſeem to reſemble the gerunds and ſupines of the Latin.

All the terms which ſerve to qualify, to diſtinguiſh, or to augment, either *ſubſtance* or *action*, are claſſed by the Shanſcrit grammarians under one head; and the word uſed to expreſs it literally ſignifies *increaſe* or *addition*. According to their arrangement, a ſimple ſentence conſiſts of three members; the *agent*, the *action*, the *ſubject*: which, in a grammatical ſenſe, are reduced to two; the *noun* and the *verb*. They have a particular word to ſpecify ſuch words as amplify the noun which imports quality, and anſwers to our *adjectives* or *epithets*: Such as are applied to denote relation or connection, are intimated by another term which we may tranſlate *prepoſition*.

107 Shanſcrit and Bengaleſe adjectives.

The adjectives in Bengaleſe have no diſtinction of gender or number; but in Shanſcrit theſe words preſerve the diſtinction of gender, as in the Greek and Latin.

Prepoſitions are ſubſtitutes for caſes, which could not have been extended to the number neceſſary for expreſſing all the ſeveral relations and predicaments in which a noun may be found, without cauſing too much embarraſſment in the form of a declenſion. Thoſe are too few in the Greek language, which occaſions much inconvenience. See ſect. *Greek*.

The Latin is leſs poliſhed than the Greek, and of conſequence bears a much nearer reſemblance to the Shanſcrit, both in words, inflections, and terminations.

The learned are now convinced that the uſe of numerical figures was firſt derived from India. Indeed the antiquity of their application in that country far exceeds the powers of inveſtigation. All the numerals in Shanſcrit have different forms for the different genders, as in Arabic. There appears a ſtrong probability that the European method of computation was derived from India, as it is much the ſame with the Shanſcrit, though we think the Europeans learned it from the Arabians. The Bengaleſe merchants compute the largeſt ſums by *fours*; a cuſtom evidently derived from the original mode of computing by the fingers.

The Shanſcrit language, among other advantages, has a great variety in the mode of arrangement; and the words are ſo knit and compacted together, that every ſentence appears like one complete word. When two or more words come together *in regimine*, the laſt of them only has the termination of a caſe; the others are known by their poſition; and the whole ſentence ſo connected, forms but one compound word, which is called a *foot*.

Sect. VI. *Of the Chineſe Language*.

Chineſe Language.

108 Antiquity of the Chineſe.

The Chineſe, according to the moſt authentic accounts, are a people of great antiquity. Their ſituation was ſuch, as, in the earlieſt ages of the world, in a great meaſure ſecured them from hoſtile invaſion. Their little commerce with the reſt of mankind precluded them the knowledge of thoſe improvements which a mutual emulation had often generated among other nations, who were ſituated in ſuch a manner, with relation to each other, as ſerved to promote a mutual intercourſe and correſpondence. As China is a large and fertile country, producing all the neceſſaries, conveniencies, and even the luxuries of life, its inhabitants were not under the neceſſity of looking abroad for the two former, nor expoſed to the temptation of engaging in foreign commerce, in order to procure the latter. Perfectly ſatisfied with the articles which their own country produced, they applied themſelves entirely to the practice of agriculture and other arts connected with that profeſſion; and their frugality, which they retain even to this day, taught them the leſſon of being contented with little: of conſequence, though their population was almoſt incredible, the produce of their ſoil was abundantly ſufficient to yield them a ſubſiſtence. Their inventions were their own; and as they borrowed nothing from other people, they gradually began to deſpiſe the reſt of mankind, and, like the ancient Egyptians, branded them with the epithet of *barbarians*.

Thoſe people had at an early period made amazing proficiency in the mechanical arts. Their progreſs in the liberal ſciences, according to the lateſt and indeed the moſt probable accounts, was by no means proportioned. In mathematics, geometry, and aſtronomy, their knowledge was contemptible; and in ethics, or moral philoſophy, the complexion of their laws and cuſtoms proves their ſkill to have been truly ſuperficial. They value themſelves very highly at preſent upon their oratorial talents; and yet of all languages ſpoken by any civilized people, theirs is confeſſedly the leaſt improved. To what this untowardly defect is owing, the learned have not yet been able to determine.

109 Their language an original tongue.

The language of the Chineſe is totally different from thoſe of all other nations, and bears very ſtrong ſignatures of an original tongue. All its words are monoſyllabic, and compoſitions and derivations are altogether unknown. Their nouns and verbs admit of no flexions: in ſhort, every thing relating to their idioms is peculiar, and incapable of being compared with any other dialect ſpoken by any civilized people. Moſt barbarous languages exhibit ſomething that reſembles an attempt towards thoſe diacritical modifications of ſpeech; whereas the Chineſe, after a ſpace of 4000 years, have not advanced one ſtep beyond the very firſt elements of ideal communication. This circumſtance, we think, is a plain demonſtration that they did not emigrate from that region where the primitive race of mankind is thought to have fixed its reſidence. Some have imagined, we believe with good reaſon, that they are a *Tartarian* race, which, breaking off from the main body of that numerous and widely extended people, directed their march towards the ſouth-eaſt. There, falling in with delightful and fertile plains which their poſterity now inhabit, they found themſelves accommodated ſo much to their liking, that they dropped all deſire of changing their habitations. The country of China is, indeed, ſo environed with mountains, deſerts, and ſeas, that it would have been difficult for men in their primitive ſtate to have emigrated into any of the neighbouring regions. Thus ſecluded from the reſt of mankind, the Chineſe, in all probability, were left to the ſtrength of their own inventive powers to fabricate a language, as well as the other arts and improvements neceſſary for the ſupport and convenience of life.

It is indeed obvious that their ſtock of vocables, when they emigrated from Tartary, was neither ample nor properly accommodated to anſwer the purpoſes of the mutual conveyance of ideas. With this ſlender ſtock, however, they ſeem to have been ſatisfied; for it does not appear that any additions were afterwards made to that which was originally imported. Inſtead of framing a new race of terms by compounding their primitive ones; inſtead of diverſifying them by inflections, or multiplying them by derivatives, as is done in every other language; they rather choſe to retain their primitive words, and by a variety of modifications, introduced upon their orthography or pronunciation, to accommodate them to a variety of ſignifications. Were it poſſible to ſcrutinize all the Tartarian dialects, and to reduce them to their primitive monoſyllabic character, perhaps the original language of the Chineſe might be inveſtigated and aſcertained. We know that attempts have been made to compare it with ſome of the other Aſiatic languages, eſpecially the *Hebrew:* This labour has, however, proved unſucceſsful, and no primeval identity has been diſcovered. Before this compariſon could be inſtituted with the moſt diſtant proſpect of ſucceſs, the language laſt mentioned muſt be ſtripped of all its adventitious qualities; and not only ſo, but it muſt be reduced to the monoſyllabic tone, and then contraſted with the Chineſe monoſyllables; an undertaking which we are perſuaded would not be readily executed. After all, we are convinced that no reſemblance of any importance would be diſcovered.

110 Proceſs of its fabrication.

The Chineſe language muſt then, in our opinion, have been a Tartarian dialect, as the people themſelves were coloniſts from Tartary. We have obſerved above, that thoſe people have not hitherto found out the art of compoſition of words. This is the more ſurpriſing, when we conſider that, in the characters which form their written language, they employ many compoſitions. For example, the character by which they repreſent *misfortune*, is compoſed of one hieroglyphic which repreſents a *houſe*, and another which denotes *fire;* becauſe the greateſt misfortune that can befal a man is to have his houſe on fire. With reſpect to the language which they uſe in ſpeech, though they very often employ many words to expreſs one thing, yet they never run them together into one word, making certain changes upon them that they may incorporate the more conveniently, but always preſerve them entire and unaltered.

111 Paucity of its words.

The whole number of words in the Chineſe language does not exceed 1200: the nouns are but 326. It muſt certainly appear ſurpriſing, that a people whoſe manners are ſo highly poliſhed and refined, ſhould be able to expreſs ſo many things as muſt of neceſſity attend ſuch a courſe of life by ſo ſmall a number of words, and thoſe too monoſyllables. The difficulties which attend this ſingular mode muſt be felt almoſt every inſtant; circumſtances which, according to the ordinary courſe of things, ſhould have induced them to attempt both an augmentation of the number of their words and an extenſion of thoſe which they had by compoſition and derivation. We learn from Du Halde* that the Chineſe have two different dialects: the one vulgar, which is ſpoken by the vulgar, and varies according to the different provinces; the other is called the *Mandarin language*, and is current only among the learned. The latter is properly that which was formerly ſpoken at court in the province of *Kiang-nan*, and gradually ſpread among the polite people in the other provinces. Accordingly, this language is ſpoken with more elegance in the provinces adjoining to *Kiang-nan* than in any other part of the kingdom. By ſlow degrees it was introduced into all parts of the empire, and conſequently became the univerſal language.

It then appears that the modern language of China was originally the court dialect, and utterly unknown to the bulk of the people. From this circumſtance we think it may fairly be concluded that this dialect was deemed the royal tongue, and had been fabricated on purpoſe to diſtinguiſh it from the vulgar dialects. We learn from Heliodorus, that the § Ethiopians had a royal language which was the ſame with the ſacred idiom of the Egyptians. This Mandarin tongue was originally an artificial dialect fabricated with a view to enhance the majeſty of the court, and to raiſe its very ſtyle and diction above that of the reſt of mankind. The Chineſe, a wonderfully inventive people, might actually contrive a language of that complexion, with an intention to render it obſcure and enigmatical (n). Such a plan would excite their admiration, and would at the ſame time greatly exceed their comprehenſion. In proceſs of time, when the Chineſe empire was extended, the Mandarins who had been brought up at court, and underſtood nothing of the provincial dialects, found it convenient to have the moſt eminent perſons in every province taught the language employed by themſelves, in order to qualify them for tranſacting the affairs of government with them in a language which both underſtood. By this means the royal dialect deſcended to the vulgar, and in proceſs of time became univerſal. The Tartar dialect formerly in uſe vaniſhed; only a few veſtiges of it remained; which gradually incorporating with the royal language, occaſioned the variation of provincial tongues abovementioned.

We are therefore clearly of opinion, that the modern language of the Chineſe was deduced from the original Mandarin, or court dialect, and that this laſt was an artificial ſpeech fabricated by the ſkill and ingenuity of that wonderful people. The learned have long held it up as the primary dialect, becauſe, ſay they, it bears all the ſignatures of an original unimproved language. In our opinion, nothing appears more ingeniouſly artificial. It is univerſally allowed that, in its ſtructure, arrangement, idioms, and phraſeology, it reſembles no other language. Is not every learned man now convinced that all the Aſiatic languages yet known, diſcover unequivocal ſymptoms of their cognation and family reſemblance? The Ethiopians, Chaldeans, Arabians, Perſians, Egyptians, Hebrews, Phœnicians, the Brahmans, Bengaleſe, the Hindoos bordering upon China, all ſpeak only different dialects of one language, varying from the original in dialect only, ſome in a greater ſome in a leſſer degree: why ſhould the Chineſe alone ſtand altogether inſulated and unallied?

(n) An attempt of this nature, among a people like the Chineſe, is by no means improbable; nor is its ſucceſs leſs probable. For a proof of this, we need only have recourſe to Biſhop Wilkins's Artificial Language, and Pſalmanazar's Dictionary of the language of Formoſa.

* Hiſt. of China, vol. ii.

§ Ethiop. lib. vi.

The languages of the North all wear congenial features. The Tartar, or Tatar dialects of every clan, or every canton, of every denomination, exhibit the moſt palpable proofs of a near affinity: the Gothic and Sclavonian dialects, which pervade a great part of Europe and ſome parts of Aſia, are obviouſly brethren, and may eaſily be traced up to an Aſiatic original. Even ſome of the American jargon dialects contain vocables which indicate an Aſiatic or European original. Our readers, we flatter ourſelves, will agree with us, that had the language of the Chineſe been the original language, a reſemblance muſt have ſtill exiſted between it and its deſcendants. If it had originated from any other language, it would have retained ſome characteriſtic features of its parent archetype. As neither of theſe are to be found in the fabric of the language under conſideration, the concluſion muſt be, that it is a language entirely different from all other tongues; that it is conſtructed upon different principles, deſcended from different parents, and framed by different artiſts.

The Chineſe themſelves have a common and immemorial tradition, that their language was framed by *Yao* their firſt emperor, to whom they attribute the invention of every thing curious, uſeful, and ornamental. Traditional hiſtory, when it is ancient, uniform, and univerſal, is generally well founded: upon this occaſion we think the tradition above-mentioned may be fairly admitted as a collateral evidence.

112
A proof of its artificial ſtructure.

The paucity of vocables contained in this ſingular language, we think another preſumption of its artificial contexture. The Chineſe *Onomathetæ* would find it an arduous taſk to deviſe a great number of new terms, and would therefore reſt ſatisfied with the ſmalleſt number poſſible. In other languages we find the like economy was obſerved. Rather than fabricate new words, men choſe ſometimes to adapt old words to new, and, upon ſome occaſions, even to contrary ſignifications. To ſpare themſelves the trouble of coining new terms, they contrived to join ſeveral old ones into one; whence aroſe a numerous race of compounds. Derivatives too were fabricated to anſwer the ſame purpoſe. By this proceſs, inſtead of creating new vocables, old ones were compounded, diverſified, deflected, ramified, metamorphoſed, and tortured into a thouſand different ſhapes.

The Greek is deſervedly eſteemed a rich and copious language; its radical words have been curiouſly traced by ſeveral learned men, who, after the moſt laborious and exact ſcrutiny, have found that they do not amount to more than 300. The Shanſcrit language is highly compounded: its radical terms, however, are very few in number. Upon the whole, we think we may conclude, that the more any language abounds in compounds and derivatives, the ſmaller will be the number of its radical terms. The Arabic admits of no compoſition, and of conſequence, its words have been multiplied almoſt *in infinitum*; the Shanſcrit, the Perſian, and the Greek, abound with compounds, and we find their radicals are few in proportion.

113
Three different methods of enriching a language.

There are, we think, three different methods which may be employed in order to enrich and extend the range of a language. 1ſt, By fabricating a multitude of words; the plan which has been purſued by the Arabs. 2d, By framing a multitude of compounds and derivatives; the artifice employed by the Greeks and the authors of the Shanſcrit. 3d, By varying the ſignification of words without enlarging their number; the method practiſed by the Chineſe and their coloniſts. The Arabians, we think, have ſhown the moſt fertile and inventive genius, ſince they have enriched their language by actually creating a new and a moſt numerous race of words. The fabricators of the Shanſcrit and the collectors of the Greek have exhibited art, but *comparatively* little fertility of genius. Leaving, therefore, the Arabians, as in juſtice we ought, maſters of the field in the conteſt relating to the formation of language, we may range the Greek and Shanſcrit on the one ſide, and the Chineſe on the other; and having made this arrangement, we may attempt to diſcover on which ſide the largeſt proportion of genius and invention ſeems to reſt.

114
That adopted by the Chineſe.

The Greek and Shanſcrit (for we have ſelected them as moſt highly compounded) exhibit a great deal of art in modifying, arranging, and diverſifying their compounds and derivatives, in ſuch a manner as to qualify them for intimating complex ideas; but the Chineſe have performed the ſame office by the help of a race of monoſyllabic notes, ſimple, inflexible, invariable, and at the ſame time few in number. The queſtion then comes to be, whether more art is diſplayed in new modelling old words by means of declenſions, conjugations, compounds, and derivatives; or by deviſing a plan according to which monoſyllabic radical terms, abſolutely invariable, ſhould, by a particular modification of ſound, anſwer all the purpoſes performed by the other. The latter appears to us much more ingeniouſly artificial. The former reſembles a complicated machine compoſed of a vaſt number of parts, congenial indeed, but looſely connected; the latter may be compared to a ſimple, uniform engine, eaſily managed, and all its parts properly adjuſted. Let us now ſee in what manner the people in queſtion managed their monoſyllabic notes, ſo as to qualify them for anſwering all the purpoſes of ſpeech.

Though the number of words in the Chineſe language does not amount to above 1200; yet that ſmall number of vocables, by their artificial management, is ſufficient to enable them to expreſs themſelves with eaſe and perſpicuity upon every ſubject. Without multiplying words, the ſenſe is varied almoſt *in infinitum* by the variety of the accents, inflections, tones, aſpirations, and other changes of the voice and enunciation; circumſtances which make thoſe who do not

thoroughly

Chineſe Language.

thoroughly underſtand the language frequently miſtake one word for another. This will appear obvious by an example.

The word *teov* pronounced ſlowly, drawing out the *v* and raiſing the voice, ſignifies a *lord* or *maſter*. If it is pronounced with an even tone, lengthening the *v*, it ſignifies a *hog*. When it is pronounced quick and lightly, it imports a *kitchen*. If it be pronounced in a ſtrong and maſculine tone, growing weaker towards the end, it ſignifies a *column*.

By the ſame economy, the ſyllable *po*, according to the various accents, and the different modes of pronunciation, has eleven different ſignifications. It ſignifies *glaſs to boil, to winnow rice, wiſe or liberal, to prepare, an old woman, to break or cleave, inclined, a very little, to water, a ſlave or captive.* From theſe examples, and from almoſt numberleſs others which might be adduced, it is abundantly evident that this language, which at firſt ſight appears ſo poor and confined, in conſequence of the ſmall number of the monoſyllables of which it is compoſed, is notwithſtanding very copious, rich, and expreſſive.

Again, the ſame word joined to various others, imports a great many different things; for example *mou*, when alone, ſignifies a *tree, wood;* but when joined with another word, it has many other ſignifications. *Mou leoo,* imports "wood prepared for building;" *mou lan,* is "bars, or wooden grates;" *mou hia,* "a box;" *mou ſang,* "a cheſt of drawers; *mou tſiang,* "a carpenter; *mou eul,* "a muſhroom; *mou nu,* "a ſort of ſmall orange;" *mou ſing,* "the planet Jupiter;" *mou mien,* "cotton," &c. This word may be joined to ſeveral others, and has as many different ſignifications as it has different combinations.

Thus the Chineſe, by a different arrangement of their monoſyllables, can compoſe a regular and elegant diſcourſe, and communicate their ideas with energy and preciſion; nay even with gracefulneſs and propriety. In theſe qualities they are not excelled either by the Europeans or Aſiatics, who uſe alphabetical letters. In fine, the Chineſe ſo naturally diſtinguiſh the tones of the ſame monoſyllable, that they comprehend the ſenſe of it, without making the leaſt reflection on the various accents by which it is determined.

115 Conſequences of this method on pronunciation.

We muſt not, however, imagine, as ſome authors have related, that thoſe people cant in ſpeaking, and make a ſort of muſic which is very diſagreeable to the ear; theſe different tones are pronounced ſo curiouſly, that even ſtrangers find it difficult to perceive their difference even in the province of *Kiang-nan,* where the accent is more perfect than in any other. The nature of it may be conceived by the guttural pronunciation in the Spaniſh language, and by the different tones that are uſed in the French and Italian: theſe tones are almoſt imperceptible; they have, however, different meanings, a circumſtance which gave riſe to the proverb, that *the tone is all.*

If the fineneſs and delicacy of their tones are ſuch as to be ſcarce perceptible to a ſtranger, we muſt ſuppoſe that they do not riſe high, but only by ſmall intervals; ſo that the muſic of their language muſt ſomewhat reſemble the muſic of the birds, which is within a ſmall compaſs, but nevertheleſs of great variety of notes. Hence it will follow, that ſtrangers will find it very difficult, if not impoſſible, to learn this language; more eſpecially if they have not a delicate ear and a flexible voice, and alſo much practice. The great difference then between the Chineſe and Greek accents conſiſts in this, that the Greeks had but two accents, the grave and acute, diſtinguiſhed by a large interval, and that not very exactly marked; for the acute, though it never riſes above a fifth higher than the grave, did not always riſe ſo high, but was ſometimes pitched lower according to the voice of the ſpeaker. The Chineſe muſt have many more accents, and the intervals between them muſt be much ſmaller, and much more carefully marked; for otherwiſe it would be impoſſible to diſtinguiſh them. At the ſame time, their language muſt be much more muſical than the Greek, and perhaps more ſo than any language ought to be; but this becomes neceſſary for the purpoſes abovementioned. Du Halde is poſitive, that notwithſtanding the perpetual variation of accents in the Chineſe tongue, and the almoſt imperceptible intervals between theſe tones, their enunciation does not reſemble ſinging: many people, however, who have reſided in China, are equally poſitive that the tone with which they utter their words does actually reſemble *canting;* and this, when we conſider the almoſt imperceptible intervals by which they are perpetually raiſing and lowering the tone of their voice, appears to us highly probable.

As the people of whoſe language we are treating at preſent communicate a variety of different ſignifications to their monoſyllabic words by their different accentuation, ſo they employ quantity for the very ſame purpoſe. By lengthening or ſhortening the vowels of their words, they employ them to ſignify very different things. The ſame they perform by giving their words different aſpirations, as likewiſe by ſounding them with different degrees of roughneſs and ſmoothneſs; and even ſometimes by the different motion, poſture, or attitude, with which their enunciation is accompanied. By theſe methods of diverſifying their monoſyllables (ſays Du Halde), they make 330 of them ſerve all the purpoſes of language, and theſe too not much varied in their termination; ſince all the words in that language either terminate with a vowel or with the conſonant *n*, ſometimes with the conſonant *g* annexed.

From this account, we think it is evident that the Chineſe, by a wonderful exertion of ingenuity, do, by different tones and proſodical modifications, by means of a very inconſiderable number of words, all invariable radicals, actually perform all that the moſt poliſhed nations have been able to atchieve by their compounds, derivatives, &c. diverſified by declenſions, conjugations, and flexions of every kind; circumſtances which, in our opinion, reflect the greateſt honour on their inventive powers.

116 Grammar of the Chineſe.

With reſpect to the grammar of this language, as it admits of no flexions, all their words being indeclinable, their caſes and tenſes are all formed by particles. They have no idea of genders; and even the diſtinction of numbers, which in almoſt all other languages, even the moſt unimproved, is marked by a particular word, is in the Chineſe only indicated by a particle. They have only the three ſimple tenſes, namely, the paſt, preſent, and future; and for want of different terminations, the ſame word ſtands either for the verb or the verbal ſubſtantive, the adjective or the ſubſtantive derived from it, according to its poſition in the ſentence.

The Chineſe language being compoſed of monoſyllables, and theſe indeclinable, can ſcarce be reduced to grammatical rules: we ſhall, however, attempt to lay before our readers as much of the texture of that ſingular dialect as may enable them to form ſome vague idea of its genius and conſtitution. We ſhall begin with the letters and proceed regularly to the remaining parts as they naturally ſucceed each other.

117 Chineſe letters or characters

The art of joining the Chineſe monoſyllables together is extremely difficult, and requires a very long and laborious courſe of ſtudy. As they have only figures by which they can expreſs their thoughts, and have no accents in writing to vary the pronunciation, they are obliged to employ as many different figures or characters as there are different tones, which give ſo many different ſignifications to the ſame word. Beſides, ſome ſingle characters ſignify two or three words, and ſometimes even a whole period. For example, to write theſe words, *good morrow, Sir*, inſtead of joining the characters which ſignify *good* and *morrow* with that of *Sir*, a different character muſt be uſed, and this character alone expreſſes theſe three words. This circumſtance greatly contributes to multiply the Chineſe characters.

This method of joining the monoſyllables is indeed ſufficient for writing ſo as to be underſtood; but it is deemed trifling, and is uſed only by the vulgar. The ſtyle that is employed, in order to ſhine in compoſition, is quite different from that which is uſed in converſation, though the words are in reality the ſame. In writings of that ſpecies, a man of letters muſt uſe more elegant phraſes, more lofty expreſſions, and the whole muſt be dignified with tropes and figures which are not in general uſe, but in a peculiar manner adapted to the nature of the ſubject in queſtion The characters of Cochin-china, of Tong-king, of Japan, are the ſame with thoſe of the Chineſe, and ſignify the ſame things; though, in ſpeaking, theſe nations do not expreſs themſelves in the ſame manner: of conſequence the language of converſation is very different, and they are not able to underſtand each other; while, at the ſame time, they underſtand each other's written language, and uſe all their books in common.

118 Exceedingly numerous,

The learned muſt not only be acquainted with the characters that are employed in the common affairs of life, but muſt alſo underſtand their various combinations, and the numerous and multiform diſpoſitions and arrangements which of ſeveral ſimple ſtrokes make the compound characters. The number of their characters amount to 80,000; and the man who knows the greateſt number of them is of courſe the moſt learned. From this circumſtance we may conclude, that many years muſt be employed to acquire the knowledge of ſuch a prodigious number of characters, to diſtinguiſh them when they are compounded, and to remember their ſhape and import. After all, a perſon who underſtands 10,000 characters may expreſs himſelf with tolerable propriety in this language, and may be able to read and underſtand a great number of books. The generality of their learned men do not underſtand above 15,000 or 20,000, and few of their doctors have attained to the knowledge of above 40,000. This prodigious number of characters is collected in their great vocabulary called *Hai-pien*. They have radical letters, which ſhow the origin of words, and enable them to find out thoſe which are derived from them; for inſtance, the characters of mountains, of trees, man, the earth, of a horſe, under which muſt be ſought all that belongs to mountains, trees, man, &c. In this ſearch one muſt learn to diſtinguiſh in every word thoſe ſtrokes or figures which are above, beneath, on the ſides, or in the body of the radical figure.

Clemens Alexandrinus (ſee Section *Chaldean*, &c.) informs us, that the Egyptians employed three ſorts of characters; the firſt was called the *epiſtolary*, which was uſed in writing letters; the ſecond was denominated *ſacred*, and peculiar to the ſacerdotal order; the laſt *hieroglyphical*, which was appropriated to monumental inſcriptions and other public memorials. This mode of repreſentation was twofold: one, and the moſt ſimple, was performed by deſcribing the picture of the ſubject which they intended to preſent, or at leaſt one that reſembled it pretty nearly; as when they exhibit the ſun by a circle and the moon by a creſcent; the other was properly ſymbolic; as when they marked *eternity* by a ſerpent with his tail in his mouth, the *air* by a man clothed in an azure robe ſtudded with ſtars, &c.

The Chineſe, in all probability, had the ſame variety of characters. In the beginning of their monarchy, they communicated their ideas by drawing on paper the images of the objects they intended to expreſs; that is, they drew the figure of a bird, a mountain, a tree, waving lines, to indicate birds, mountains, foreſts, rivers, &c.

There were, however, an infinite number of ideas to be communicated, whoſe objects do not fall under the cognizance of the ſenſes; ſuch as the ſoul, the thoughts, the paſſions, beauty, deformity, virtues, vices, the actions of men and other animals, &c. This inconvenience obliged them to alter their original mode of writing, which was too confined to anſwer that purpoſe, and to introduce characters of a more ſimple nature, and to invent others to expreſs thoſe things which are the objects of our ſenſes.

119 And truly hieroglyphical.

Theſe modern characters are, however, truly hieroglyphical, ſince they are compoſed of ſimple letters which retain the ſignification of the primitive characters. The original character for the ſun was a circle, thus ⊙; this they called *ga*: They now repreſent that luminary by the figure |☰|, to which they ſtill give the original name. But human inſtitutions having annexed to theſe laſt framed characters the very ſame ideas indicated by the original ones, the conſequence is, that every Chineſe letter is actually ſignificant, and that it ſtill retains its ſignificancy, though connected with others. Accordingly the word *tſai*, which imports "miſfortune, calamity," is compoſed of the letter *mien* "a houſe," and the letter *ho* "fire;" ſo that the ſymbolical character for miſfortune is the figure of a houſe on fire. The Chineſe characters, then, are not ſimple letters without any ſignification, like thoſe of the Europeans and other Aſiatics; but when they are joined together, they are ſo many hieroglyphics, which form images and expreſs thoughts.

Upon the whole, the original characters of the Chineſe were real pictures (ſee ſection of the *Egyptian* language); the next improvement was the ſymbolical character; the third and laſt ſtage is the preſent mode in which artificial ſigns have been fabricated, in order to repreſent ſuch thoughts or ideas as could not be repreſented by one or other of the methods above deſcribed. Du Halde, Vol. II. p. 400, *et ſeq.* has furniſhed us with rules for pronouncing the Chineſe vowels and conſonants; a piece of information which, we apprehend, would be of little conſequence to our readers, and which we ſhall therefore paſs over, and proceed to give a brief account of their grammar. As the whole language is compoſed of monoſyllables, and theſe indeclinable, its grammatical ſtructure muſt be ſimple and obvious: we ſhall only mention what to us appears ſingular and important.

120
Peculiarities of the Chineſe parts of ſpeech.

In the Chineſe language there is no diverſity of genders or caſes, and of conſequence no declenſions. Very often the noun is not diſtinguiſhed from the verb; and the ſame word which in one ſituation is a ſubſtantive, in another may become an adjective, and even a verb.

The adjective always goes before the ſubſtantive; but if it follows it, it becomes a ſubſtantive.

The caſes and numbers are known only by the compoſition. The plural number is diſtinguiſhed by the particle *men*, which is common to all nouns; but when the noun is preceded by ſome word that ſignifies number, the particle *men* is not annexed.

The Chineſe genitive, both ſingular and plural, when it comes after nouns, is often made by *ti*: and there is no other caſe in that language. The ſame particle is ſometimes placed after pronouns, as if they were derivatives.

The comparative degree is formed by adding the particle *keng*, which is always ſet before the noun, and ſignifies *much*. The particle *to* is ſometimes uſed, which likewiſe imports *much*.

The Chineſe have only three perſonal pronouns, *nqo* "I," *ni* "thou," and *ta* "he:" theſe become plural by adding the ſyllable *men*. They are made poſſeſſive by adding the ſyllable *ti*, as *nqo ti* "mine," *ni ti* "thine," *ta ti* "his." The patronymics are formed by putting the name of the city, country, &c. after the pronoun: *chon* is the pronoun relative *who*, *what*, *which*.

Chineſe verbs have only three tenſes, the preterperfect, the preſent, and the future. When there is no particle added to the verb, it is the preſent; the preterperfect is made by adding the particle *leao*: to diſtinguiſh the future tenſe they uſe the particle *tſiang* or *hoei* and theſe are all the varieties incident to their verbs.

The Chineſe language has no words that are properly adverbs; they only become ſo by cuſtom, or by the place they poſſeſs in diſcourſe. They are often obliged to employ ſeveral words to expreſs the adverbs of other languages: they have none that are demonſtrative, or proper for calling or exhorting; but in their ſtead they are obliged to uſe nouns and verbs.

121
Their numerals.

Perhaps our readers may wiſh to know the Chineſe numerals; and may imagine that they bear a reſemblance to thoſe of the European or other Aſiatic dialects. In this, however they will be diſappointed. They ſtand as follows:

Y	One
Eut	Two
San	Three
Sace	Four
Ou	Five
Lou	Six
Tſi	Seven
Po	Eight
Kieou	Nine
Che	Ten
Che y	Eleven
Eut che	Twelve
San che	Thirteen
Pe	One hundred
Eut pe	Two hundred
Y tſien	One thouſand
Y ouan	Ten thouſand
Che ouan	Twenty thouſand
Eut ouan	One hundred thouſand
Che ouan	Two hundred thouſand
Y pe ouan	One million.

There are a great many particles proper to numbers in the Chineſe language: they are frequently uſed, and in a way peculiar to it; for every numeral has a particle importing the object to which it is attached. Thus *co* is uſed for man, and *y co* for a woman, &c. *hoei* is uſed for illuſtrious men; *tche* or *tchi* is uſed for ſhips, dogs, hens; *mey* is uſed for pearls and precious things; *pen* is uſed for books; *teng* is appropriated to oxen and cows; *too* is uſed for letters and little bundles of paper; *oo* is employed for corn and pulſe. Thoſe diſtinctions indicate a language manufactured on purpoſe to be employed by people who were too high and too haughty to converſe with the vulgar.

122
Style of the Chineſe writers,

The ſtyle of the Chineſe, in their elaborate compoſitions, is myſterious, conciſe, and allegorical, after the eaſtern manner. It is often obſcure to thoſe who do not underſtand the language thoroughly; and it requires a conſiderable degree of ſkill to avoid miſtakes in reading an author of elegance and ſublimity. Their writers expreſs a great deal in few words; and their expreſſions are lively, full of ſpirit, intermingled with bold compariſons and lofty metaphors. They affect to inſert in their compoſitions many ſentences borrowed from their five canonical books; and as they compare their books to pictures, ſo they liken theſe quotations to the five principal colours employed in painting; and in this their eloquence chiefly conſiſts.

They prefer a beautiful character to the moſt finiſhed picture; and nothing is more common than to ſee a ſingle page covered with old characters, if they happen to be fair and elegant, ſold at a very high price. They honour their characters in the moſt common books; and when they happen to light by chance upon a printed leaf, they gather it up with the greateſt care and reſpect.

In China there are three varieties of language; that of the common people, that of the people of faſhion, and that employed in writing books. Though the firſt is not ſo elegant as either of the other two, it is not however inferior to our European languages; though thoſe who are but ſuperficially acquainted with the Chineſe may, in fact, imagine it uncouth and barbarous. This low and rude language is pronounced and written many different ways, as is generally the caſe in other countries.

But a more poliſhed, and at the ſame time a much more energetic, language, is employed in an almoſt infinite number of novels; ſome perhaps true, but many more the vehicles of fiction. Theſe are replete with lively deſcriptions, characters highly finiſhed, morality, variety, wit, and vivacity, in ſuch a degree as to equal in purity and politeneſs the moſt celebrated authors of Europe. This was the language of the Mandarines; and though exquiſitely beautiful in its kind, was ſtill inferior to the language of books. This laſt might be ſtyled the *hyperſublime;* and of this there are ſeveral degrees and intervals before an author can arrive at what they call the language of the *kings*. This mode of writing cannot be well underſtood without looking upon the letters; but when underſtood, it appears eaſy and flowing. Each thought is generally expreſſed in four or ſix characters: nothing occurs that can offend the niceſt ear; and the variety of the accents with which it is pronounced produces ſoft and harmonious ſound.

The difference between the *king* and their other books conſiſts in the difference of the ſubjects upon which they are written. Thoſe of the former are always grand and ſublime, and of courſe the ſtyle is noble and elevated: thoſe of the latter approach nearer to the common affairs and events of life, and are of conſequence detailed in the Mandarine tongue. In writing on the ſublime ſubjects no punctuations are uſed. As theſe compoſitions are intended for the learned only, the author leaves to the reader to determine where the ſenſe is complete; and thoſe who are well ſkilled in the language readily find it out.

The copiouſneſs of the Chineſe language is in a great meaſure owing to the multitude of its characters. It is likewiſe occaſioned, in ſome degree, by the difference of their ſignification, as alſo by the artificial method of their conjunction, which is performed moſt commonly by uniting them two and two, frequently three and there, and ſometimes four and four.

123 Their books numerous and bulky,

Their books are very numerous and bulky, and of courſe exceedingly cumbrous. A dictionary of their language was compiled in this century. It conſiſted of 95 large volumes. An appendix was annexed of 25 volumes. Their other books are voluminous in proportion. The Chineſe, one may ſay, are a nation of learned men. Few people of rank neglected the belles lettres; for ignorance in a man of any degree of eminence is deemed an indelible ſtain on his character.

For their maner of writing, the implements with which they write, and the materials upon which they draw their characters, we muſt remit our readers to the article WRITING. It would, we believe, afford our readers ſome pleaſure, could we diſcover and explain the reaſons which have hitherto prevented the Chineſe from adopting the letters employed from time immemorial by the other nations of Europe and Aſia.

124 Obſtacles to their improvement in ſcience and literature.

The Chineſe have ever looked upon themſelves as greatly ſuperior to the reſt of mankind. In ancient times they entertained ſuch contemptible notions of foreigners, that they ſcorned to have any further commerce with them than to receive their homage. They were indeed, at a very early period, highly revered by the Indians, Perſians, and Tartars. In conſequence of this veneration, they looked upon themſelves as the favourites of heaven. They imagined they were ſituated in the middle of the earth, in a kind of paradiſe, in order to give laws to the reſt of mankind. Other men they looked upon with contempt and diſdain, and deemed them deformed in body and defective in mind, caſt out into the remote corners of the world as the droſs and refuſe of nature. They boaſted that themſelves only had received from God rational ſouls and beautiful bodies, in order to qualify them for being ſovereigns of the ſpecies.

Such are the ſentiments of the Chineſe, and with ſuch ſentiments it is by no means ſurpriſing that their improvements in *language*, in *writing*, and other appendages of the belles lettres, have not been proportioned to their progreſs in mechanics. When people are once fully perſuaded that they have already arrived at the ſummit of perfection, it is natural for them to ſit down contented, and ſolace themſelves with the idea of their own ſuperior attainments. The Chineſe had early entertained an exalted opinion of their own ſuperiority to the reſt of mankind; and therefore imagined that they had already carried their inventions to the *ne plus ultra* of perfection; the conſequence was, that they could make no exertions to carry them higher.

The Chineſe, for the ſpace of 3000 years, had almoſt no intercourſe with the reſt of mankind. This was the conſequence of their inſulated ſituation.—They, of courſe, *compared themſelves with themſelves;* and finding that they excelled all their barbarian neighbours, they readily entertained an opinion that they excelled all the reſt of mankind in an equal proportion. This conceit at once ſtifled the emotions of ambition, and deprived them of all opportunities of learning what was going forward in other parts of the world.

They deſpiſed every other nation. People are little diſpoſed to imitate thoſe whom they deſpiſe; and this perhaps may be one reaſon why they are at this day ſo averſe from adopting the European inventions.

A ſuperſtitious attachment to the cuſtoms of the ancients, is the general character of the Aſiatic nations. This is evidently a kind of diacritical feature among the Chineſe. The inſtitutions of *Fohi* are looked up to among them with equal veneration as thoſe of *Thoth* were among the Egyptians. Among the latter, there was a law, which made it capital to introduce any innovation into the muſic, painting, or ſtatuary art, inſtituted by that legiſlator. We hear of no ſuch law among the former; but cuſtom eſtabliſhed, and that invariably, for a ſpace of 3000 years, might operate as forcibly among them as a poſitive law did among the people firſt mentioned. An attachment to ancient cuſtoms is often more powerful and more coercive than any law that can be promulgated and enforced by mere human authority. Theſe reaſons, we think, may be aſſigned as the impediments to the progreſs of the Chineſe in the belles lettres, and perhaps in the cultivation of the other ſciences.

Though the language of the Chineſe is confeſſedly different from all the other known languages in its

125 Chineſe words found in various other languages,

character and conſtruction, it contains, however, a great number of words evidently of the ſame origin with thoſe which occur in other dialects, uſed by people who, according to the natural courſe of things, could never have been connected with that remote country. A few of thoſe we ſhall produce before we conclude this ſection. We ſhall begin with the import of the name *China*.

China, or, as the orientals write it, *Sin*, is perhaps the Latin *ſinus*, "the boſom, the heart, the middle." The Chineſe actually imagine that their country is ſituated in the very middle of the earth, and of conſequence call it *Cham*, "the middle the heart;" a denomination which exactly ſuits their opinion.

Tu, in Chineſe, intimates every thing that falls under the cognizance of the ſenſes, every thing that ſtrikes the ſight; in Latin, *tueor*.

Ta, a table, a plank, a figure that renders every thing ſenſible: 2. To ſee, to look upon, to appear; Greek ταν ταιω, whence τεινω, *tendo*.

Tue, to examine attentively, to inſpect carefully.

Tui, the moſt apparent, chief, principal, firſt; 2. Lightning, thunder.

Teu, a ſign by which to know one, letter of acknowledgment. All theſe ideas are contained in the Hebrew תי, *thu*, *ſignum*, which we believe has produced the Egyptian *theuth*, the good or godlike man who invented letters, geometry, muſic, aſtronomy, &c.

Tai, a dye, a theatre; Greek of old Θεαω, then Θεαομαι, "to ſee, to look."

Tam, Latin *tantum*, "ſo much."

Tan, land, country, region, a ſyllable annexed to the end of a great number of words. *Aqui tan*, *Aquitania*, "a land of water;" *Mauri tan*, *Mauritania*, "the land of the Moors." The orientals prefix *s*, whence *Farſi ſtan*, *Farſiſtan*, "the land or country of the Perſians;" *Chuſi ſtan*, *Chuſiſtan*, "the country of Chuz;" *Turque ſtan*, *Turqueſtan*, "the land of the Turks."

Ti, a chief, an emperor, a title of dignity; whence the Greek τιω "to honour;" hence, too, the word *di*, "bright, glorious;" whence Δις "Jupiter, "Διος "divine;" the Latin *Dius*, now *Deus*, "God," and *Divus*, with the *digamma Æolicum* inſerted; the Celtic *Dhia*, &c. It ſignified originally "bright, glorious," and was an epithet of the Sun.

Tum, Latin *tumeo*, "to ſwell."

Liven, "to love;" Hebrew לב, *leb*, "the heart;" Latin, *libet*. This word pervades all the dialects of the Gothic tongue, ſtill retaining either the ſame or a nearly analogous ſignification.

Li, "letters;" Latin, *lino*, "to daub," as the Chineſe actually do in forming their letters.

Lo, "to contain, that which contains;" Celtic, *log*; French, *loge*, *logis*, *loger*.

Lim, "a rule:" hence Latin, *linea*, "a line."

Su, "with;" Greek, συν, "with;" Celtic, *cyn*, *cym*; whence Latin, *cum*, *con*, &c.

Xim, "very high, elevated, ſacred, perfect;" Latin, *eximius*.

Sin, "the heart;" Perſian, *Sin*, "the heart."

Sien, "chief, firſt;" Celtic, *can*, *cean*, *ſan*, "the head;" metaphorically, the chief, the firſt, the principal; Thibet, "*ſen*, or *ken*, "great, elevated;" Arabic, *ſame*, "to be elevated or raiſed."

Sim, or *Sing*, "a conſtellation, a ſtar, an element;" Hebrew, *ſhem*; Greek, σημειον, σημα; Latin, *ſignum*.

Sie, "a man of learning;" Goth. Sax. Engl. "ſee; to ſee, ſeer."

Cem, "a prieſt;" Hebr. *cohen*; Syr. *con*; Egypt. *can*, *cun*.

Quin, "a king;" Celtic, *ken*, *kend*, "head, chief;" Gothic, *koanig*; Germ. Flem. Eng. *king*, alſo *queen*.

Hu, "a door;" Goth. Germ. Eng. *hus*, *hauſen*, *houſe*.

Min, "a river;" Welch, *men*, "the water of a river;" Latin, *mano*, "to flow," and perhaps *amœnus*, "pleaſant."

Hen, "hatred;" Greek, αινος "cruel, horrible, odious."

Kiven, "a dog;" Greek κυων, *id.*

Ven, "beauty;" Latin, *Venus*, *venuſtas*; Iceland, Swed. *wen*, "pleaſant;" Scotch, *winſome*.

Han, "the ſoul, breath;" Greek, ανεμος; Latin, *anima*, *animus*.

To theſe inſtances of the analogy between the Chineſe language and thoſe of the other people of Aſia and Europe many more might be added; but the preceding, it is hoped, will ſerve as a ſpecimen, which is all that can be expected from an inquiry of the nature of the preſent.

SECT. VII. *Of the Greek Language.*

126 Origin of the Greeks,

BEFORE we enter upon the conſideration of the eſſential and conſtituent parts of this noble language, we wuſt beg leave to ſettle a few preliminaries, which, we truſt, will ſerve to throw ſome light upon many points which may come under conſideration in the courſe of the following diſquiſition.

The Greeks, according to the moſt authentic accounts, were deſcended of Javan or Ion, the fourth ſon of Japhet, the eldeſt ſon of the patriarch Noah. The Scriptures of old, and all the orientals to this day, call the Greeks *Ionim* or *Iavnim* or *Javanoth*. We have already obſerved, in the beginning of the article concerning the Hebrew language, that only a few of the deſcendants of Ham, and the moſt profligate of the poſterity of Shem and Japhet, were concerned in building the tower of Babel. We ſhall not now reſume the arguments then collected in ſupport of that poſition; but proceed to inveſtigate the character of that branch of the poſterity of Javan which inhabited Greece and the neighbouring regions.

At what period the coloniſts arrived in theſe parts cannot be certainly determined; nor is it of great importance in the queſtion before us. That they carried along with them into their new ſettlements the language of Noah and his family, is, we think, a point that cannot be controverted. We have endeavoured to prove that the Hebrew, or at leaſt one or other of its ſiſter dialects, was the primæval language of mankind. The Hebrew, then, or one of its cognate branches, was the original dialect of the Ionim or Greeks.

Be that as it may, before theſe people make their appearance in profane hiſtory, their language deviates very widely from this original archetype. By what means, at what period, and in what length of time this change was introduced, is, we believe, a matter not eaſy to be elucidated. That it was progreſſive, is abundantly certain both from the rules of analogy and reaſon.

The colonies, which traverſed a large tract of country before they arrived at their deſtined ſettlements, muſt have ſtruggled with numberleſs difficulties in the courſe of their peregrinations. The earth, during the periods which immediately ſucceeded the univerſal deluge, muſt have been covered with foreſts, interſected with ſwamps, lakes, rivers, and numberleſs other impediments. As the neceſſaries, and a few of the conveniences of life, will always engroſs the firſt cares of mankind, the procuring of theſe comforts will, of neceſſity, exclude all concern about arts and ſciences which are unconnected with theſe purſuits. Hence we think it probable, that moſt of thoſe colonies which migrated to a very great diſtance from the plains of Shinar, which we believe to have been the original ſeat of mankind, in a great meaſure neglected the practice of the polite but unneceſſary modes of civilization which their anceſtors were acquainted with, and practiſed before the era of their migration. Certain it is, that thoſe nations which continued to reſide in the neighbourhood of that centre of civilization, always appear in a cultivated ſtate; while, at the ſame time, the coloniſts who removed to a conſiderable diſtance appear to have ſunk into barbariſm, at a period more early than the annals of profane hiſtory can reach.

127 Who were long a barbarous people,

—This appears to have been the ſituation of the primary inhabitants of Greece. Their own hiſtorians, the moſt partial to their own countrymen that can well be imagined, exhibit a very unpromiſing picture of their earlieſt progenitors. Diodorus Siculus, in delineating the character of the original men, we believe ſketches his draught from the firſt inhabitants of Greece [‡] He repreſents them as abſolute ſavages, going out in ſmall parties to make war upon the wild beaſts of the field, which (according to him) kept them in continual alarm. "Neceſſity obliged them to band together for their mutual ſecurity; they had not ſagacity enough to diſtinguiſh between the wholeſome and poiſonous vegetables; nor had they ſkill enough to lay up and preſerve the fruits of autumn for their ſubſiſtence during the winter." The ſcholiaſt on Pindar deſcribes the ſituation of the inhabitans of Peloponneſus in the following manner [‖]. "Now ſome have affirmed that the nymphs who officiated in performing the ſacred rites, were called *Meliſſæ*. Of theſe Mnaſeas of Patara gives the following account. They prevailed upon men to relinquiſh the abominable practice of eating raw fleſh torn from living animals, and perſuaded them to uſe the fruits of trees for food.—

128 Progreſs of their civilization.

Meliſſa, one of them, having diſcovered bee-hives, ate of the honey-combs, mingled the honey with water for drink, and taught the other nymphs to uſe the ſame beverage. She called bees Μελισσαι *Meliſſæ*, from her own name, and beſtowed much care on the management of them.

"Theſe things (ſays he) happened in Peloponneſus; nor is the temple of Ceres honoured without nymphs, becauſe they firſt pointed out the mode of living on the fruits of the earth, and put an end to the barbarous practice of feeding on human fleſh. The ſame ladies too, from a ſenſe of decency, invented garments made of the bark of trees."

Hecatæus the Mileſian, treating of the Peloponneſians, affirms[*], "that before the arrival of the Hellenes, a race of barbarians inhabited that region; and that almoſt all Greece was, in ancient times, inhabited by barbarians [†]. In the earlieſt times (ſays Pauſanias) (o) barbarians inhabited moſt part of the country called *Hellas*." The original Greeks, if we may believe an author of deep reſearch and ſuperior ingenuity [‡], were ſtrangers to all the moſt uſeful inventions of life. Even the uſe of fire was unknown till it was found out and communicated by Prometheus, who is thought to have been one of the firſt civilizers of mankind. Hence Æſchylus[‖], introduces Promotheus commemorating the benefits which he had conferred upon mankind by his inventions, in a ſtrain that indicates the uncultivated ſtate of the world prior to the age in which he flouriſhed. For the entertainment of our readers, we ſhall tranſlate as much of that paſſage as ſuits our preſent purpoſe.

———"Of the human race
Now hear the tale, how fooliſh erſt they were:
I taught them thought and exerciſe of reaſon;
If aught they ſaw before, they ſaw in vain.
Hearing, they heard not; all was ſhapeleſs dreams
For a long ſpace of time, at random mixt
In wild confuſion: for they neither knew
Tile-cover'd houſes ſtanding in the ſun,
Nor timber work; but, like the earth-bred ant
They lodg'd in ſunleſs caves dug under ground:
No certain ſign had they of winter cold,
Nor of the flow'ry ſpring, or ſummer ſtore,
But blindly manag'd all: till I them taught
What time the ſtars appear, what time they ſet,
Hard to be ſcan'd: then arithmetic rare,
That queen of arts, by dint of patient thought
Deſcryd, I taught them: and how vocal ſounds;
From letters join'd aroſe."

This character, though applied to mankind in general, was in reality that of the moſt ancient Greeks. Theſe forbidding features had been tranſmitted to the poet by tradition as thoſe of his anceſtors: he was a Greek, and of conſequence imputes them to all mankind without diſtinction.

Phoroneus, the ſon and ſucceſſor of Inachus [§], is ſaid to have civilized the Argives, and to have taught them the uſe of ſome new inventions. This circumſtance raiſed his character ſo high among the ſavage aborigines of the country, that ſucceeding ages [¶] deemed him the firſt of men. Pelaſgus obtained the like character, becauſe he taught the Arcadians to live upon the fruit of the fagus, to build ſheds to ſhelter them from the cold, and to make garments of the ſkins of ſwine.

But what clearly demonſtrates the unpoliſhed character of the moſt ancient Greeks is, the extravagant

[‡] Lib. 1.

[‖] Python. Ode 4.

[*] Strabo, lib. 7.

[†] Id. lib. 1.

[‡] Plin. Nat. Hiſt.

[‖] Prometh. verſe 441.

[§] Plato.

[¶] Pauſan. lib. 8. c. 1.

(o) The Greeks borrowed this contemptuous epithet from the Egyptians. See *Herod.* l. ii. cap. 158.

gant honours laviſhed by them upon the inventors of uſeful and ingenious arts. Moſt of theſe were advanced to divine honours, and became the objects of religious worſhip to ſucceeding generations. The family of the Titans afford a moſt ſtriking inſtance of this ſpecies of adulation. Jupiter, Juno, Mars, Apollo, Venus, Diana, &c. were ſprung of this family. By the uſeful inventions which theſe perſonages communicated to the uncultivated nations of Greece, they obtained ſuch laſting and ſuch extravagant honours, that they juſtled out the ſidereal divinities of the country, and poſſeſſed their high rank as long as Paganiſm prevailed in thoſe regions. To theſe teſtimonies of the ſavagiſm of the original Greeks, others almoſt without number might be added; but thoſe adduced in the preceeding part of this inquiry will, we hope, ſatisfy every candid reader as to the truth of the poſition advanced.

129 A new colony arrives in Greece called Pelaſgi.

While matters were in this ſituation with reſpect to the primitive Ionim or Greeks, a new colony arrived in thoſe parts which in a few years conſiderably changed the face of affairs. The people who compoſed this colony were called *Pelaſgi;* concerning whoſe origin, country, character, and adventures, much has been written, and many different opinions exhibited by the learned. It is not our province to enter into a detail of their arguments and ſyſtems; we ſhall only inform our readers, that the general opinion is, that they were natives either of Egypt or Phœnicia. We have ſeen a diſſertation in manuſcript upon this ſubject from which we are allowed to extract the following particulars.

The author, we think, has proved by very plauſible arguments, that theſe people could not be deſcendants of the Egyptians nor Phœnicians. He maintains, that the Pelaſgi were a great and numerous tribe; that they overſpread all the coaſt of Aſia Minor from Mount Mycale to Troas; that they were maſters at one time of all the Aſiatic and Grecian iſlands; that they over-ran Greece and many of the neighbouring countries; and all this in leſs than half a century.—Theſe facts he ſeems to have proved from Homer, Herodotus, Diodorus Siculus, Pauſanias, and other Greek authors of approved authenticity. He ſhows, that they were a civilized generation; that they were well acquainted with military affairs, legiſlation, agriculture, navigation, architecture, letters, &c. He inſiſts, that Phœnicia could not at any given period have furniſhed ſuch a numerous body of emigrants, even ſuppoſing the whole nation had emigrated, and left their native country a deſert. He believes that this event took place before the invaſion of Canaan by the Iſraelites; that conſequently the Pelaſgic migration was not occaſioned by that cataſtrophe. He has ſhown, we think by very probable arguments, that the Egyptians in the earlieſt ages were averſe to foreign expeditions, eſpecially by ſea: becauſe that people hated this element, and beſides could be under no temptation to emigrate; add to this, they were accuſtomed to live on ſmall matters, and their country was exceedingly fertile and eaſily cultivated. It appears (ſays he) from Herodotus, that the Pelaſgi were not acquainted with the religion of the Zabians, which could not have been the caſe had they emigrated from either of theſe countries. He makes it appear, at leaſt to our ſatisfaction, that Herodotus is miſtaken when he ſuppoſes that the deities of Greece were derived from Egypt. He demonſtrates, that the names of the greateſt part of thoſe deities are of Phœnician extraction; and this opinion he eſtabliſhes by a very plauſible etymological deduction. He aſſerts, that had the Pelaſgi been natives of either of the countries above-mentioned, it would be abſurd to ſuppoſe them ignorant of the names and religious rites of their reſpective nations. He finds, that the Egyptian and Phœnician colonies, which afterwards ſettled in Greece, were enemies to the Pelaſgi, and either ſubdued or expelled them the country, which, he imagines could ſcarce have been the caſe had both parties ſprung from the ſame anceſtors. After ſettling theſe points, he concludes, that the people in queſtion were the progeny of the Arabian ſhepherds, who, at a very early period invaded and ſubdued both the Lower and Upper Egypt. After poſſeſſing that country about a century and a half, they were conquered by Amenophis king of the Upper Egypt, who drove them out of the country. Upon this the fugitives retired to Paleſtine, where Manetho the Egyptian hiſtorian loſes ſight of them, and either through malice or ignorance confounds them with the Iſraelites. This writer ſuppoſes that thoſe fugitives gradually directed their courſe for the weſt and north weſt coaſts of Aſia Minor, whence they conveyed themſelves over to Greece.

Such are the arguments by which the author of the diſſertation above-mentioned ſupports his hypotheſis. It is, for aught we know, altogether new, and to us it appears by no means improbable. If our curious readers ſhould wiſh to know more of this ſubject, they may conſult Gebelin's preliminary Diſcourſe to his Greek Dictionary, Lord Monboddo's Inquiry into the Origin and Progreſs of Language, vol. i. towards the end, and Mr Bryant's Analyſis of Ancient Mythology, *paſſ.*

Be this as it may, nothing is more certain than that the Pelaſgi were the firſt people who in ſome degree civilized the ſavages of ancient Greece. It is not our buſineſs at preſent to enumerate the many uſeful inventions which they communicated to the Greeks, at that time worſe than barbarians. We deem it however abſolutely neceſſary as an introduction to our ſubject, to hazard a few conjectures on the language and letters of thoſe adventurers; a point ſtrictly connected with the ſubject ſoon to fall under conſideration.

130 Who introduce letters into that country.

Whether we ſuppoſe the Pelaſgi to have been the offspring of the Phœnicians, Egyptians, or Arabian ſhepherds, it will make little difference as to their language; every man of learning and reſearch is convinced that thoſe three nations, eſpecially at that early period, ſpoke a dialect of the Hebrew. The Pelaſgi then, muſt have ſpoken a dialect of that language when they arrived in Greece. Perhaps it might have undergone ſeveral changes and acquired ſome new modifications, during ſo many years as had paſſed ſince they began to be a ſeparate nation, and in the courſe of ſo many peregrinations. Some monuments of theirs ſtill extant prove this fact beyond all contradiction. As theſe people incorporated with the aborigines of Greece, the remains of the original language of mankind,

kind, or at leaſt ſo much of it as had been retained by them, gradually coaleſced with that of the new ſettlers. From this, we think, it is obvious, that prior to the arrival of the new coloniſts from the Eaſt, the language now current among the two united tribes muſt have been a dialect of the Phœnician, Arabian, Hebrew, &c. Be that as it may, Herodotus ‖ affirms that the Pelaſgi in his time ſpoke a barbarous language, quite unintelligible to the modern Greeks.

The reaſon of this difference between the language of the Hellenes or Greeks in the age of Herodotus and that of the remains of the Pelaſgi at that period, ſeems to be this: Prior to the time of that hiſtorian, the Greek language had, from time to time, undergone many changes, and received vaſt improvements; whereas, on the contrary, that of the remnant of the Pelaſgi, who were now reduced to a very low ſtate, had remained ſtationary, and was then juſt in the ſame predicament in which it had been perhaps a century after their arrival in the country.

As the Pelaſgi, as was obſerved above, were a people highly civilized and well inſtructed in the various arts at that time known in the eaſtern world, they were ſkilled in agriculture, architecture, muſic, &c. (P): The preſumption then is that they could not be unacquainted with alphabetical writing. This moſt uſeful art was well known in the countries from which they emigrated; and of courſe it is impoſſible to imagine that they did not export this art as well as the others abovementioned. Diodorus Siculus imagines that § the Pelaſgi knew not the uſe of alphabetical letters, but that they received them from Cadmus and his Phœnician followers; that thoſe letters were afterwards called *Pelaſgic*, becauſe the Pelaſgi were the firſt people of Greece who adopted them. This account muſt go to the ſcore of national vanity, ſince very ſoon after he acknowledges * that Linus wrote the exploits of the firſt Bacchus and ſeveral other romantic fables in Pelaſgic characters; and that Orpheus, and Pronapides the maſter of Homer, employed the ſame kind of letters. Zenobius likewiſe informs us † that Cadmus ſlew Linus for teaching characters differing from his. Theſe letters could be none other than the Pelaſgic ‡,

Pauſanias, in his Attics, relates ‖, that he himſelf ſaw an inſcription upon the tomb of Coræbus, who lived at the time when Crotopus, who was contemporary with Deucalion, was king of the Argives. This inſcription then was prior to the arrival of Cadmus; and conſequently letters were known in Greece before they were introduced by this chief. It likewiſe appears from Herodotus himſelf, that the Ionians were in poſſeſſion of alphabetical characters before the coming of the Phœnicians. "For (ſays (he * the Ionians having received lettters from the Phœnicians, changing the figure and ſound of ſome of them, ranged them with their own, and in this manner continued to uſe them afterwards." If, then, the Ionians (Q) ranged the Phœnician characters with their own, it is obvious that they had alphabetical characters of their own.

Beſides theſe hiſtorical proofs of the exiſtence of Pelaſgic characters, monuments bearing inſcriptions in the ſame letters have been diſcovered in ſeveral parts of Greece and Italy, which place this point beyond the reach of controverſy. What characters theſe were may be eaſily determined. As the Pelaſgi emigrated from Arabia, the preſumption is that their letters were Phœnician. They are ſaid by Dr Swinton to have been 13 in number, whereas the Phœnician alphabet conſiſts of 16. The three additional letters were probably invented by the latter people after the Pelaſgi had left the eaſtern quarters. The Phœnician letters imported by the Pelaſgi were, no doubt, of a coarſe and clumſy contexture, unfavourable to expedition in writing, and unpleaſant to the ſight. Beſides, the Phœnician characters had not as yet received their names; and accordingly the Romans, who derived their letters from the Arcadian Pelaſgi †, had no names for theirs. The probability is, that prior to this era the Pelaſgic letters had not been diſtinguiſhed by names. They were of courſe no other than the original letters of the Phœnicians in their firſt uncouth and irregular form; and for this reaſon they eaſily gave way to the Cadmean, which were more beautiful, more regular, and better adapted to expedition.

131
The Thracians a powerful nation at a very early period.

Hitherto we have ſeen the Pelaſgi and the Ionim incorporated, living under the ſame laws, ſpeaking the ſame language, and uſing the ſame letters. But another nation, and one too of vaſt extent and populouſneſs, had at an early period taken poſſeſſion of a conſiderable part of the country afterwards diſtinguiſhed by the name of *Hellas* or *Greece*. The Thracians were a great and mighty nation; inferior to none except the Indians*, ſays the father of Grecian hiſtory. Theſe people, at a very early period, had extended their quarters over all the northern parts of that country. They were, in ancient times, a learned and poliſhed nation. From them, in ſucceeding ages, the Greeks learned many uſeful and ornamental ſciences. Orpheus (R) the muſician, the legiſlator, the poet, the philoſopher, and the divine, is known to have been of Thracian extraction. Thamyris and Linus were his diſciples, and highly reſpected among the Greeks for their learning and ingenuity. That theſe people ſpoke the ſame language with the Greeks, is abundantly evident from the connection between them and theſe Thracian bards. The Thracian language, then, whatever it was, contributed in a great proportion towards forming that of the Greeks. From the remains of the Thracian dialect there appears to have been a very ſtrong reſemblance between it and the

‖ Lib. 1. cap. 59.

§ Lib. 3.

* Ibid.

† Apud Dr Gregory Sharp's Strict. Greek Language.

‡ See Plate X.

‖ Lib. 1. cap. 49.

* Lib. 1. c. 58.

† Livii lib. 1. c. 7.

Plate IX.

* Herod. lib. 3. cap. 3.

(P) The Arcadians, who were a Pelaſgic tribe, were highly celebrated for their ſkill in muſic. They introduced this art into Italy. See *Dion. Halicar*. L 1.

(Q) The Athenians were originally called *Ionians*.

(R) Orpheus ſeems to be compounded of two oriental words, *or* "light," and *phi* "the mouth." Though ſome deduce it from the Arabian *ariſ* "a learned man."

the Chaldean. This poſition we could readily ſupport by the moſt plauſible etymological deduction, did the limits preſcribed us in this article admit ſuch an inquiry. It appears, however, that the ‡ Thracians, Getæ, and Daci or Davi, ſpoke nearly the ſame language. The Goths, ſo much celebrated in the annals of the lower empire, were the deſcendants of the Getæ and Daci; and conſequently retained the dialect of their anceſtors. The reader, therefore muſt not be ſurpriſed, if in tracing the materials of which the Greek language is compoſed, we ſhould ſometimes have recourſe to the remains of the Gothic.

‡ Strabo. lib. I. & 7.

132
The Greek language compoſed of three different dialects.

We have now found out three branches of the Greek language; that of the Ionim or *Aborogines*, that of the Pelaſgic tribe, and that of the Thracians. Theſe three we imagine were only different dialects of the very ſame original tongue. This aſſertion we could readily prove by the compariſon of a great number of words taken from the two laſt, were this a proper place for ſuch a diſcuſſion.

132
Arrival of Cadmus in Greece.

Some centuries after the arrival of the Pelaſgi, Cadmus, an Egyptian (s) by birth, and a ſojourner in Phœnicia, arrived in Bœotia with a multitude of followers. This colony chief and his countrymen introduced letters and ſeveral other uſeful improvements into the country in queſtion. As theſe people were natives of Phœnicia and its environs, their alphabet was that of their native country, conſiſting of 16 letters. That the Phœnician alphabet was nearly the ſame with the Samaritan and Hebrew, has been ſo often and ſo clearly demmonſtrated by the learned of this and the former century, that it would be altogether ſuperfluous to inſiſt upon it in this ſhort inquiry. The Phœnicians, as is generally known, wrote from right to left, and the old Grecian characters inverted, exactly reſemble the other.

† Scaliger.

133
The letters introduced by him.

The names of the Cadmean characters are Syrian †, which ſhows the near reſemblance between that language and the Phœnician. They ſtand thus: *alpha*, *betha*, *gama*, *delta* &c. The Syrians uſed to add *a* to the Hebrew vocables; hence alph becomes alpha, beth, betha or beta, &c. In the Cadmean alphabet we find the vowel letters, which is an infallible proof that this was the practice of the Phœnicians in the age of Cadmus; and this very circumſtance furniſhes a preſumption that the Jews did the ſame at the ſame period.

After all it is evident that the oldeſt Greek letters, which are written from right to left, differ very little from thoſe of the Pelaſgi. The four double letters. θ, φ, ξ, χ, are ſaid to have been added by Palamedes about 20 years before the war of Troy. Simonides is generally ſuppoſed to have added the letters ζ, η, ψ, though it appears by ſome ancient inſcriptions that ſome of theſe letters were uſed before the days of Palamedes and Simonides.

In the year of our Lord 1456 ſeven brazen tables were diſcovered at Engubium, a city of Umbria in the Apennines, of which five were written in Pelaſgic or Etruſcan characters and two in Latin. The firſt of the tables is thought to have been compoſed about 168 years after the taking of Troy, or 1206 years before Chriſt. By comparing the inſcription on theſe tables with the old Ionic characters, the curious have been enabled to diſcover the reſemblance.

134
The old Ionic character.

The old Ionic character wrote from right to left continued in general uſe for ſeveral centuries; It was compoſed of the Cadmean and Pelaſgic characters, with ſome variations of form, poſition, and ſound, The Athenians continued to uſe this character till the year of Rome 350. The old Ionic was gradually improved into the new, and this quickly became the reigning mode. After the old Ionic was laid aſide the * (Βουστροφαδον) Buſtrophadon came into cuſtom, which goes backwards and forwards as the ox does with the plough. They carried the line forward from the left, and then back to the right. The words were all placed cloſe together, and a few ſmall letters were uſed before the fourth century. If our curious readers would wiſh to know more of letters and alphabets, we muſt remit them to Chiſhul, Morton, Poſtellus, the great Montfaucon, Gebelin, Aſtle, &c. For our part we are chiefly concerned at preſent with the Phœnician and Cadmean ſyſtems; and on theſe perhaps we may have dwelt too long. Having now, we hope, ſufficiently proved that the Greek alphabet was derived from the Phœnician, in order to convince our curious but illiterate readers of the certainty of our poſition, as it were by occular demonſtration, we ſhall annex a ſcheme of both alphabets, to which we ſhall ſubjoin ſome ſtrictures upon ſuch letters of the Greek alphabet as admit any ambiguity in their nature and application.

* Pauſan. lib. 5. cap. 17.

135
The Greek alphabet derived from the Phœnician.

Α, *alpha*, had two ſounds, the one broad like *a* in the Engliſh word *all*; the other ſlender, as *e* in *end*, *ſpend*, *defend*. The Hebrews certainly uſed it ſo, becauſe they had no other letter to expreſs that ſound; the Arabs actually call the firſt letter of their alphabet *eliſ*; and they as well as the Phœnicians employ that letter to expreſs both the ſound of A and E promiſcuouſly. The Greeks call their letter E επψιλον, that is, E ſlender, which ſeems to have been introduced to ſupply the place of A ſlender.

Η, *eta*, was originally the mark of the *ſpiritus aſper*, and no doubt anſwered to the Hebrew ה. It is ſtill retained in that capacity in the word Ηκατον, and in words with the *ſpiritus aſper* beginning books, chapters, ſections, &c. E originally marked both the ſound of Εψιλον and Ητα; that is, it was ſometimes ſounded ſhort as at preſent, and ſometimes long, where it is now ſupplied by H. As it was found convenient to diſtinguiſh theſe two different quantities of ſound by different letters, they adopted H, the former *ſpiritus aſper*, to denote the long ſound of E, and ſubſtituted the preſent *ſpiritus aſper* [ʽ] in its place.

Ι, *iota*, is the Hebrew or Phœnician *jod* or *yod*. We imagine it originally ſerved the purpoſe of both iota and ypſilon. It had two different ſounds, the one broad and full, the other weak and ſlender. The latter and the ſound of the modern υψιλον. That this was actually the caſe, appears in ſeveral monumental inſcriptions: And upon this depends the variation of ſome caſes

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(s) Joſeph Scaliger's account of the origin of the Ionic letters. *Euſeb. Chron.*

Exemplum Ionicarum Priscarum

Literarum ex columna, quæ in via Appia reperta, postea ad hortos Farnesianos traducta est.

ODENI. ⊗EMITON. METAKINESAI. EK. TO. TPIOPIO. HO

ESTIN. EPI. TO. TRITO. EN. TEI. HODOI. TEI. APPIAI. EN TOI

HERODO. AΛROI. OΛΔR. LOION. TOI. KINESANTI. MARTVS

DAIMON. ENHODIA. KAI. HOI. KIONES. DEMETROS

KAI. KORES. ANA⊗EMA. KAI. + ⊗ONION ⊗EON. KAI.

Shancrit Alphabet.

Vowels.

अ	आ	इ	ई	उ	ऊ	ऋ	ॠ	ऌ	ॡ	ए	ऐ	ओ	औ	अं	अः
a or e	ā	ee	ee	oo	ōo	ru	ru	lu	lrū	ăe -	ŏi	ō	au	un	ah, or, eh

Connected Vowels.

क का कि की कु कू कृ कॄ कॢ कॣ के कै को कौ कं कः

Consonants.

क	ख	ग	घ	ङ	च	छ	ज	झ	ञ	ट	ठ	ड	ढ	ण	त	थ	द
kĕ	khĕ	gu	ghu	n or ngĕ	chi	chha	ja	jha	nya	tà	thà	de	dhe	na	tē	t,hē	dĕ

ध	न	प	फ	ब	भ	म	य	र	ल	व	श	ष	स	ह	क्ष	ज्ञ
d,hĕ	ne	pa	p,ha	bĕ	bhe	mĕ	yĕ	rǎ	lĕ	wĕ	sǎ	sha	szh	kha	x	jnya or gya

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caſes of the demonſtrative pronoun and of the ſecond declenſion.

Ο, *omicron* or ſmall *o*, in the original Greek had three different ſounds. It ſounded *o* ſhort, as at preſent; and likewiſe *o* long, now denoted by Ω or large *O*. It likewiſe marked the ſound of the improper diphthong ου, ſounded like the Engliſh diphthong *oo*. The Ω was taken from the Phœnician wau or *V*.

Υ, *ypſilon*, we have obſerved before, was adopted to ſupply a mark for the ſound of I ſlender.

Ζ, *zeta*, is compounded of δς. Dion. Halic. however, informs us that this letter ſhould be pronounced σδ, according to the Doric plan.

Θ, *theta*, was not known in the old Greek. It is compounded of τ and the *ſpiritus aſper*, both which were of old written ſeparately thus TH.

Ξ, *xi*, is compounded of γς, κς, χς. Theſe letters, too, were originally written ſeparately.

Φ, *phi*. This letter is compounded of β, π, and the *ſpiritus aſper;* thus BH, PH.

Χ, *chi*, like the foregoing, is compounded of γ, κ, and the *ſpiritus aſper* as above.

Ψ, *pſi*, like ſome of the reſt, is made up of βς, πς, which, too, were originally written in ſeparate characters.

Theſe obſervations are thrown together purely for the uſe of ſtudents who may not chooſe to penetrate into the *minutiæ*. We are ſorry that the nature of the work will not permit us to extend our reſearches to greater length. The reader will find an ancient inſcription on Plate CCCXC, in which the powers of the letters are exemplified as they were in the firſt ſtage of the Greek language. Every language, we believe, was originally compoſed of inflexible words; the variations which now diſtinguiſh nouns and verbs were the effects of progreſſive improvements. What might have been the ſtate of the Greek language with reſpect to theſe variations in its original form, it is not now poſſible to diſcover. That it was rude and irregular, will not, we imagine, be controverted. One of the firſt attempts towards forming the variations, now denominated *declenſions* and *conjugations*, would probably be made upon the *demonſtrative* article and the *ſubſtantive* verb. This obſervation will be found to hold good in moſt poliſhed languages. In the Greek tongue, this was evidently the method.

136
Origin and flexion of the article.

The original Greek article was imported from the eaſt. It was the Hebrew or Phœnician ה *ha*. This particle ſometimes ſignifies *one*, and ſometimes it anſwers to our demonſtrative *the;* both in its adverbial and demonſtrative capacity it imports demonſtration. In the earlieſt ſtages of the two oriental languages, it was probably written apart, as *ha-melech* "the king." In proceſs of time it came to be joined with the following word, as *Hammelech*. From this we think the Greek article was deduced. It is ſtill retained in the Doric dialect in its priſtine character. The difference between *ho* and *ha* in the eaſtern language is nothing. Here then we have the articles ὁ maſculine and ἁ feminine. Upon theſe ſeveral changes were ſuperinduced, in order to render them more uſeful for the purpoſes of language. For thoſe changes we know of no archetype.

The Greeks then having adopted the Hebrew, or Phœnician, or Chaldean article *ha*, and changed it into *ho* for the maſculine, ſeem to have arranged its variations in the following manner:

	Sing.	*Plu.*
Nom.	ὁ	ὁι
Gen.	ὁυ	ὡν
Dat.	ὁι	ὁις
Acc.	ὁν	ὁυς

137
Its uſe in the flexion of nouns of the firſt and ſecond declenſions.

In the earlieſt ſtages of the Greek language, ι and υ were ſounded in the ſame manner, or nearly ſo, as was obſerved above. The accuſative was at firſt like the nominative; for diſtinction's ſake it was made to terminate in ν, which letter was likewiſe adopted to characterize the genitive plural; ς was annexed to the dative plural, to diſtinguiſh it from the dative ſingular. The radical word was ſtill without inflexion.

When the article was inflected in this manner, the proceſs ſtood as follows: we take λογος for an example:

	Sing.	*Plu.*
Nom.	ὁ λογ *ſpeech*	ὁι λογ *ſpeeches*
Gen.	ὁυ λογ *of ſpeech*	ὁν λογ *of ſpeeches*
Dat.	ὁι λογ *to ſpeech*	ὁις λογ *to ſpeeches*
Acc.	ὁν λογ *ſpeech*	ὁυς λογ *ſpeeches*

In this arrangement our readers will obſerve, that in the time under conſideration, ω was not yet introduced; and therefore ομικρον or little ο was the ſame letter in the genitive plural as in the accuſative ſingular; but in the latter caſe it was ſounded long by way of diſtinction.

The article *ha*, which is ſtill retained in the Doric dialect, was varied as follows:

	Sing.	*Plu.*
Nom.	ἁ	ἁι
Gen.	ἁς	ἁν
Dat.	ἁι	ἁις
Acc.	ἁν	ἁς

Theſe variations differ a little from thoſe of the maſculine; and they were no doubt made for the ſake of diſtinction, as is uſual in ſuch caſes We ſhall now give an example of the feminine as it muſt have ſtood before variations were introduced. We ſhall employ τιμη.

	Sing.	*Plu.*
Nom.	ἁ τιμ *honour*	ἁι τιμ *honours*
Gen.	ἁς τιμ *of honour*	ἁν τιμ *of honours*
Dat.	ἁι τιμ *to honour*	ἁις τιμ *to honours*
Acc.	ἁν τιμ *honour*	ἁς τιμ *honours*

Afterwards, when the Chaldean article *da* was adopted for the neuter gender, the letter ד or *d* was changed into τ, and prefixed to it; and then the Greeks, who, in their declenſion of adjectives, always followed the neuter gender, began to prefix it to the oblique caſes.

In this manner we think the Greek nouns ſtood originally; the only change being made upon the article. At length, inſtead of prefixing that word, and expreſſing it by itſelf, they found it convenient to affix a fragment of it to the noun, and ſo to pronounce both with more expedition. Thus ος-λογ, *e. g.* became λογ-ός, ὁυ-λογ became λογ-ου, and of courſe λογος and λογου, &c. The *ſpiritus aſper*, or rough breathing, was thrown away, in order to facilitate the coalition. Nouns of the neuter gender, as was neceſſary, were diſtinguiſhed by uſing ν inſtead of ς. In Oriental words the Greeks often change ς into ν, and *vice verſa*.

138 In this mode of flexion the Greeks copied from the Orientals.

In this caſe the Greeks ſeem to have copied from an eaſtern archetype. In Hebrew we find an arrangement exactly ſimilar. To ſupply the place of the pronouns poſſeſſive, they affix fragments of the perſonals: Thus, they write *ben i* "my ſon," inſtead of *ben-ani*, and *debir-nu* "our words," inſtead of *debir-anu*, &c. The perſons of their verbs are formed in the ſame manner. In this way, in our opinion, the variations of the firſt and ſecond declenſions were produced.

139 Formation of the third declenſion, and of its caſes.

After that a conſiderable number of their nouns were arranged under theſe two claſſes, there remained an almoſt infinite number of others which could not conveniently be brought into theſe arrangements; becauſe their terminations did not readily coaleſce with the articles abovementioned. Theſe, like nouns of the neuter gender, were in a manner ſecluded from the ſociety of the two other claſſifications. It is probable that theſe for a long time continued indeclinable. At laſt, however, an effort was made to reduce them into a claſs as well as the others. All theſe excluded nouns originally terminated with ς, which appears from their genitives as they ſtand at preſent. By obſerving this caſe, we are readily conducted to the termination of the priſtine vocable. The genitive always ends in ος, which ending is formed by inſerting ο between the radical word and ς. By throwing out ο we have the ancient nominative: Thus, Τιταν, genitive Τιτανος; taking out ο we have Τιτανς, the original inflexible termination. Αντω, genitive Αντοος; throw out ο and you have Αντος. Παλλας, genitive Παλλαδος; take away ο and there remains παλλαδς. Ορνις, genitive Ορνιθος; by throwing out ο we have ορνιθς. Αναξ, genitive Ανακτος, Ανακτς. Κρατος, genitive Κρατεος, Κρατης; originally Κρατες, becauſe originally ε had the ſound of η, as was obſerved above. Μελι, genitive Μελιτος, Μελιτς. Ειδος, genitive Ειδεος, Ειδες, the old noun. In ſhort, the genitive is always formed by inſerting ο immediately before ς, which is always the termination of the nominative; and by this rule we eaſily diſcover the noun ſuch as it was in its original form.

The dative of this declenſion was cloſed with ι *aſcriptum;* the ſame with that of the ſecond, namely, ι *ſubſcriptum*. The accuſative commonly terminates with α; but was originally ended with ν. The Romans imitated the Æolian dialect, and they commonly ended it with *em* or *im*. The Greeks, perhaps, in this imitated their progenitors, for *a* was their favourite vowel. The nominative plural ended in ες, which nearly reſembles the Engliſh plural, and was poſſibly borrowed from the Thracians. The genitive plural in all the declenſions ends in ων; the dative ends in σι, the σ being inſerted to diſtinguiſh it from the dative ſingular. When a ſtrong conſonant, which would not eaſily coaleſce with ς, comes immediately before it, that conſonant is thrown out to avoid a harſh or difficult ſound. The ſum then is; the caſes of nouns of the firſt and ſecond declenſions conſiſt of the radical word with fragments of the articles annexed, and theſe were the firſt claſſifications of nouns. The other nouns were left out for ſome time, and might be denominated *neuters;* at length they too were claſſified, and their variations formed as above. In this proceſs the Greeks deviated from the oriental plan; for theſe people always declined their nouns by particles prefixed. Whether the Greeks were gainers by this new proceſs, we will not pretend poſitively to determine. We are, however, inclined to imagine that they loſt as much in perſpicuity as they gained by variety.

140 Greek ablative.

It is generally believed that the Greeks have no ablative; to this opinion, however, we cannot aſſent. It is true, that the dative, and what we would call the *ablative*, are always the ſame: yet we think there is no more reaſon to believe that the latter is wanting in Greek, than that the ablative plural is wanting in Latin, becauſe in that language both theſe caſes are always alike.

141 Genders.

In the eaſtern languages there are only two genders, analogous to the eſtabliſhed order of nature, where all animals are either male or female. But as the people of the Eaſt are, to this day, ſtrongly addicted to perſonification, they ranged all objects of which they had occaſion to ſpeak, whether animate or inanimate, under one or other of theſe two claſſes. Hence aroſe what is now called the *maſculine* and *feminine* genders. The orientals knew nothing of a neuter gender, becauſe, indeed, all objects were comprehended under the foregoing claſſes. The Phœnician feminine was formed from the maſculine, by adding אח, *ah*. In this the Greeks in many caſes imitated them. The Greeks and Latins left a vaſt number of ſubſtantives like a kind of outcaſts, without reducing them to any gender; this proceſs gave riſe to the neuter gender, which imports, that ſuch ſubſtantives were of *neither gender*. This has the appearance of a defect, or rather a blemiſh, in both. Sometimes, too, they make words neuter, which, according to the analogy of grammar, ought to be either maſculine or feminine. And again, they range words under the maſculine or feminine, which by the ſame rule ought to have been neuter. In ſhort, the doctrine of generical diſtribution ſeems to have been very little regarded by the fabricators of both tongues. The beauty which ariſes from variety ſeems to have been their only object.

142 Farther obſervations on the article.

The uſe of the article in the Greek language is, we think, rather indeterminate; it is often prefixed to proper names, where there is no need of demonſtration nor geometrical diſtinction. On the contrary, it is often omitted in caſes where both the one and the other ſeem to require its aſſiſtance. In ſhort, in ſome caſes it ſeems to be a mere expletive. Though both Lord Monboddo and Mr Harris have treated of this part of ſpeech, neither the one nor the other has aſcertained its proper uſe. (See *Orig. and Progr. of Language*, vol. ii. p. 53. *Hermes*, page 214. *et ſeq).*— We know not any objection to the early uſe of articles among the Greeks ſo plauſible as the total neglect of them among the Romans. But it ought to be conſidered, that after the flexions were introduced, the uſe of the article was in a great meaſure neglected. Accordingly, Lord Monboddo obſerves that it is very ſeldom uſed as ſuch by Homer, but commonly in place of the relative pronoun, ὁς, ἡ, ὁ.— Thus it would appear, that at the time when the Roman language was reduced to the Grecian ſtandard, the article was not commonly uſed by the Greeks; and of courſe the Latins never employed it. There can be no doubt but the pronoun *who*, in the northern languages, is the ſame with the Greek ὁ, and the Hebrew *hua*. This among the northern people is always

ways a relative, which affords a preſumption that the Greeks originally uſed the article in the ſame manner as we do at preſent. The fact is, that the articles having once got into vogue, were often poſitively uſed as mere expletives to fill up a gap; and that on the other hand, when there was no occaſion for pointing out an object, it being fully determined by the tenor of the diſcourſe, it was often omitted.

143 Adjectives. In forming adjectives, they followed the ſame plan that they had done with ſubſtantives. Their great effort was to make their adjectives agree with their ſubſtantives in gender, number, and caſe. This arrangement improved the harmony of ſpeech; and nothing could be more natural than to make the word expreſſing the quality correſpond with the ſubject to which it belonged.

As adjectives denote qualities, and thus are ſuſceptible of degrees, nature taught them to invent marks for expreſſing the difference of theſe degrees. The qualities may exceed or fall below each other by almoſt numberleſs proportions; it was, however, found convenient to reſtrict theſe increaſes and decreaſes to two denominations. The poſitive is, properly ſpeaking, no degree of compariſon at all; therefore we need only point out the formation of the comparative and ſuperlative.

The former is generally thought to be fabricated, by firſt adding the Hebrew word יתר, *excellent*, to the poſitive, and then affixing the Greek termination ος; and the latter, by affixing the Syrian word *tath* and the ſyllable ος, in the ſame manner.

144 Greek numerals. Every nation, even the moſt uncivilized, have early acquired the notion of number. Numerical characters and names are the ſame in many different languages. Theſe terms were diſcovered, and in uſe, long before grammar came to any perfection; and therefore remain either inflexible or irregular. The firſt way of computing among the Greeks was by the letters of the alphabet; ſo that Α ſignified *one* and Ω *twenty four*: in this manner the rhapſodies of Homer are numbered; and ſo are the diviſions of ſome of the Pſalms, as is generally known. But a more artificial plan of computation was obviouſly neceſſary. They divided the letters of the alphabet into *decades* or tens, from A to I=10. To expreſs the number 6, they inſerted ϛ *bauv* =6; ſo that by this means the firſt decade amounted to 10. In the next decade every letter increaſed by tens, and ſo P denoted 100. In this decade they inſerted ϙ κοππα = 90. In the third, every letter roſe by 100; ſo that ϡ) σανπι = 900. By inſerting theſe three Phœnician characters they made their alphabet amount to 900. To expreſs chiliads or thouſands, they began with the letters of the alphabet as before; and to make the diſtinction, they placed a dot under each character, as the units, tens, hundreds, were diſtinguiſhed by an acute accent over them.

But in monumental inſcriptions, and in public inſtruments, a larger and more laſting numerical character was fabricated, They began with Ι, and repeated that letter till they arrived at Π = 5. This is the firſt letter of πεντε 5. Then they proceeded, by repeating Ι till they came to 10 Δ, the firſt letter of δεκα; 10. Then they repeated Δ over and over, ſo that four Δ = 40. To expreſs 50, they uſed this method; they incloſed Δ in the belly of |Δ| = 50, |H| = 500 |M| = 50,000, &c. Often, however, X ſignifies 1000, and then we have δις χιλιοι, 2000, τρις χιλιοι, 3000; and ſo of the reſt.

145 Pronouns. The word *pronoun* ſignifies a word placed inſtead of a noun or name; and indeed the perſonal pronouns are really ſuch: this needs no explication. The pronoun of the firſt perſon is one of thoſe words which have continued invariable in all languages; and the other perſonals are of the ſame character. The relatives, poſſeſſives, demonſtratives, and gentiles, are generally derived from theſe, as may be diſcerned by a very moderate adept in the language. Our readers will therefore, we hope, eaſily diſpenſe with our dwelling upon this part of ſpeech.

146 Greek verbs, how formed. *Verb*. In moſt ancient languages, verbs, according to the order of nature, have only three tenſes or times, namely, the *paſt*, *preſent*, and *future*. The intermediate tenſes were the invention of more refined ages.—The Greek, in the moſt early periods, had no other tenſes but thoſe abovementioned. The manner of forming theſe we ſhall endeavour to point out, without touching upon the nature of the reſt, ſince an idea of them may be acquired from any common grammar.

We have obſerved above, that the flexion of nouns of the firſt and ſecond declenſions are formed by annexing fragments of the articles to the radical words; and that the variation of the tenſes were produced by joining the ſubſtantive verb, according to the ſame analogy. Every Greek verb was originally an inflexible biliteral, triliteral, quadriliteral or diſſyllabic radix. The variations were formed a long while after in the manner above intimated.

The Greeks had their ſubſtantive or auxiliary verb, from the Phœnician or Chaldean verb הוה, *fuit*. This verb, taking away the gentle aſpirate from both beginning and end, actually becomes ει. This vocable the Greeks brought along with them from the Eaſt, and manufactured after their own manner, which appears to have been thus:

Preſ. εω, εεις, εει, εομεν, εετε, εοσι,
Cont. ω, εις, ει, ουμεν, ειτε, ουσι,
Fut. εσω, εσεις, εσει, εσομεν, &c.

We place οσι in the third perſon plural, becauſe for many centuries ομικρον ſupplied the ſound of the diphthong ου. By theſe variations it will appear that the radical verb was rendered capable of inflexion. We have obſerved that Greek verbs were a collection of biliteral, triliteral, or quadriliteral, radical words.—The following may ſerve for examples: τι, λεγ, Μαρ, τυπ, φαν, ταν, ραπ, Δαμ, Δυλ, λειχ.

Theſe radicals are taken at random; and we believe our Grecian ſtudent, by adding the terminations, will readily find them all ſignificant verbs. With theſe radicals then, and the ſubſtantive-verb, we ſuppoſe the preſent and future tenſes were formed.

147 Original preſent that which is now the ſecond future. But it is now generally admitted that the modern preſent was not the original one of the verb. The ſecond, or Attic future, appears plainly to have been the moſt ancient preſent. When the language was improved, or rather in the courſe of being improved, a new preſent was invented, derived indeed from the former, but differing widely from it in its appearance and complexion. Upon this occaſion, the old preſent

Greek Language.

was degraded, and inſtead of intimating what was *doing at preſent*, was made to import what was immediately to be done hereafter. By this means, γραφεω, contracted into γραφῶ, *I am writing*, came to intimate *I am juſt going to write*. This change was probably made for the ſake of enriching the language, for variety, for energy. Thus τυπεω contracted τυπῶ became τυπτω, τικῶ, τικτω, &c. Acccording to this theory, we find, that ſuch verbs as now have no ſecond future retain their original form, only the circumflex has been removed in order to accommodate them to the general ſtandard. Grammarians have now choſen the three characteriſtic letters of active verbs from the preſent, firſt future, and perfect. The true characteriſtic of the original verb was that of the preſent ſecond future. Many verbs are now deſtitute of that tenſe, becauſe, ſince the invention of the new preſent, thoſe have fallen into diſuſe.

148 Formation of the modren preſent,

Let us now take the verb λεγω, *dico*, in order to make a trial; and let us write the radix and the auxiliary, firſt ſeparately, and then in conjunction: Thus,

λεγ-εω, λεγ-εεις, λεγ-εει, λεγ-εομεν, λεγ-εετε, λεγ-εοσι.

Then we will have contracted λεγῶ, λεγεῖς, λεγεῖ, λεγοῦμεν, λεγεῖτε, λεγȣσι. Here we believe every thing is ſelf-evident.

The Engliſh would run thus: Saying *I am*, ſaying *thou art*, ſaying *he is*, &c. At firſt the radix and the auxiliary were pronounced ſeparately, as we do our helping verbs in Engliſh, and would have been written in the ſame manner had words been then diſtinguiſhed in writing.

149 Firſt future, and

The preſent firſt future occupied the ſame place that it now does, and concurred in its turn to complete the future in conjunction with the radix. That the ſubſtantive verb was inflected in the manner above laid down, is obvious from its future middle εσομαι, and from the future of the Latin verb *ſum*, which was of old *eſo eſis*, &c. Verbs in λω, μω, νω, ρω, often take σω in the firſt future. See *Fæd. Cret. ap. Marm. Oxon.* l. 67. Verbs in λω and ρω aſſume σ by analogy, as κελλω, κελσω, *Eurip. Hecub.* v. 1057. κελσαι *Hom. Od.* x. v. 511. τελλω τελσω, *unde* τελσον, *Il.* x. v. 707. ορω, ορσομεν, *Pind. Nem. Od.* 9. *Duodec.* 2. τειρω, τερσει, *Theoc. Idyll.* 22. v. 63. In fine, the Æolic dialect after the liquids often inſerts σ.

It muſt be obſerved, that the Greeks, in order to accelerate the pronunciation, always throw out the ε and ε, except in verbs ending in αω, εω, οω; where they generally change them into η and ω. When the laſt letter of the radix can coaleſce with σ after ε is thrown out, they transform it ſo as to anſwer that purpoſe; if not, they ſometimes throw it out. We ſhall once more take λεγω for an example:

λεγ-εσω, λεγ-εσεις, λεγ-εσει, &c.

Throwing out ε, it would ſtand λεγ-σω, λεγ-σεις, &c. by changing γς into ξ it becomes λεξω. Δ θ and τ cannot coaleſce with σ, therefore they throw them out: thus Αδω, future firſt ασω; πληθω, future firſt πλησω; Ανυτω, Ανυσω, &c.

Theſe are the general rules with reſpect to the formation of the preſent and future of active verbs in the earlieſt ſtages of the Greek language. The limits preſcribed will not allow us to purſue theſe conjectures; but the reader may, if he thinks proper, carry them a great way.

150 Præterite tenſes.

The præterite tenſe falls next under conſideration. If we may truſt analogy, this, as well as the other two, muſt have owed its conformation to the radix of the verb, and ſome other word fitted to eke out its terminations. It has been thought by ſome critics, that this addition was taken from the Hebrew word היה; and we ſhould be of the ſame opinion did not another auxiliary preſent itſelf nearer home, which appears to us much more congruous to ſuch a purpoſe. Perhaps, indeed, the people from whom we ſuppoſe it borrowed, derived it from the eaſtern quarters. We have already obſerved, that the Thracians were maſters of a great part of Greece in the very earlieſt ages. At that time they were a polite and learned people. From them a conſiderable part of the Greek language was derived. If, therefore, we ſhould find a word in their language employed for the ſame purpoſe, and accommodated to coaleſce with the radical verb, we feel ourſelves very much inclined to prefer ſuch a word.

151 Origin of the auxiliary verb.

The word *ha* pervades many different languages as an auxiliary verb. From it we have the Italian *ho*, the Spaniſh *he*, the French *ai;* and in one ſhape or other it appears in all the German and Scandinavian dialects. It is the Gothic auxiliary; and, we believe, it forms the termination of the perfect active of the firſt conjugation in the Latin tongue: For there *am* is the radix of *amo;* in the præterite *am-havi*, *amavi:* and the præterperfect *am-hav-eram*, i. e. *amaveram*, compounded of *am*, *hav*, and *eram*, the imperfect of the indicative of the ſubſtantive verb. This proceſs, in the formation of the præterite of Latin verbs, will ſcarce be queſtioned, and forms certainly a preſumptive proof that the Greeks purſued the ſame line. From this verb is likewiſe derived the Latin *habeo*, by changing *v* into *b*, which are indeed the ſame letter. Our readers, after this detail, will not be ſurpriſed if we ſhould now hazard a conjecture, and declare it as our opinion, that this ſame Gothic auxiliary *ha* is actually the additional part of the præterite of Greek verbs, and that part upon which the conjugation depends.

In forming this combination between the radix and the auxiliary, the Greeks were obliged to fabricate ſeveral devices. As often as the laſt letter of the radix could not unite with the aſpirate in *ha*, they metamorphoſed it into one of the double letters, which are capable of coaleſcing with it. In the verb λεγω, γ was changed into χ; thus, λεγ *ha* became λεχα, τυπτω præterite τυπ *ha*, was combined into τυφα. In verbs which had a radix that would not admit this conjugation, they hardened the *h* into κ, as in τιω, præterite τι-κα, Ακου-κα. Many other ways were contrived to facilitate this reunion. Theſe are detailed in every Greek grammar, and ſo need not be mentioned.—What has been ſaid with reſpect to this configuration, we offer as a pure conjecture, without the moſt remote intention of obtruding it upon our readers.

If it is admitted, that the auxiliary *ha* formed the conjugating termination of the active verb among the Greeks, it will likewiſe be admitted, that the radical verb and the other made originally two diſtinct words: that, according to this ſcheme, the præterite would proceed thus, λεγ *ha*, ſaid *I have*; λεγ *has*, ſaid *thou haſt*; λεγ *he*, ſaid *he hath*, &c. This proceſs to us appears rational, elegant, and advantageous. The pluperfect was not then invented, and therefore it does not come under our conſideration. The other tenſes were all deduced from thoſe deſcribed; and in forming theſe intermediate diſtinctive tenſes, we believe that both critics and grammarians, and perhaps philoſophers too, were employed. See GRAMMAR.

The eaſtern nations have diverſified their verbs, by affixing fragments of the perſonal pronouns to the radix, by which they gained only the advantage of exhibiting the genders of the perſons engaged in being, acting, and ſuffering; but a perpetual repetition of theſe was unavoidable. The Greeks, by their artificial combination of the radix with the two auxiliaries, avoided the neceſſity of repeating their perſonal pronouns, as we and the other modern inhabitants of Europe are obliged to do; and at the ſame time, by diverſifying the terminations of their nouns and verbs, wonderfully improved the beauty and harmony of their language. The arrangement above inſiſted on is ſo very different from that of the orientals, and ſo entirely Gothic, that we think there can be no doubt that the Greeks borrowed this manœuvre from the Thracians. Every perſon moderately acquainted with the Greek language will, upon examination, diſcover a wonderful coincidence between the ſtructure, idioms, and phraſeology, of the Engliſh and Greek languages: ſo many congenial features muſt engender a ſtrong ſuſpicion that there once ſubſiſted a pretty intimate relation between them.

In the preceding deduction, we find ourſelves obliged once more to differ from the very learned author of the *Origin and Progreſs of Language*. As we took the liberty to queſtion his originality of the Greek language, and at the ſame time preſumed to attack the goodly ſtructure raiſed by philoſophers, critics, and grammarians; ſo that we now totally differ from that learned writer as to his theory of the creation of verbs out of the inhabile matter of αω, εω, &c. This whole fabric, in our opinion, leans on a feeble foundation.

The apparatus of intermediate tenſes, of augments, derivation of tenſes, with their formation, participles, and idiomatical conſtructions, and other eſſentials or appendages, we omit, as not coming within the verge of the diſquiſition.

152
Derivation and formation of the middle voice,

The derivation and formation of the middle and paſſive voices, would certainly afford matter of curious ſpeculation; but the labour neceſſary to inveſtigate this connection would greatly overbalance the benefit expected.

However, to complete our plan, we ſhall ſubjoin a few ſtrictures with reſpect to the formation of the middle voice, which was, in our opinion, immediately formed from the active.

We have ſeen already, that the active voice in its original ſtate was formed by annexing fragments of the ſubſtantive or auxiliary verb to the radix. The ſame economy was obſerved in fabricating the flexible parts of the verb of the middle voice. To demonſtrate this, we ſhall firſt conjugate the preſent tenſe of the auxiliary paſſive upon the principles above laid down.

Preſent, Εομαι, εεσαι, εεται, εομεθα, εεσθε, εονται. Such was the paſſive-preſent of the auxiliary. We ſhall now take our example from the verb τυπτω; ſecond future τυπ-εομαι, *ſtruck I am*, τυπ-εεσαι, *ſtruck thou art*, τυπ-εεται, *ſtruck he is*, &c. contracted τυπουμαι, τυπη, τυπειται. The conjunction and formation here is obvious. Perhaps, in the ſecond perſon, σ was inſerted, which, however, is thrown out in the progreſs of the perſons. The future middle is clearly formed, by affixing the future paſſive of the verb εω, only as η was introduced into the language for ε long, it was generally (T) ſubſtituted inſtead of that vowel in verbs ending in αω and εω, and ω for ο in verbs ending in οω; the two vowels ε and ο being originally long as well as ſhort, till η was adopted to denote the long ſound of the former, and ω that of the latter. In many verbs, before the conjunction of the radix and auxiliary, ε was thrown out: thus, τυπ-εσομαι became τυψομαι, λεγ-εσομαι, λεξόμαι, &c.

Plate CCCXC.

The præterite was deduced from that of the active by a very ſlight variation, ſo trifling, indeed, that it need not be mentioned; only we may obſerve, that the aſpirate *h* is never retained in this tenſe, which originally ſeems to have been the only diſtinguiſhing character by which that tenſe of the middle-voice differed from the ſame tenſe of the active.

From the ſtrict analogy between the mode of forming the three primary tenſes of the active and middle voice, we are led to ſuſpect that what is now the middle was originally the paſſive voice.

The intermediate formation of the former, by annexing the paſſive auxiliary, is obvious. The middle voice ſtill partakes of the paſſive ſignification, ſince it has ſometimes a paſſive, though more frequently an active. There are ſeveral parts of the preſent paſſive quite analogous to the ſame tenſes in the middle: and, laſtly, it is the common progreſs, in the courſe of improvement, to proceed ſtep by ſtep, and by approximation. What is moſt ſimple and eaſy is the firſt object, then ſucceeds what is only a little more difficult, and ſo on till we arrive at the laſt ſtage, when human ingenuity can go no farther. Now, it will readily be admitted, that the paſſive voice is much more embarraſſed and intricate in its texture than the middle; and, therefore, the former ſhould have been poſterior in point of time to the latter.

We are well aware, that the very learned Kuſter, and moſt other moderns, deeply ſkilled in the origin, progreſs, and ſtructure of the Greek language, have thought otherwiſe. The general opinion has been, that the Greek middle voice anſwered exactly to the Hebrew conjugation *hithpahal*, and in its priſtine ſignification imported a reciprocality, or when the *agent acts upon itſelf*. For our part, we only intended a few hints upon the ſubject, which our learned readers may purſue, approve, or reject, at pleaſure.

If we might pretend to inveſtigate the formation of the paſſive voice, we ſhould imagine that the modern

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(T) We ſay generally, becauſe in verbs ending in εω, that ε is ſometimes retained, as τελεω, τελεσω, αρκεω-εσω.

dern preſent was formed from the ancient one, by inſerting ſuch letters as were found neceſſary for beauty, variety, energy, &c.; the firſt future from the ſecond future middle of the verb τιθημι, once θεω. This future is θησομαι; and, joined to the radix, always occupies that place, τι-θησομαι, τελεθησομαι, φλεχθησομαι τυφθησομαι, and ſo of the reſt; whether μαι, σαι, ται, which occur ſo frequently as the terminations of the middle and paſſive voices, are fragments of ſome obſolete verb, we will not pretend to determine.

153 And of the paſſive.

From verbs in αω, εω, οω, υω, are formed verbs in μι; which in the preſent, imperfect, and ſecond aoriſt, as it is called, only have a different form, by aſſuming μι with a long vowel preceding it, in the preſent active; which vowel is preſerved in each perſon ſingular. This collection of irregular verbs ſeems to be formed from the verb ειμι, which in ſome dialects might be ημι. Indeed the imperfect ην, ης, η, ſeems, to imply as much: in this, however, we dare not be poſitive.

In the whole of this analyſis of the formation of verbs, we have laid down what to us appears moſt plauſible. That metaphyſical critics may diſcover inaccuracies in the preceding detail we make no doubt; but our candid readers will doubtleſs reflect, that no language was ever fabricated by philoſophers, and that the elements of language were hammered out by peaſants, perhaps, by ſavages. Critics have created a philoſophy of language we admit, and have a thouſand times diſcovered wonderful acuteneſs and ingenuity in the mechaniſm of words and ſentences, where the original onomathetæ never apprehended any, and which poſſibly never exiſted but in their own heated imagination. If our more enlightened readers ſhould find any thing in the preceding detail worthy of their attention, ſo much the better; if the contrary ſhould happen, we preſume they will take up with the hackneyed ſyſtem. We have all along neglected the dual number, becauſe it regularly follows the type of the other numbers.

Be that as it may, before we drop this ſubject we muſt take the liberty to ſubjoin an obſervation or two with reſpect to the conſequences of the practice of new modelling the preſent, and of courſe the imperfect, tenſes of verbs. 1ſt, After this arrangement they commonly retained all the other tenſes exactly as they had ſtood connected with the primitive verb: this needs no example. 2d, They often collected the tenſes of verbs, whoſe preſent and imperfect were now obſolete in order to ſupply this defect. Thus we have φερω-Οισω, ενεγκα, ηνοχα. 3d, They often formed preſent and imperfect tenſes without any other tenſes annexed: The poets in particular ſeem to have fabricated theſe two tenſes at pleaſure.

If this procedure was convenient for the poets, it was certainly moſt incommodious with reſpect to the vulgar, as well as to foreigners who had an inclination to learn the language. The vulgar, ſome ages after Homer and Heſiod, muſt have found it as difficult to underſtand their poems as our people do to comprehend thoſe of Chaucer and Spenſer. By this diſpoſition, too, the etymology of verbs was almoſt entirely confounded. The preſent ſecond future being, as has been obſerved, the ancient preſent, the attention of the curious etymologiſt was naturally diverted to the modern preſent, where it was utterly impoſſible to diſcover the radical word. A few examples will elucidate this point: τεινω *to ſtretch, to extend*, old preſent τανω; ταν is the radix, which at once appears to be a Perſian word ſignyfying *a large tract of country*. Hence *Mauritania* "the land of the Mauri," Aquitania, Bretania; and with *ſ* prefixed Hindo-ſtan, Chuſi-ſtan, Turque-ſtan. The obſelete verb Οπω, whence Οπτομαι, is evidently derived from *op*, an Egyptian name of the moon; φαινω, ſecond future φανῶ, *to ſhow*, from the Egyptian word *phan* or *pan*, a name of the ſun: τυπτω, future ſecond τυπῶ; τυπ is obviouſly the offspring of תף *thaph*, "a drum or timbrel," from beating or ſtriking, &c. In ſuch etymological reſearches, the ſtudent muſt be careful to turn the Ionic η into the Doric α; becauſe the Dores were lateſt from the coaſt of Paleſtine, and conſequently retained the largeſt ſhare of the Phœnician dialect: thus Γηθεω, *to rejoice*, turning η into α becomes Γαθεω. This word, throwing away the termination, becomes *gath*, plainly ſignifying a *wine preſs* (υ). It is likewiſe to be obſerved, that the Æolians often change α into υ, as συρξ inſtead of σαρξ, &c.

It is not our intention to enter into the arrangement and peculiar conſtructions of the Greek language. There is, however, one, which we cannot well paſs over in ſilence. As that tongue is deſtitute of thoſe words which the Latins call *gerunds*, to ſupply this defect they employ the infinitive with the article prefixed; thus, Εις το ειναι φιλους, *in order to their being friends*; απο του ἑλεσθαι αυτους Βασιλεα, *from their having elected a king*; Εκ του απο φευγειν αυτους εκ της πολεος, *from their flying out of the city*. In theſe phraſes the infinitive is ſaid to aſſume the nature of a ſubſtantive noun; agreeing with the article before it, exactly as if it were a noun of the neuter gender. Idioms of this kind occur in our own tongue; only with us the verb, inſtead of being expreſſed in the infinitive, is turned into the participle. According to this arrangement, the firſt of the preceding phraſes, which, according to the Greek, would ſtand *toward to be friends*, in Engliſh is, *in order to their being friends*. This anomaly, then, if indeed it be ſuch, is of no manner of conſequence. The French, if we are not miſtaken, would expreſs it in the very ſame manner with the Greek, that is, *pour etre amis*.

154 Greek infinitives uſed as nouns.

From treating of verbs, we ſhould naturally proceed to the conſideration of adverbs, which are ſo denominated, becauſe they are generally the concomitants of verbs. Every thing relating to that part of ſpeech, in the Greek tongue, may be ſeen in the Port Royal or any other Greek grammar. Inſtead therefore of dwelling upon this beaten topic, we ſhall hazard a conjecture upon a point to which the critics in the Greek tongue, as far as we know have not hitherto adverted.

155 Greek particles of oriental extraction.

The moſt elegant and moſt admired writers of Greece and eſpecially Homer, and after him Heſiod, abound with ſmall particles, which appear to us pure expletives, created as it were to promote harmony, or fill up a blank without ſenſe or ſignification. How thoſe

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(υ) Hence it came to ſignify rejoicing, from the mirth and revelry attending the treading of the vine preſs.

thoſe expletive particles ſhould abound in that language beyond any other, we think, is a matter not eaſy to account for. It has been ſaid by the Zoili, that if you extract theſe nonentities from the poems of that bard, *qui ſolus meruit dici poeta*, a *magnum inane*, a mighty blank would be left behind. We would willingly do juſtice to that pigmy race of words, and at the ſame time vindicate the prince of poets from that groundleſs imputation. Plato likewiſe, the prince of philoſophers, has been often accuſed of too frequently employing thoſe ſuperfluous auxilliaries.

Thoſe particles were no doubt imported from the eaſt. It would be ridiculous to imagine that any deſcription of men, however enthuſiaſtically fond they might be of harmonious numbers, would ſit down on purpoſe to fabricate that race of monoſyllables purely to eke out their verſes; mere ſounds without ſignificancy. In the firſt place, it may be obſerved, that there is a very ſtrict connection among the particles of all cognate languages. To this we may add, that the not underſtanding the nature, relations ſignification, and original import of thoſe ſeemingly unimportant terms, has occaſioned not only great uncertainty, but numberleſs errors in tranſlating the ancient languages into the modern. The Greek language in particular loſes a conſiderable part of its beauty, elegance variety, and energy, when theſe adverbial particles with which it is replete are not thoroughly comprehended. An exact tranſlation of theſe ſmall words, in appearance inſignificant, would throw new light not only on Homer and Heſiod, but even upon poets of a much poſterior date. Particles, which are generally treated as mere expletives, would often be found energetically ſignificant. It is however, altogether impoſſible to ſucceed in this attempt without a competent ſkill in the Hebrew, Chaldaic, Arabian, Perſian, and old Gothic languages. We ſhall here take the liberty to mention a few of theſe particles which are moſt familiar, one or other of which occur in almoſt every line of Homer, and which we believe are either not underſtood or miſunderſtood. Such are Δα, δη, μει, ητοι, μαν, γε, ερι, αρα, ρα, γουν. Δα is nothing elſe but the Chaldaic particle δα, the parent of the Engliſh *the*. It likewiſe ſignifies *by turns in your turn*: δη, is the ſame word in the Ionic dialect; μεν is a particle of the Hebrew affirmative אמן *amen, fides, veritas*. Μαν, a kind of oath by the moon called *mana*, almoſt over all the eaſt; hence Dor. μανα; γε, an oath by γεα, that is, *the earth*: αρα, another oath by the ſame element, probably from the oriental word of the ſame import; ρα, is a fragment of αρα, mentioned before; γουν, of γεα, the *earth*, and Ον or Ων, an Egyptian name of the ſun; Ως *as*, a particle which pervades all the dialects of the Gothic language. In this manner we believe all theſe ſmall words that occur ſo frequently in the Greek tongue, and which have hitherto been held inexplicable, may be eaſily rendered in ſignificant terms; and were this done, we believe they would add both beauty and energy to the clauſes in which they ſtand. But this diſcuſſion muſt be left to more accompliſhed adepts.

156 Prepoſitions,

We ſhall not explain the nature of prepoſitions, becauſe we are convinced that few people will take the trouble to peruſe this diſquiſition who are not already acquainted with their import in language. The Greek prepoſitions are eighteen in number, which need not be enumerated here. Moſt of theſe might be eaſily ſhown to be particles, or fragments deduced from oriental or Gothic words. The uſe of theſe words is to connect together terms in diſcourſe, and to ſhow the relation between them. In languages where, as in Engliſh, all theſe relations are expreſſed without any change on the termination of the nouns to which they are prefixed, the proceſs is natural and eaſy. The whole is performed by juxta-poſition. But in the Greek and Latin tongues, this effect is produced, partly by prefixing prepoſitions and partly varying the terminations of nouns. Had the Greeks been able to intimate all thoſe relations by varying the terminations, or had they multiplied their prepoſitions to ſuch a number as would have enabled them to expreſs theſe relations without the caſual variations, as the northern languages have done; in either caſe their language would have been leſs embarraſſing than it is in its preſent ſtate. According to the peſent arrangement both prepoſitions and the caſual variations are uſed promiſcuouſly to anſwer that purpoſe, a method which appears to us not altogether uniform. Though this plan might occaſion little embarraſſment to natives, it muſt, in our opinion, have proved ſomewhat perplexing to foreigners. The difficulty would be, as to the latter, when to adopt the one and when the other expedient.

Another inconveniency ariſes from the exceeding ſmall number of prepoſitions in that language, which bear too ſmall a proportion to the great variety of relations which they are appropriated to intimate. This deficiency obliged them often to employ the ſame prepoſition to denote different relations; For inſtance, Επι intimates, 1ſt, *upon*; as επι του λιθου, *upon the ſtone*; and then it takes the genitive. 2d, It denotes *near upon*; as επι τῳ λιθῳ, and then it governs the dative. 3d. The ſame prepoſition ſignifies *motion towards*; as Επεσεν επι τον λιθον, *he fell upon the ſtone*. In theſe inſtances the ſame prepoſition intimates three different relations; and, which is ſtill more embarraſſing, each of theſe requires a different caſe. The difficulty in this inſtance is ſo conſiderable, that even the moſt accurate of the Greek writers themſelves often either forget or neglect the true application. Many examples of this might be adduced, did the limits aſſigned us admit Such illuſtrations. Every man who has carefully peruſed the Grecian authors will readily furniſh himſelf with examples.

157 Irreglarly uſed.

Again, ſome prepoſitions, which indicate different relations, are prefixed to the ſame caſe. Thus, Εξ ſignifies *from*; as, Εκ Διος Αρ ομεθα, *from Jupiter we begin*; απ εμου βιου, *from my life*, or *my courſe of life*; προ των θυρων, *before the doors*; προ νικης εγκωμιον, *an encomium before the victory*; Αντι αγαθων αποδιδοναι κακα, *to render evil for good*; αντι σου, *againſt you*. In theſe examples, and indeed every where, thoſe prepoſitions intimate different relations, and yet are prefixed to the ſame caſes. Sometimes the ſame prepoſition ſeems to aſſume two oppoſite ſignifications: this appears from the prepoſition αντι juſt mentioned, which intimates both *for*, *inſtead of*, and *againſt* or *oppoſite to*.

What has been obſerved with reſpect to the prepoſitions above mentioned, the reader will readily enough apply to Κατα, Μετα, Δια, περι. Theſe incongruities certainly imply ſomething irregular; and ſeem to intimate

Greek Language.

mate that thoſe anomalies were ſo deeply incorporated with the conſtitution of the language, that the ſubſequent improvers found it impoſſible to correct them. Indeed to prefix a prepoſition to a caſe already diſtinguiſhed by the affixed termination, appears to us a ſuperfluity at leaſt, if not an abſurdity; for certainly it would have been more natural to have ſaid εκ ζευς αρχομεθα, than εκ Διος αρχομεθα. Some very learned men, who have inquired *into the origin of language*, have been of opinion that prepoſitions were the laſt invented ſpecies of words. If this opinion is well founded, we may ſuppoſe (and we think that this ſuppoſition is not altogether improbable) that the caſual terminations of the Greek language were firſt affixed to the radix, in the manner above exhibited; and that prepoſitions were afterwards fabricated and prefixed to the caſes already in uſe.

The ſyntax or conſtruction of the Greek language does not, according to our plan, come within the compaſs of our preſent inquiry. This the curious Greek ſtudent will eaſily acquire, by applying to the grammars compoſed for that purpoſe. We have already hazarded a few conjectures with reſpect to the formation of the moſt important and moſt diſtinguiſhed claſſes of words into which it has been divided by the moſt able grammarians, without, however, deſcending to the minutiæ of the language. As prepoſitions are the chief materials with which its other words, eſpecially verbs, are compounded, we ſhall briefly conſider the order in which they probably advanced in this proceſs.

158 Uſed in compoſition.

Complex ideas are compounded of a certain number or collection of ſimple ones. Of thoſe complex notions, ſome contain a greater and ſome a ſmaller number of ſimple conceptions. In language, then, there are two ways of expreſſing thoſe complex ideas, either by coining a word to expreſs every ſimple idea ſeparately, according to the order in which they ſtand in the mind; or by trying to combine two or more ſimple terms into one, and by that method to intimate one complex idea, by one ſingle word. The Arabians, notwithſtanding all the boaſted excellencies of their language, have never arrived at the art of compounding their words, in order to anſwer this noble purpoſe; and the ſiſter dialects are but ſlenderly provided with this ſpecies of vocables. The Greeks, of all other nations (except perhaps thoſe who ſpake the Shanſcrit language), are unrivalled in the number, variety, propriety, elegance, energy, and expreſſion of their compound terms. The Greeks, like the Arabians, in the earlieſt ſtages of their language, had only a collection of radical disjointed words, conſiſting of the jargons of the aboriginal Greeks, of the Pelaſgi, Thracians, &c. How theſe words were arranged and conſtructed, we have no data remaining upon which we can found a critical inveſtigation. We muſt therefore remain ſatisfied with ſuch probable conjectures as the nature of the caſe, and the analogy of the language, ſeem to ſuggeſt.

The prepoſitions were originally placed before the nouns, whoſe relations they pointed out. For example, let us take the ξυναπεθνησκετο τοις αλλοις, *he died along with the reſt*, or *he died out of hand along with the others*. Theſe words were arranged thus: απεθνησκετο συν τοις αλλοις; and απο-θνησκον συν τοις αλλοις. In this manner the parts of every compound word were placed ſeparately, at leaſt as much as other words which had no connection.

Greek Language.

159 The firſt compound words in Greek.

The firſt compound words of the Greek language were the radical nouns with the article, and the radical part of the ſubſtantive or auxiliary verb. The ſucceſs of this experiment encouraged them to attempt the ſame in other words. By this noble invention they found themſelves able to expreſs, in one word, with eaſe and ſignificancy, what in other languages, and formerly in their own, required a tedious ambages or circumlocution. In proceſs of time, as their language was gradually mellowed, they increaſed the number of their compounds, till their language, in that reſpect, infinitely excelled all its preſent dialects. In this proceſs they were careful to unite ſuch leters as not only prevented aſperity and difficulty of pronunciation, but even promoted harmony and elegance. But this was the labour of poſterior ages.

The Greeks were entirely ignorant of the derivation or etymology of their language: for this we need only conſult Plato's Cratylus, Ariſtotle's Rhetoric, Demetrius, Phalerus, Longinus, &c. In deducing patronymics, abſtracts, poſſeſſives, gentiles, diminutives, verbals, &c. from radicals of every kind, they have ſhown the greateſt art and dexterity. Examples of this occur almoſt in every page of every Greek author. But this extended no farther than their own language: every foreign language was an abomination to the Greeks. But more of this in the ſequel.

160 Original materials of the Greek language;

The original materials of the Greek tongue were undoubtedly rough and diſcordant, as we have deſcribed them above. They had been collected from different quarters, were the produce of different countries, and had been imported at very diſtant periods. It would therefore be an entertaining, if not an inſtructing ſpeculation, if it were poſſible to diſcover by what men and by what means this wonderful fabric was founded, erected, and carried to perfection. The writers of Greece afford us no light. Foreigners were unacquainted with that originally inſignificant canton. Every thing beyond Homer is buried in eternal oblivion. Orpheus is indeed reported to have compoſed poems; but theſe were ſoon obliterated by the hand of time. The verſes now aſcribed to that philoſophical hero are none of his †. Linus wrote, in the Pelaſgic dialect, the atchievments of the firſt Bacchus; Tamyris the Thracian wrote; and Pronapides the maſter of Homer was a celebrated poet. The works of all theſe bards did not long ſurvive; and it is a certain fact that the Greek tongue was highly poliſhed even more early than the age in which theſe worthies flouriſhed. Homer, no doubt, imitated their productions, and ſome are of opinion that he borrowed liberally from them. The Greeks knew no more of the original character of their language than of the original character and complexion of their progenitors. They allowed, indeed, that their language was originally barbarous and uncouth; but by what means or by what perſons it was poliſhed, enriched, and finally arranged, was to them an impenetrable ſecret.

We have already demonſtrated that the Ionim or aborigines of Greece were a race of barbarians; that conſequently their language, or rather their jargon, was of the ſame contexture. The Pelaſgi found both the people and their ſpeech in this uncultivated ſtate. Theſe people arrived in Greece about the year before Chriſt 1760. It was then that the language of Greece began to be cultivated. Before the age of Homer the work ſeems to have been completed. Nothing of conſequence was afterwards added to the original ſtock; on the contrary, not a few moieties were deducted from the Homeric treaſure. The Pelaſgi, as was ſaid before arrived in Greece *an. ant. Chr.* 1760. Homer is thought to have been born *an. ant. Chr.* 1041; conſequently the cultivation of the Greek tongue was completed in a period of about 700 years. But upon the ſuppoſition that Orpheus, Linus, Tamyris, &c. wrote long before Homer, as they certainly did, that language was arrived nigh the ſtandard of perfection two centuries before; by which computation the period of its progreſs towards its ſtationary point is reduced to 500 years. But as the Pelaſgi were a colony of foreigners, we ought to allow them one century at leaſt to ſettle and incorporate with the natives, and to communicate their language, laws, manners, and habits to the aborigines of the country. By this deduction we ſhall reduce the term of cultivation to leſs than four centuries.

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† Pauſan, lib. i. cap. 22.

161 Which was carried to its utmoſt perfection at a very early period,

During this period Greece was furiouſly agitated by tumults and inſurrections. That country was divided into a number of independent ſtates, which were perpetually engaged in quarrels and competitions. The profeſſion of arms was abſolutely neceſſary for the protection and preſervation of the ſtate; and the man of conduct and prowe?s, was honoured as a demigod, and his exploits tranſmitted with eclat to poſterity. The Greek tongue was then rough and unpoliſhed; becauſe, like the ancient Romans, the braveſt men were more diſpoſed to act than to ſpeak. Every language will take its colour from the temper and character of thoſe who employ it; and had it not been owing to one claſs of men, the Greek tongue would have continued equally rough to the era of Homer, as it had been a century after the arrival of the Pelaſgi.

There has appeared among barbarous or half civilized people a deſcription of men whoſe profeſſion it has been to frequent the houſes or palaces of the great, in order to celebrate their atchievements, or thoſe of their anceſtors, in the ſublimeſt ſtrains of heroic poetry. Accordingly we find that the Germans had their *bards*, the Gauls their *fads*, the Scandinavians their *ſcalds* or *ſcaldres*, the Iriſh their *fileas*, all retained for that very purpoſe. They lived with their chieftains or patrons; attended them to battle; were witneſſes of their heroic deeds; animated them with martial ſtrains; and celebrated their prowe?s if they proved victorious; or, if they fell, raiſed the ſong of woe, and chanted the mournful dirge over their ſepulchres. Theſe bards were always both poets and muſicians. Their perſons were held ſacred and inviolable. They attended public entertainments, and appeared in all national conventions. The chief of them were employed in the temples of the gods; and the leſs illuſtrious, like our minſtrels of old, ſtrolled about from place to place, and exerciſed their functions wherever they found employment.

162 By the poets, who made a

Among the ancient Greeks there was a numerous tribe of men of the very ſame deſcription, who were at once poets and muſicians, and whoſe office it was to celebrate the praiſes of the great, and to tranſmit their exploits to poſterity in the moſt exaggerated encomiums. Theſe poetical vagrants were ſtyled Αοιδοι or ſongſters. Some of theſe lived in the houſes of great men; while others leſs ſkilful or leſs fortunate, ſtrolled about the country in the manner above deſcribed. The more illuſtrious of thoſe Αοιδοι who were retained in the temples of the gods, were certainly the firſt improvers of the language of the Greeks. Among the Hebrews, we find the firſt poetical compoſitions were hymns in honour of Jehovah, and among the pagans the ſame practice was eſtabliſhed. In Greece, when all was confuſion and devaſtation, the temples of the gods were held ſacred and inviolable. There the Αοιδοι improved their talents, and formed religious anthems on thoſe very models which their progenitors had chanted in the eaſt.

The language of the Greeks was yet rugged and unmellowed: their firſt care was to render it more ſoft and more flexible. They enriched it with vocables ſuited to the offices of religion; and theſe we imagine were chiefly imported from the eaſt. Homer every where mentions a diſtinction between the language of gods and men. The language of gods imports the oriental terms retained in the temples, and uſed in treating of the ceremonies of religion; the language of men intimates the ordinary civil dialect which ſprung from the mixed dialects of the country. The prieſts, no doubt, concurred in promoting this noble and important purpoſe. From this ſource the ſtrolling Αοιδοι drew the rudiments of their art; and from theſe laſt the vulgar deduced the elements of poliſhed ſtyle.

163 Diſtinction between the language of Gods and of men.

To theſe Αοιδοι of the ſuperior order we would aſcribe thoſe changes mentioned in the preceding part of this inquiry, by which the Greek tongue acquired that variety and flexibility, from which two qualities it has derived a great ſhare of that eaſe, beauty, and verſatility, by which it now ſurpaſſes moſt other languages. The diverſity of its terminations furniſhes a moſt charming variety, while at the ſame time the ſenſe is communicated to the reader or hearer by the relation between them. By this economy the poet and the orator are left at liberty to arrange their vocables in that order which may be moſt ſoothing to the ear, and beſt adapted to make a laſting impreſſion on the mind.

Few colonies have emigrated from any civilized country without a detachment of prieſts in their train. The ſupreme powers, whoever they were, have always been worſhipped with muſic and dancing. The Hebrews, Phœnicians, and Egyptians, delighted in theſe muſical and jocund feſtivals. The prieſts who attended the Iones, Dores, Æolians, Thebans, Athenians, &c. from the eaſt introduced into Greece that exquiſite taſte, thoſe delicate muſical feelings, which diſtinguiſhed the Greeks from all the neighbouring nations. Hence that numerous race of onomotopœas, by which the Greek language is inveſted with the power of expreſſing almoſt every paſſion of the human ſoul, in ſuch terms as oblige it to feel and actually to aſſimulate to the paſſion it would excite. Numberleſs inſtances of this occur in every page of Homer, Heſiod, Pindar, Sophocles, Euripides, and even of Ariſtophanes; to quote inſtances would be to inſult the Greek ſtudent.

Every body knows that the practice of writing in verſe was antecedent to the date of proſaic compoſition. Here, then, the Αοιδοι and the miniſters of religion chiefly diſplayed their ſkill and diſcernment. By a judicious mixture of ſhort and long ſyllables; by a junction of conſonants which naturally ſlide into each other; by a careful attention to the rythm, or harmony reſulting from the combination of the ſyllables of the whole line—they completed the metrical tone of the verſe, guided by that delicacy of muſical feeling of which they were poſſeſſed before rules of proſody were known among men.

Much liberty was certainly uſed in tranſpoſing letters, in varying terminations, in annexing prefixes and affixes, both to nouns and other kinds of words where ſuch adjuncts were poſſible: and upon this occaſion we think it probable, that thoſe particles of which we have ſpoken above were inſerted like filling ſtones thruſt in to ſtop the gaps or chinks of a building. Verſes were then clumſy and irregular, as the quantity of vowels was not duly aſcertained, and the colliſion of heterogeneous conſonants not always avoided. Probably theſe primitive verſes differed as widely from the finiſhed ſtrains of Homer and his ſucceſſors, as thoſe of Chaucer and Spencer do from the ſmooth poliſhed lines of Dryden and Pope.

164 Earlieſt poets of Greece. The poetical compoſitions of the earlieſt Greeks were not, we think, in the hexameter ſtyle. As they were chiefly calculated for religious ſervices, we imagine they reſembled the Hebrew iambics preſerved in the ſong of Aaron and Miriam, Deborah and Barak, Pſalms, Proverbs, &c. which were indeed calculated for the ſame purpoſe. Archilochus perhaps imitated theſe, though the model upon which he formed his iambics was not generally known. The later dramatic poets ſeem to have copied from the ſame archetypes. Hexameters, it is probable, were invented by Orpheus, Linus, Tamyris, Muſæus, &c. The firſt of theſe travelled into Egypt, where he might learn the hexameter meaſure from that people, who uſed to bewail *Maneros* and *Oſiris* in elegiac ſtrains. This ſpecies of metre was firſt conſecrated to theology, and the moſt profound ſciences of moral and natural philoſophy; at length it was brought down to celebrate the exploits of kings and heroes.

Res geſtas regumque, ducumque et fortia bella,
Quo ſcribi poſſent numero monſtravit Homerus.

We have hazarded a conjecture above, importing that the earlieſt poetical compoſitions of the Greeks were conſecrated to the ſervice of the gods. We ſhall now produce a few facts, which will furniſh at leaſt a preſumtive evidence of the probability of that conjecture.

165 Orpheus. Orpheus begins his poem with ancient chaos, its transformations and changes, and purſues it through its various revolutions. He then goes on to deſcribe the offſpring of Saturn, that is time, the æther, love, and light. In ſhort, his whole poem is ſaid to have been an oriental allegory, calculated to inſpire mankind with the fear of the gods, and to deter them from murder, rapine, unnatural luſts, &c.

166 Muſæus. Muſæus was the favourite ſcholar of Orpheus, or perhaps his ſon. He compoſed prophecies and hymns, and wrote ſacred inſtructions, which he addreſſed to his ſon. He preſcribed atonement and luſtrations; but his great work was a Theogony, or Hiſtory of the Creation, &c.

167 Melampus. Melampus brought the myſteries of Proſerpine from Egypt into Greece. He wrote the whole hiſtory of the diſaſters of the gods. This ſeer is mentioned by Homer himſelf.

168 Olen. Olen came from Lycia and compoſed the firſt hymn that was ſung in Delos at their ſolemnities; he probably emigrated from Patara a city of Lycia, where Apollo had a celebrated temple and oracle.

The Hyperborean damſels uſed to viſit Delos where they chanted ſacred hymns in honour of the Delian god.

169 Homer and Heſiod. To theſe we add the great Homer himſelf, if indeed the hymns commonly annexed to the Odyſſey, are his compoſition. Heſiod's Theogony is too well known to need to be mentioned.

From theſe inſtances we hope it appears, that the origin of the poetry of Greece is to be found in the temples; and that there, its meaſure, numbers, rythm, and other appendages were originally fabricated.

170 Different dialects with their origin. The Grecian poets, however, enjoyed another advantage which that claſs of writers have ſeldom poſſeſſed, which aroſe from the different dialects into which their language was divided. All thoſe dialects were adopted indifferently by the prince of poets; a circumſtance which enabled him to take advantage of any word from any dialect, provided it ſuited his purpoſe. This, at the ſame time that it rendered verſification eaſy, diffuſed an agreeable variety over his compoſition. He even accommodated words from Macedonia, Epirus, and Illyricum, to the purpoſes of his verſification: Beſides, the laws of quantity were not then clearly aſcertained; a circumſtance which afforded him another conveniency. Succeeding poets did not enjoy theſe advantages, and conſequently have been more circumſcribed both in their diction and numbers.

The Greek language, as is generally known, was divided into many different dialects. Every ſept, or petty canton, had ſome peculiar forms of ſpeech which diſtinguiſhed it from the others. There were, however, four different dialectical variations which carried it over all the others. Theſe were the Attic, Ionic, Æolic, and Doric. Theſe four dialectical diſtinctions originated from the different countries in the eaſt from which the tribes reſpectively emigrated. The Attics conſiſted, 1ſt, of the barbarous aborigines; 2d, of an adventitious colony of Egyptian Saites; 3d, a branch of Ionians from the coaſt of Paleſtine. Theſe laſt formed the old Ionian dialect, from which ſprung the Attic and modern Ioniac. The Æolians emigrated from a different quarter of the ſame coaſt; the inhabitants of which were a remnant of the old Canaanites, and conſequently different in dialect from the two firſt mentioned colonies. The Dores ſprang from an unpoliſhed race of purple fiſhers on the ſame coaſt, and conſequently ſpoke a dialect more coarſe and ruſtic than any of the reſt. Theſe four nations emigrated from different regions; a circumſtance which, in our opinion, laid the foundation of the different dialects by which they were afterwards diſtinguiſhed.

It is impoſſible in this ſhort ſketch to exhibit an exact view of the diſtinguiſhing features of each dialect. Such an analyſis would carry us far beyond the limits of the article in queſtion. For entire ſatiſfaction on this head, we muſt refer the Grecian ſtudent to Mattaire's *Græcæ Linguæ Dialecti*, where he will find every thing neceſſary to qualify him for underſtanding that ſubject. We ſhall content ourſelves with the few obſervations following.

The Athenians being an active, briſk, volatile race, delighted in contractions. Their ſtyle was moſt exquiſitely poliſhed. The moſt celebrated authors who wrote in that dialect were the following: Plato, Thucidydes, Xenophon, Demoſthenes, and the other orators; Æſchylus, Eurpides, Sophocles, Ariſtophanes, Menander Diphilus, with the other comic and tragic poets. That dialect was either ancient or modern. The ancient Attic was the ſame with the Ionic.

The Ionic, as was ſaid, was the ancient Attic; but when that nation emigrated from Attica and ſettled on the coaſt of Aſia Minor, they mingled with the Carians and Pelaſgi and of courſe adopted a number of their vocables. They were an indolent, luxurious, and diſſolute people; of courſe their ſtyle was indeed eaſy and flowing, but verboſe, redundant, and without nerves. This, however, is the leading ſtyle in Homer; and after him a prodigious number of writers on every ſubject have uſed the ſame dialect, ſuch as Herodotus of Halicarnaſſus the celebrated hiſtorian; Cteſias of Cnidus the hiſtorian of Perſia and India; Hecatæus of Miletus; Megaſthenes the hiſtorian, who lived under Seleucus Nicanor; Hippocrates the celebrated phyſician of Coos; Hellanicus the hiſtorian often mentioned with honour by Polybius; Anarceon of Teia; Alcæus, Sappho of Leſbos, excellent poets; Pherecydes Syrus the philoſopher, and a multitude of other perſons of the ſame profeſſion, whom it would be ſuperfluous to mention upon the preſent occaſion.

The Æolic and Doric were originally cognate dialects. When the Dorians invaded Peloponneſus and ſettled in that peninſula, they incorporated with the Æolians, and their two dialects blended into one produced the new Doric. The original Dores inhabited a rugged mountainous region about Oſſa and Pindus, and ſpoke a rough unpoliſhed language ſimilar to the ſoil which they inhabited. Andreas Schottus, in his obſervations on poetry, l. 2. cap. 50. proves from an old manuſcript of "Theocritus, that there were two dialects of the Doric tongue, the one ancient and the other modern; that this poet employed Ionic and the modern Doric; that the old Doric dialect was rough and cumbrous; but that Theocritus has adopted the new as being more ſoft and mellow." A prodigious number of poets and philoſophers wrote in this dialect, ſuch as Epicharmus the poet; Ibycus the poet of Rhegium; Corinna the poeteſs of Theſpis, or Thebes, or Corinth, who bore away the prize of poetry from Pindar; Erynna a poeteſs of Leſbos; Moſchus the poet of Syracuſe; Sappho the poeteſs of Mitylene; Pindarus of Thebes the prince of lyric poets; Archimedes of Syracuſe the renowned mathematician; and almoſt all the Pythagorean Philoſophers. Few hiſtorians wrote in that dialect; or if they did, their works have not fallen into our hands. Moſt of the hymns ſung in temples of the gods were compoſed in Doric; a circumſtance which evinces the antiquity of that dialect, and which, at the ſame time, proves its affinity to the oriental ſtandard.

171 The partiality of the Greek to their own tongue, and its evil conſequences.

After that the Greek tongue was thoroughly poliſhed by the ſteps which we have endeavoured to trace in the preceding pages, conſcious of the ſuperior excellency of their own language, the Greeks, in the pride of their heart, ſtigmatized every nation which did not employ their language with the contemptuous title of *barbarians*. Such was the delicacy of their pampered ears, that they could not endure the untutored voice of the people whom they called Βαρϐαροφωνοι. This extreme delicacy produced three very pernicious effects; for, 1ſt, it induced them to metamorphoſe, and ſometimes even to mangle, foreign names, in order to reduce their ſound to the Grecian ſtandard; and, 2d, it prevented their learning the languages of the eaſt, the knowledge of which would have opened to them an avenue to the records, annals, antiquities, laws, cuſtoms, of the people of &c. thoſe countries, in compariſon of whom the Greeks themſelves were of yeſterday, and knew nothing. By this unlucky bias, not only they, but even we who derive all the little knowledge of antiquity we poſſeſs through the channel of their writings, have ſuffered an irreparable injury. By their transformation of oriental names they have in a manner ſtopped the channel of communication between the hiſtories of Europe and Aſia. This appears evident from the fragments of Cteſias's Perſian hiſtory, from Herodotus, Xenophon, and all the other Grecian writers who have occaſion to mention the intercourſe between the Greeks and Perſians. 3d, It deprived them of all knowledge of the etymology of their own langnage, without which it was impoſſible for them to underſtand its words, phraſeology, and idioms, to the bottom. We mentioned Plato's Cratylus above. In that dialogue, the divine philoſopher endeavours to inveſtigate the etymology of only a few Greeks words. His deductions are abſolutely childiſh, and little ſuperior to the random conjectures of a ſchool boy. Varro, the moſt learned of all the Romans, has not been more ſucceſsful. Both ſtumbled on the very threſhold of that uſeful ſcience; and a ſcholar of very moderate proficiency in our days knows more of the origin of theſe two noble languages, than the greateſt adepts among the natives did in theirs. By prefixes, affixes, tranſpoſitions of letters, new conjunctions of vowels and conſonants for the ſake of the muſic and rythm, they have ſo diſguiſed their words, that it is almoſt impoſſible to develope their original. As a proof of this, we remember to have ſeen a manuſcript in the hands of a private perſon where the firſt twelve verſes of the Iliad are carefully analyſed; and it appears to our ſatiſfaction that almoſt every word may be, and actually is, traced back to a Hebrew, Phœnician, Chaldean, or Ægyptian original; and we are convinced that the ſame proceſs will hold good in the like number of verſes taken from any of the moſt celebrated poets of Greece. This inveſtigation we found was chiefly conducted by reducing the words to the original invariable ſtate, which was done by ſtripping them of prefixes, affixes, &c. Theſe ſtrictures are, we think, well founded; and conſequently need no apology to protect them.

172 Beauty of the Greek language.

Theſe imperfections, however, are counterbalanced by numberleſs excellencies: and we are certainly much more indebted to that incomparable people for the information they have tranſmitted to us though the medium of their writings, than injured by them in not conveying to us and themſelves more authentic and more ample communications of ancient events and occurrences. Without fatiguing our readers with ſuperfluous encomiums on a language which has long ago been extolled perhaps to an extravagant degree by the labours of men of the moſt enlarged capacity and the moſt refined taſte, we ſhall now proceed to make a few obſervations on *ſpirits* and *accents;* which being rather apendages than eſſentials of the language, we have on purpoſe reſerved for the laſt place.

173 The ſpiritus aſper and lenis.

Every word in the Greek language beginning with a vowel is marked with a ſpirit or breathing: This aſpiration is double, namely *lenis et aſper*, "the gentle and rough or aſpirated." The gentle accent, though always marked, is not now pronounced, though in the earlieſt periods of the language it was undoubtedly enounced, though very ſoftly. Both theſe aſpirations were imported from the eaſt. They were actually the Hebrew ה *he* and ח *heth*. The former denoted the *ſpiritus lenis*, and the latter the *ſpiritus aſper*. The Hebrew prefixed *ha* or *he* to words beginning with a vowel, and of courſe the Greeks followed their example. Theſe people ſeem to have delighted in aſpirates; and of conſequence the letter σ is, ſome think, rather too often affixed to the terminations of their words. Every word beginning with ρ had the aſpirate joined to ρ, probably with a deſign to render the aſpiration ſtill more rough.

174 The accents.

The Greek accents are three in number; the acute, the grave, and the circumflex. The acute raiſes and ſharpens the voice; the grave depreſſes and flattens it; the circumflex firſt raiſes and ſharpens the voice, and then depreſſes and flattens it. It is obviouſly compoſed of the other two. The learned author of the *Origin and Progreſs of Language* has taken much pains to prove that theſe accents were actually muſical notes, invented and accommodated to raiſe, depreſs, and ſuſpend the voice, according to a ſcale of muſical proportions. It is ſcarce poſſible, we think, for a modern Greek ſcholar to comprehend diſtinctly the ancient theory of accents. Theſe the native Greeks learned from their infancy, and that with ſuch accuracy, that even the vulgar among the Athenians would have hiſſed an actor or actreſs off the ſtage or an orator off the pulpitum ‡, on account of a few miſtakes in the enunciation of thoſe notes.

Theſe elevations, depreſſions, and ſuſpenſions of the voice upon certain ſyllables, muſt have made their language ſound in the ears of foreigners ſomewhat like recitative, or ſomething nearly reſembling *cant*. But the little variety of thoſe ſyllabic tones, and the voice not reſting upon them, but running them on without interruption, ſufficiently diſtinguiſhed them from muſic or cant. Be that as it may, we think it highly probable, that the wonderful effects produced by the harangues of the orators of Greece on the enraptured minds of their hearers, were owing in a good meaſure to thoſe articial muſical tones by which their ſyllables were ſo happily diverſified.

To this purpoſe we ſhall take the liberty to tranſcribe a paſſage from Dion. Halic. *De Structura Orationis*, which we find tranſlated by the author of the *Origin and Progreſs of Language*, vol. ii, book 3d, part ii. chap. 7. page 381. "Rhetorical compoſition is a kind of muſic differing only from ſong or inſtrumental muſic, in the degree, not in the kind; for in this compoſition the words have melody, rythm, variety or change, and what is proper or becoming; So that the ear in it, as well as in muſic, is delighted with the melody. moved by the rythm, is fond of variety, and deſires with all theſe what is proper and ſuitable. The difference, therefore, is only of greater and leſs."

With reſpect to accents, it may be obſerved that only one ſyllable of a word is capable of receiving the acute accent, however many there be in the word. It was thought that the raiſing the tone upon more than one ſyllable of the word, would have made the pronunciation too various and complicated, and too like chanting.

The *grave accent* always takes place when the acute is wanting. It accords with the level of the diſcourſe; whereas the acute raiſes the voice above it.

The *circumflex accent* being compoſed of the other two, is always placed over a long ſyllable, becauſe it is impoſſible firſt to elevate the voice and then to depreſs it on a ſhort one. Indeed among the Greeks a long ſyllable was pronounced like two ſhort ones; and we apprehended it was ſometimes written ſo eſpecially in latter times. It is altogether obvious from two learned Greek authors, Dion. Halic. And Ariſtoxenus, that the Greek accents were actually muſical notes, and that theſe tones did not conſiſt of loud and low, or ſimply elevating and depreſſing the voice; but that they were uttered in ſuch a manner as to produce a melodious rythm in diſcourſe.

In a word, the acute accent might be placed upon any ſyllable before the antepenult, and roſe to a *fifth* in the diatonical ſcale of muſic; the grave fell to the third below it. The circumflex was regulated according to the meaſure of both, the acute always preceding. The grave accent is never marked except over the laſt ſyllable. When no accent is marked, there the grave always takes place. Some words are called *enclitics*. Theſe have no accent expreſſed, but throw it back upon the preceding word. The circumflex, when the laſt ſyllable is ſhort, is often found over the penult, but never over any other ſyllable but the laſt or the laſt but one.

175 The ancient Greeks had no accentual marks.

The ancient Greeks had no accentual marks. They learned thoſe modifications of voice by practice from their infancy; and we are aſſured by good authority, that in pronunciation they obſerve them to this day. The accentual marks are ſaid to have been invented by a famous grammarian, Ariſtophanes of Byzantium, keeper of the Alexandrian library under Ptolemy Philopater, and Epiphanes, who was the firſt likewiſe who is ſuppoſed to have invented punctuation. Accentual marks, however, were not in common uſe till about the 7th century; at which time, they are found in manuſcripts. If our curious readers would wiſh to enter more deeply into the theory of accents, we muſt remit them to Origin of Language, vol. ii. l. 2. *paſſim*; and to Mr Foſter's Eſſay on the different Nature of Accent and Quantity.

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‡ See Pulpitum.

Such, in general, are the obſervations which we thought the nature of our deſign obliged us to make on the origin and progreſs of the Greek language. Some of our more learned readers may perhaps blame us for not interſperſing the whole diſquiſition with quotations from the moſt celebrated writers in the language which has been the object of our reſearches. We are well aware that this is the general practice in ſuch caſes. The books were before us, and we might have tranſcribed from them more quotations than the nature of an article of this kind would permit. In the firſt part there were no books in that language to quote from, becauſe the Greeks knew nothing of their own origin, nor of that of their language, and conſequently have recorded nothing but dreams and fictions relating to that ſubject. Even when we had made conſiderable progreſs in our inquiry, the nature of the plan we have adopted excluded in a great meaſure the uſe of quotations. When we drew near the concluſion, we imagined that our learned readers would naturally have recourſe to the paſſages alluded to without our information, and that the unlearned would not trouble themſelves about the matter. The Greek ſtudent who intends to penetrate into the depths of this excellent language, will endeavour to be thoroughly acquainted with the books after mentioned.

176 Books to be ſtudied by every one who wiſhes to be a maſter of this language.

Ariſtotle's Rhetoric and Poetics, his book *De Interpretatione*, eſpecially with Ammonius's Commentary. Ammonius was a native of Alexandria, and by far the moſt acute of all the ancient grammarians.

Dion. Halic. *De ſtructura Orationis*, where, amidſt abundance of curious and intereſting obſervations, will be found the true pronunciation of the Greek letters.

Demetrius Phalereus *De Elocutione*; a ſhort Eſſay indeed, but replete with inſtruction concerning the proper arrangement of words and members in ſentences.

Longinus, the prince of critics, whoſe remains are above commendation. Theodorus Gaza † and the other refugees from Conſtantinople, who found an hoſpitable reception from the munificent family of the Medici, and whoſe learned labours in their native language once more revived learning and good taſte in Europe. Theſe, with ſome other critics of leſs celebrity, but equal utility, will unlock all the treaſures of Grecian erudition, without however diſcloſing the ſource from which they flowed. To theſe one might add a few celebrated moderns, ſuch as Monſ. Fourmont the Elder, Monſ. Gebelin, Abbé Pezron, Salmaſius, and eſpecially the learned and induſtrious Lord Monboddo.

† See Gaza.

We ſhall now give a very brief account of the vaſt extent of the Greek language even before the Macedonian empire was erected: at which period, indeed, it became in a manner univerſal, much more than ever the Latin language could accompliſh notwithſtanding the vaſt extent of the Roman empire.

177 Vaſt extent of the Greek language.

Greece, originally Hellas, was a region of ſmall extent, and yet ſent out many numerous colonies into different parts of the world. Theſe colonies carried their native language along with them, and induſtriouſly diffuſed it wherever they formed a ſettlement. The Iones, Æoles, and Dores, poſſeſſed themſelves of all the weſt and north-weſt coaſt of the Leſſer Aſia and the adjacent iſlands; and there even the barbarians learned that poliſhed language. The Greek colonies extended themſelves along the ſouth coaſt of the Euxine ſea as far as Sinope, now Trebizond, and all the way from the weſt coaſt of Aſia Minor: though many cities of barbarians lay between, the Greek tongue was underſtood and generally ſpoken by people of rank and faſhion.

There were Greek cities on the north coaſt of the Euxine ſea to the very eaſtern point, and perhaps beyond even thoſe limits; likewiſe in the Taurica Cherſoneſus, or Crim Tartary; and even to the mouth of the Danube, the ſtraits of Caffa, &c. In the neighbourhood of all theſe colonies, the Greek language was carefully propagated among the barbarians, who carried on Commerce with the Greeks.

A great part of the ſouth of Italy was planted with Greek cities on both coaſts; ſo that the country was denominated *Magna Græcia*. Here the Greek tongue univerſally prevailed. In Sicily it was in a manner vernacular. The Ionians had ſent a colony into Egypt in the reign of Pſammitichus; and a Greek ſettlement had been formed in Cyrenia many ages before. The Phocians had built Maſſilia or Marſeilles as early as the reign of Cyrus the Great, where ſome remains of the Greek language are ſtill to be diſcovered. Cæſar tells us, that in the camp of the Helvetii regiſters were found in Greek letters. Perhaps no language ever had ſo extenſive a ſpread, where it was not propagated by the law of conqueſt.

178 Greek ſpoken at preſent.

The Greek tongue, at this day, is confined within very narrow limits. It is ſpoken in Greece itſelf, except in Epirus, and the weſtern parts of Macedonia. It is likewiſe ſpoken in the Grecian and Aſiatic iſlands in Candia or Crete, in ſome parts of the coaſt of Aſia Minor, and in Cyprus: but in all theſe regions, it is much corrupted and degenerated.

As a ſpecimen, we ſhall inſert a modern Greek ſong, and the advertiſement of a quack medicine, which, with other plunder, was brought by the Ruſſians from Chocſim or Chotzim in 1772.

Song in modern Greek.

ΜΙ δυσικίαις πολεμῶ μὶ βάσανα ὡς το λεμω
Εἶμαι, και κεντινεύω, και να χαθω κοντεύω
Σ τω πέλαγος των συμφερων με ἐπικινδυνοι καιρον
Μ'ανεμȣς ολάθριȣς σφοδρȣς και εναντιȣς.
Με κύματα πολλῶν και μῶν τȣφανι αναϛεναϛμῶν.
Θαλασσα φȣσκομένη, πολλα αγριωμένη,
Ὅπȣ αφριζι καὶ φυσα με σαγανάκια περισσά.
Σύνεφα σκοτισμένα και κατασυγχισμένα,
Και να φανῆ μια σωτερία, να ἰδȣν τὰ μάτιά μȣϛερια.
Γλιχα νερα να εὕρω, κασχα και δεν ἠξεύρῶ,
Ν' άραξω και δεν ημπορῶ γιατι λιμένα δεν θορῶ,
Μ' ατελπισίαν θρέχω οτα αρμενα πȣ έχω.
Πȣ με αυτα και να πνιγῶ η σελαμέτινα ευγῶ,
Και τȣτα αν βαϛαξȣν, εμπορȣν να με φυλαξȣν.

Tranſlation.

With dire misfortunes, pains and woes,
O'erwhelm'd ingulph'd, I ſtruggling fight;
O'er my frail bark proud billows cloſe
To plunge her deep in laſting night.

Greek Language.

Rough ſeas of ills inceſſant roar,
Fierce winds adverſe, with howling blaſt,
Heave ſurge on ſurge. Ah! far from ſhore
My found'ring ſkiff ſhall ſink at laſt.
Involv'd in low'ring darkſome clouds,
'Mid ſultry fogs, I pant for breath;
Huge foaming billows rend my ſhrouds,
While yawning gulphs extend beneath.
From burſting clouds loud thunders roll,
And deaf'ning peals terrific ſpread;
Red lightnings dart from pole to pole,
And burſt o'er my devoted head.
When ſhall the friendly dawning rays
Guide me to pleaſures once poſſeſt;
And breezy gales, o'er peaceful ſeas,
Waft to ſome port of endleſs reſt?
In dark deſpair, with tempeſts toſt,
I veer my ſail from ſide to ſide.
Conduct me, Heav'n! to yond' fair coaſt,
Or plunge me in the 'whelming tide.

The Quack Bill.

ΒΑΛΣΑΜΟΝ ΤΗΣ 'ΙΕΡΟΥΣΑΛΗΜ, ΑΠΟ
ΤΑΙΣ, ΚΑΙ ΝΟΥΡΑΙΣ, ΚΑΙ
ΠΑΛΕΑΙΣ ΡΕΤΖΕΤΑΙΣ.

ΤΟΥΤΟ το ϐαλσαμον ωφελεῖ εις το αδυνατὲν σοματι, ϗ βοηθει την χονευσιν δυναμώνει την καρδιαν. συκώνει ὅλας τας ἐμφραξεις τῆς κοιλιας ωφελεῖ εις την στένωσιν ϗ βῆχα παλαιεν. 'Ιατρέυει τας εσωτερικας πληγας τȣ͂ στήθȣς, ϗ τȣ͂ πνευμονος ηγουν πλεμονίȣ. κινεῖ τα καταμήνια τῶν γυναικων. 'Εις τας ἐξωτερικας πληγας πρέπει να βάζεται με το ξανθο τόσον εις παλαιας. Οσεν ϗ ειονεας, καθως ειναι ἡ σπαθιᾶις, ϗ μαχαιριαις, ϗ αλλα κοψίματα ἐιατρευει κάθελογῆς Φισολα, ϗ ολας τας βρομερας πληγας ὁπȣ͂ εφθασαν εις το κόκαλον θαυμάσιως, ωφελεῖ εις τα αυτία ὁπȣ τρέχουν εμπυον να σαζεται δυο η τρεῖς κόμπȣς ηχουν σαλαγματίας μεβαμπάκι βρεμμένον εις αυτο, βάνεται εις τας πληγωμενας δοντοκοιλιαῖς ϗ θέλουν ιατρευθῆ. ϗ ακόμι δυναμώνει τα ὀδόντια ὁπȣ͂ κινοῦν ται δε θελουν να πέσουν. βοηθᾶ ϗ απο την πανȣ͂κλαν.

'Η δόσις εσωκρικῶς ας ειναι δέκα η ϗ δώδεκα σύμπȣς εις ολίγον κρασι, η ϗ νερον, το κάθε ταχυ ϗ βράδυ. ας το μεταχειριζεται, ϗ ειναι θαυμάσιον μετην δοκιμην βεβαιωμενον.

'Αληθες ϐάλσαμον τȣ͂ Βασιλεȣ.

Inſtead of giving a literal and bald tranſlation of this advertiſement, which runs exactly in the ſtyle of other quack bills, it may be ſufficient to obſerve, that the medicine recommended is ſaid, when taken inwardly, to raiſe the ſpirits, remove coſtiveneſs and inveterate coughs; to cure pains of the breaſt, and belly-aches; to aſſiſt reſpiration, and remove certain female obſtructions. When applied externally, it cures wounds and ſores, whether old or freſh, removes ringing of the ears, faſtens the teeth when looſe, and ſtrengthens the gums.

All this and much more, it is ſaid to do in a wonderful manner; and is declared to be the true royal balſam of Jeruſalem, and an univerſal ſpecific.

It is indeed next to a miracle that ſo many monuments of Grecian literature are ſtill to be found among men. Notwithſtanding the burning of the famous library of Alexandria, and the almoſt numberleſs wars, maſſacres, and devaſtations, which have from time to time in a manner deſolated thoſe countries where the Greek language once flouriſhed; we are told that there ſtill remain about 3000 books written in that language.

Greek Language.

179
Diſtinguiſhed ſtages of the Greek language.

We ſhall now conclude this ſection with a brief detail of the moſt diſtinguiſhed ſtages and variations through which this noble tongue made its progreſs from the age of Homer to the taking of Conſtantinople, *an. poſt. Chr.* 1453; a period of more than 2000 years.

Homer gave the Greek poetry its colour and conſiſtency, and enriched as well as harmonized, the language. It ſeems, from the coincidence of epithets and cadence in Homer and Heſiod, that the Greek heroic verſe was formed ſpontaneouſly, by the old Αοιδοι a ſort of *improviſatori;* and that Homer and his firſt followers adopted their verſification. The Iliad and Odyſſey have much of the air of extempore compoſitions; an epithet is never wanting to fill up a verſe; and a ſet of expreſſions are mechanically annexed to ſuch ideas as were of frequent recurrence. Hence that copiouſneſs and waſte of words in the old Greek bard, which forms ſuch a contraſt to the condenſed and laboured compoſition of Virgil.

The Greek proſe was of a more difficult ſtructure; and it may be diſtributed into different ſtyles or degrees of purity. Of the proſe authors now extant, the firſt and beſt ſtyle is that of Herodotus, and of Plato in the florid or mixed kind, of Xenophon in the pure and ſimple, of Thucydides and Demoſthenes in the auſtere. Nothing, perhaps, is ſo conducive to form a good taſte in compoſition as the ſtudy of theſe writers.

The ſtyle of Polybius forms a new epoch in the hiſtory of the Greek language: it was the idiotic or popular manner of expreſſion, eſpecially among military men, in his time, about the 150th Olympiad. It became the model of ſucceeding writers, by introducing a ſimple unſtudied expreſſion, and by emancipating them from the anxious labour of the old Greeks reſpecting the cadence and choice of words. The ſtyle of the New Teſtament, being plain and popular, frequently reſembles that of Polybius, as has been ſhown by Raphelius, and by Kirchmaier, *de paralleliſmo.* N. T. *et Polybii,* 1725.

Before this hiſtorian, the Alexandrian Jews had formed a new or Helleniſtic ſtyle, reſulting from the expreſſion of oriental ideas and idioms in Greek words, after that language had loſt of its purity, as it gained in general uſe by the conqueſts of Alexander. The Helleniſtic is the language of the Septuagint, the Apocrypha, the New Teſtament, and partly of Philo and Joſephus. This mixture in the ſtyle of the evangeliſts and apoſtles, is one credential of the authenticity of the beſt of all books, a book which could not have been written but by Jewiſh authors in the firſt century. See the fine remarks of Biſhop Warburton, Doctrine of Grace, book i. ch. 8—10. Critics loſe their labour in attempting to adjuſt the Scripture-Greek to the ſtandard of Atticiſm.

The diction of the Greek hiſtorians, and geographers of the Auguſtan age, is formed on that of Polybius; but improved and modernized, like the Engliſh of the preſent age, if compared by that of Clarendon or Bacon. More perſpicuous than refined, it was well ſuited to ſuch compilations as were then written by men of letters, ſuch as Dionyſius, Diodorus,

rus and Strabo, without much experience or rank in public life.

The eccleſiaſtical ſtyle was cultivated in the Chriſtian ſchools of Alexandria, Antioch, and Conſtantinople; rank and luxuriant, full of oriental idioms, and formed in a great meaſure on the Septuagint verſion. Such is, for inſtance, the ſtyle of Euſebius. After him, the beſt Chriſtian writers poliſhed their compoſitions in the ſchools of rhetoric under the later Sophiſts. Hence the popular and flowing purity of St Chryſoſtome, who has more good ſenſe than Plato, and perhaps as many good words.

On the Greek of the Byzantine empire, there is a good diſſertation by Ducange, *de cauſis corruptæ Græcitatis*, prefixed to his Gloſſary, together with Portius's Grammar of the modern Greek. This laſt ſtage of the Greek language is a miſerable picture of Turkiſh barbariſm. And, which is moſt ſurpriſing, there is no city of Greece where the language is more different from the ancient than at Athens. The reaſon of that is, becauſe it has been long inhabited by a mixed multitude of different nations.

To conclude, the Greeks have left the moſt durable monuments of human wiſdom, fortitude, magnificence, and ingenuity, in their improvement of every art and ſcience, and in the fineſt writings upon every ſubject neceſſary, profitable, elegant, or entertaining.

The Greeks have furniſhed the brighteſt examples of every virtue and accompliſhment, natural or acquired, political, moral, or military: they excelled in mathematics and philoſophy; in all the forms of government, in architecture, navigation, commerce, war: as orators, poets, and hiſtorians, they ſtand as yet unrivalled, and are like to ſtand ſo for ever; nor are they leſs to be admired for the exerciſes and amuſements they invented, and brought to perfection, in the inſtitution of their public games, their theatres, and ſports.

180 No perfect tranſlation of any Greek author.

Let us further obſerve, that in vain our readers will look for theſe admired excellencies in any of the beſt tranſlations from the Greek: they may indeed communicate ſome knowledge of what the originals contain; they may preſent you with propoſitions, characters, and events: but allowing them to be more faithful and more accurate than they really are, or can well be, ſtill they are no better than copies, in which the ſpirit and luſtre of the originals are almoſt totally loſt. The mind may be inſtructed, but will not be enchanted: The picture may bear ſome faint reſemblance, and if painted by a maſterly hand give pleaſure: but who would be ſatisfied with the canvas, when he may poſſeſs the real object? who would prefer a piece of coloured glaſs to a diamond? It is not poſſible to preſerve the beauties of the original in a tranſlation.—The powers of the Greek are vaſtly beyond thoſe of any other tongue. Whatever the Greeks deſcribe is always felt, and almoſt ſeen; motion and muſic are in every tone, and enthuſiaſm and inchantment poſſeſs the mind:

> *Graiis ingenium, Graiis dedit ore rotundo,*
> *Muſa loqui.* Hor.

Sect. VIII. *Of the Latin Language.*

181 Origin of the Romans, and of their language.

This language, like every other ſpoken by barbarians, was in its beginning rough and uncultivated.—What people the Romans were, is a point in which antiquarians are not yet agreed. In their own opinion they were ſprung from the Trojans *; Dion. Halicar. derives them from the Greeks †; and Plutarch informs us ‡ that ſome people imagined that they were ſprung from the Pelaſgi. The fact is, they were a mixture of people collected out of Latium and the adjacent parts, which a variety of accidents had drawn together, to eſtabliſh themſelves on that mountainous region, in order to ſecure their own property, and plunder that of their neighbours. They were in all probability compoſed of Arcadians, Sabines, Latins, Hetruſcans, Umbrians, Oſcans, Pelaſgi, &c.; and if ſo, their language muſt have been a mixture of the different dialects peculiar to all theſe diſcordant tribes.

* Tit. Liv. lib. i. cap. 1. &c.
† Antiq. Rom. lib. i.
‡ Vita Romul.

The Latin language ought then to be a mingled maſs of the Arcadian, that is, the Æolian § Greek, the Pelaſgic, Hetruſcan, and Celtic dialects. Theſe jarring elements, like the people to whom they belonged reſpectively, gradually incorporated, and produced what was afterwards called the *Latin* tongue.

§ Strabo, liv. v. Dionyſ. Halicarn. Antiq. lib. i.

The Arcadians were a Pelaſgic || tribe, and conſequently ſpoke a dialect of that ancient Greek produced by the coalition of this tribe with the ſavage aborigines of Greece. This dialect was the groundwork of the Latin. Every ſcholar allows, that the Æolian Greek, which was ſtrongly tinctured with the Pelaſgic, was the model upon which the Latin language was formed. From this deduction it appears, that the Latin tongue is much more ancient than the modern Greek; and of courſe we may add, that the Greek, as it ſtood before it was thoroughly poliſhed, bore a very near reſemblance to that language. Hence we think we may conclude, that the knowledge of the Latin language is neceſſary in order to underſtand the Greek. Let us not then expect to find the real ingredients of the Greek tongue in the academic groves of Athens, or in Smyrna, or in Rhodope, or in Hæmos; but on the banks of the Tiber and on the fields of Laurentum.

|| Strabo et Herodotus.

A very conſiderable part of the Latin tongue was derived from the Hetruſcan. That people were the maſters of the Romans in every thing ſacred. From them they learned the ceremonies of religion, the method of arranging games and public feſtivals, the art of divination, the interpretation of omens, the method of luſtrations, expiations, &c. It would, we believe, be eaſy to prove, that the Pelaſgi * and Hetruſci (x) were the ſame race of people; and if this was the caſe, their languages muſt have differed in dialect only.

* Thucydides, lib. iv.

The Umbrian or Celtic enters deeply into the compoſition of the Latin tongue. For proof of this, we need only appeal to *Pelloutier*, *Bullet's Memoires de la Langue Celtique, partie premiere*, *Abbé Pezron's Origin of*

(x) The Hetruſci were variouſly denominated by the Greeks and Romans. The former called them

τυρσανοι ;

Latin Language. *of ancient Nations*, &c. Whether the old Celtic differed eſſentially from the Pelaſgic and Hetruſcan, would be a matter of curious inveſtigation, were this a proper ſubject for the preſent article.

The Latin abounds with oriental words, eſpecially Hebrew, Chaldaic, and Perſian. Theſe are certainly remains of the Pelaſgic and Hetruſcan tongues, ſpoken originally by people who emigrated from regions where thoſe were parts of the vernacular language.—The Greeks, in poliſhing their language, gradually diſtorted and disfigured vaſt numbers of the rough eaſtern vocables, which made a very great part of it. (See the preceding ſection).

The Romans, of leſs delicate organs, left them in their natural ſtate, and their natural air readily bewrays their original. We had collected a large liſt of Latin words ſtill current in the eaſt; but find that Thomaſſin * and Ogerius (x), and eſpecially Monſ. Gebelin, in his moſt excellent Latin Dictionary, have rendered that labour ſuperfluous.

* Gloſſary.

In this language, too, there are not a few Gothic terms. How theſe found their way into the Latin, it is not eaſy to diſcover, unleſs, as Pelloutier ſuppoſes, the Celtic and Gothic languages were originally the ſame: or perhaps we may conjecture, that ſuch words were parts of a primitive language, which was at one time univerſal.

182 How far the Latin reſembles the Greek.

There are, beſides, in the Latin a great number of obſolete Greek words, which were in proceſs of time obliterated, and others ſubſtituted in their room; ſo that, upon the whole, we are perſuaded, that the moſt effectual method to diſtinguiſh the difference between the early and modern Greek, would be to compare the ancient Latin with the latter; there being, we imagine, very little difference between the ancient Greek and Latin in the earlieſt periods.

However that may be, it is certain that the Roman letters were the ſame with the ancient Greek.—*Formæ literis Latinis quæ veterrimis Græcorum*, ſays Tacitus †; and Pliny ‡ ſays the ſame thing, and for the truth of his aſſertion he appeals to a monument extant in his own times.

† Tacitus, Anal. lib. ii.
‡ Nat Hiſt. lib. vii. cap. 58.

Theſe old Greek letters were no other than the Pelaſgic, which we have ſhown from Diodorus Siculus (ſee preceding Section) to have been prior to the Cadmean. For the Figure of theſe letters, ſee Aſtle, Poſtellus, Montfaucon, Palægraphia Græca, Monſ. Gebelin, and our Plates IX and X.

That the Latins borrowed the plan of their declenſions from the Greeks, is evident from the exact reſemblance of the terminations of the caſes throughout the three ſimilar declenſions. In nouns of the firſt declenſion the reſemblance is too palpable to ſtand in need of illuſtration. In the ſecond, the Greek genitive is in οι. In Latin the *o* is thrown out, and the termination becomes *i*. In the Greek ſection, we have obſerved, that the ſounds of ι and υ differed very little; therefore the Latins uſed ι inſtead of ι. The Latin dative ends in ο, which is the Greek dative, throwing away ι *ſubſcriptum*, which was but faintly ſounded in that language. No genuine Greek word ended in μ or *m*.

The Hellens ſeemed to have abhorred that bellowing liquid; it is, however, certain that they imported it from the eaſt, as well as the other letters, and that they employed it in every other capacity, except in that of cloſing words. In the termination of flexions, they changed it into ν.

The Latins retained *m*, which had been imported to them as a terminating letter at an era before the Greek language had undergone its laſt refinement.—Hence the Latin accuſative in *um*, inſtead of the Greek ον. The vocative caſe, we imagine, was in this declenſion originally like the nominative. The Latins have no dual number, becauſe, in our opinion, the Æolian dialect from which they copied, had none. It would be, we think, a violent ſtretch of etymological exertion, to derive either the Latin genitive plural of the ſecond declenſion from the ſame caſe of the Greek, or that of the latter from the former; we therefore leave this anomaly, without pretending to account for its original formation. The third declenſions in both languages are ſo exactly parallel, that it would be ſuperfluous to compare them. The dative plural here is another anomaly, and we think a very diſagreeable one, which we leave to the conjectures of more profound etymologiſts.

For the other peculiarities of Latin nouns, as they are nearly ſimilar to thoſe of the Greek, we muſt beg leave to remit our readers to that ſection for information.

183 Deficiency of articles.

The Latins have no articles, which is certainly a defect in their language. The Pelaſgic, from which they copied, had not adopted that word in the demonſtrative ſenſe. Homer indeed ſeldom uſes it; and the probability is, that the more early Greek uſed it leſs frequently, at leaſt in the ſenſe above-mentioned. Thus in Latin, when I ſay, *video hominem*, it is impoſſible to find out by the bare words whether the word *hominem* intimates "a man," or "the man;" whereas in Greek it would be Βλεπω ανθρωπον, *I ſee a man*, Βλεπω τον ανθρωπον, *I ſee the man*. Hence the firſt expreſſion is indefinite, and the ſecond definite.

184 Origin of the ſubſtantive verb.

The ſubſtantive verb *ſum* in Latin ſeems to be partly formed from the Greek and partly not. Some of the perſons of the preſent tenſe have a near reſemblance to the Greek verb ιω or ειμι, while others vary widely from that archetype. The imperfect præterite and

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τυρσηνοι; which was their true name, for they actually emigrated from Tarſhiſh, or the weſtern coaſt of Aſia Minor, and conſequently Herodotus everywhere calls them τυρσηνοι. The Æolians changed α into υ; hence in that dialect they were called τυρσηνοι, from *Tarſus*. The Romans ſtiled them *Tuſci*, probably from the Greek verb Θυω, *ſacrifico*, alluding to the ſkill which that people profeſſed in the ceremonies of religion. They called their country *Hetruria*, we think from the Chaldaic word *heretum*, "a magician or ſorcerer;" a name deduced from their ſkill in divination.

(x) *Græca et Latina lingua Hebraizantes*, Venice, 1763. If theſe books are not at hand, Dr Littleton's Dictionary will, in a good meaſure, ſupply their place.

and præterperfect have nothing common with the Greek verb, and cannot, we think, be forced into an alliance with it. The future *ero* was of old *eſo*, and is indeed genuine Greek. Upon the whole, in our apprehenſion the Latin ſubſtantive verb more nearly reſembles the Perſian verb *heſten* than that of any other language we are acquainted with.

185 And of other verbs.

From what exemplar the Latin verbs were derived, is not, we think, eaſily aſcertained. We know that attempts have been made to deduce them all from the Æolic Greek, and that the Romans themſelves were extremely fond of this chimera; but the almoſt numberleſs irregularities, both in the formation and conjugation of their verbs, induce us to believe that only a part of them were formed upon that model. We are apt to think that the terminations in *bam, bas, bat, bamus*, &c. are produced by their union with a fragment of ſome obſolete verb, which is now wholly loſt. In the verb *amo, e. g.* we are ſure that the radix *am* is the Hebrew word *mother;* but how *am abam, am-abo, am-arem* were fabricated, and connected with the radical *am*, is not ſo eaſily determined. That Latin verbs are compoſed of an inflexible radix and another flexible verb, as well as the Greek, cannot be doubted, but what this flexible auxiliary was, we think, cannot now be clearly aſcertained. It is not altogether improbable that ſuch parts of the verbs as deviate from the Greek archetype were ſupplied by fragments of the verb *ha*, which pervades all the branches of the Gothic language, and has, we think, produced the Latin verb *habeo*. When the Greeks began to etymologize, they ſeldom overpaſſed the verge of their own language: the Latins purſued nearly the ſame courſe. If their own language preſented a plauſible etymology, they embraced it; if not, they immediately had recourſe to the Greek; and this was the *ne plus ultra* of their etymological reſearches. Cicero, Quintilian, Feſtus, &c. and even Varro, and moſt of all the learned Romans, ſtop here; all beyond is either doubt or impenetrable darkneſs. The opinion abovementioned we offer only as a conjecture; the deciſion we leave to more able critics.

186 Deficiencies in Latin verbs.

The want of aoriſts or indefinite tenſes ſeems to us a palpable defect in the Latin language. The uſe of theſe among the Greek enabled the writer to expreſs the ſpecific variations of time with more accuracy and preciſion than the Latins, who never attempted to ſpecify them by any other tenſes but the imperfect and pluperfect. Indeed we ſhould imagine, that both the Greeks and Latins were much inferior to the Engliſh in this reſpect. The Latin word *lego*, for example, may be tranſlated into Engliſh three different ways: 1ſt, *I read;* 2d, *I do read;* 3d, *I am reading.*

187 Irregularities in the conjugations.

The Latins, in reducing verbs to their four conjugations, formed their inflexions in a very irregular manner. Many verbs of the firſt claſs inflect their præterite and ſupine like thoſe of the ſecond: thus *domo*, inſtead of giving *avi* and *atum*, has *ui* and *itum*, like *monui* and *monitum*. Again, not a few verbs of the third conjugation have *ivi* and *itum*, as if they belonged to the fourth; e. g. *peto, petivi, petitum.* Then, ſome verbs have *io* in the preſent, *ivi* in the præterite, and *itum* in the ſupine, while, contrary to the rules of analogy, they in reality belong to the third: ſuch are *cupio, cupivi, cupitum, cupere*, &c. Some verbs of the ſecond conjugation have their præterite and ſupine as if they belonged to the third; thus, *jubeo, juſſi, juſſum, jubere; augeo, auxi, auctum, augere.* Some verbs, which are actually of the fourth conjugation, have their præterite and ſupine as if they were of the third; thus *ſentio, ſenſi, ſenſum, ſentire; haurio, hauſi, hauſtum, haurire*, &c. If theſe are not manifeſt irregularities, we cannot ſay what deſerves the name. The fact ſeems to ſtand thus: The Romans were originally a banditti of robbers, bankrupts, runaway ſlaves, ſhepherds, huſbandmen, and peaſants, of the moſt unpoliſhed character. They were engaged in perpetual broils and quarrels at home, and ſeldom enjoyed repoſe abroad. Their profeſſion was robbery and plunder. Like old Iſhmael, their hands were againſt every man, and every man's hand againſt them. In ſuch a ſtate of ſociety no time was left for cultivating the ſciences. Accordingly the arts of war and goverment were their ſole profeſſion. This is ſo true, that their own poet characterizes them in the following manner:

Excudunt alii ſpirantia mollius æra, &c.

188 The Latin deficient in participles.

Another blemiſh in the Latin tongue is occaſioned by its wanting a participle of the præterite tenſe in the active voice. This defect is perpetually felt, and is the cauſe of an aukward circumlocution wherever it happens to preſent itſelf. Thus, "The general having croſſed the river drew up his army;" *Imperator, cum tranſiiſſet flumen, aciem inſtruxit.* Here *cum tranſiiſſet flumen* is a manifeſt circumlocution, which is at once avoided in the Greek ὁ ἡγεμων περασας τον ποταμον, &c. This muſt always prove an incumbrance in the caſe of active intranſitive verbs. When active deponent verbs occur, it is eaſily avoided. Thus, "Cæſar having encouraged the ſoldiers, gave the ſignal for joining battle;" *Cæſar cohortatus milites, prælii committendi ſignum dedit.*

Another palpable defect in this language ariſes from the want of a participle of the preſent paſſive. This again muſt produce an inconveniency upon many occaſions, as will be obvious to every Latin ſtudent almoſt every moment.

189 Supines and gerunds.

The two ſupines are univerſally allowed to be ſubſtantive-nouns of the fourth declenſion. How theſe aſſumed the nature of verbs it is not eaſy to determine. When they are placed after verbs or nouns, the matter is attended with no difficulty; but how they ſhould acquire an active ſignification, and take the caſe of the verb with which they are connected, implies, we ſhould think, a ſtretch of prerogative.

The Latin gerunds form another unnatural anomaly. Every Latin ſcholar knows that thoſe words are nothing but the neuters of the participles of the future paſſive. The fabricators of the Latin tongue, however, elevated them from their primary condition, giving them upon many occaſions an active ſignification. In this caſe we muſt have recourſe to

——————— *Sic volet uſus,*
Quem penes arbitrium eſt et jus et norma loquendi.

Another inconveniency, perhaps more ſeverely felt than any of the preceding, ariſes from the want of the uſe of the preſent participle of the verb *ſum*. Every body knows what a conveniency is derived from the frequent uſe of the participle ων in Greek; and indeed it appears to us ſomewhat ſurpriſing that the

Latins neglected to introduce the participle *ens* into their language. In this we believe they are ſingular. Here again a circumlocution becomes neceſſary in ſuch a caſe as the following: "The ſenate being at Rome, paſſed a decree." Inſtead of ſaying *ſenatus ens Romæ, legem tulit*, we are obliged to ſay *cum ſenatus Romæ eſſet*, &c. If the words *ens* or *exiſtens* had been adopted, as in the Greek, this odious circumlocution would have been avoided.

Many other defects of the like kind will occur to every perſon who ſhall chooſe to ſearch for them, and thoſe in the moſt approved claſſical authors. Perhaps our mentioning ſo many may be deemed invidious by the admirers of that language; but we write from conviction, and that muſt be our apology.

190 Different genius of the Latin and Greek languages.

If one take the trouble to compare the ſtructure of the Greek and Latin languages, he will, we think, quickly be convinced that their characteriſtic features are extremely different. The genius of the former ſeems eaſy and natural; whereas that of the latter, notwithſtanding the united efforts of poets, orators, and philoſophers, ſtill bears the marks of violence and reſtraint. Hence it appears that the Latin language was preſſed into the ſervice, and compelled almoſt againſt its will to bend to the laws of the Grecian model. Take a ſentence of Hebrew, Chaldean, Arabian, &c. and try to tranſlate it into Greek without regarding the arrangement of the words, and you will find it no difficult attempt; but make the ſame trial with reſpect to the Latin, and you will probably find the labour attended with conſiderable difficulty. To tranſlate Greek into Engliſh is no laborious taſk; the texture of the two languages is ſo congenial, that the words and phraſes, and even the idiomatic expreſſions, naturally ſlide into each other. With the Latin the caſe is quite otherwiſe; and before elegant Engliſh can be produced, one muſt deviate conſiderably from the original. Should we attempt to tranſlate a piece of Engliſh into Greek, and at the ſame time into Latin, the tranſlation of the former would be attended with much leſs difficulty than that of the latter, ſuppoſing the tranſlator equally ſkilled in both languages.

191 Cauſes of the difference.

This incongruity ſeems to ſpring from the following cauſe. Before any man of conſiderable abilities, either in the capacity of a poet, grammarian, or rhetorician, appeared at Rome, the language had acquired a ſtrong and inflexible tone, too ſtubborn to be exactly moulded according to the Grecian ſtandard. After a language has continued ſeveral centuries without receiving a new poliſh, it becomes like a full grown tree, incapable of being bent to the purpoſe of the mechanic. For this reaſon, it is highly probable, that the tongue in queſtion could not be forced into a complete aſſimilation with the Greek. Notwithſtanding all theſe obſtructions, in proceſs of time it arrived at ſuch an exalted pitch of perfection, as to rival, perhaps to excel, all the other European languages, the Greek only excepted. Had men of the taſte, judgment, and induſtry of Ennius, Plautus, Terence, Cicero, and the worthies of the Auguſtan age, appeared in the early ſtages of the Roman commonwealth, we may believe that their language would have been thoroughly reduced to the Grecian archetype, and that the two dialects might have improved each other by a rivalſhip between the nations who employed them.

Without pretending to entertain our readers with a pompous and elaborate account of the beauties of that imperial language which have been detailed by writers almoſt without number, we ſhall endeavour to lay before them as briefly as poſſible its priſtine character, the ſteps and ſtages by which it gradually roſe to perfection, the period when it arrived at the ſummit of its excellence, and by what means it degenerated with a rapid career till it was loſt among thoſe very people to whom it owed its birth.

192 The Latin tongue compoſed chiefly of Pelaſgic and Celtic words.

We have obſerved already, that the Latin language was a *colluvies* of all the languages ſpoken by the vagrant people who compoſed the firſt elements of that republic. The prevailing dialects were the Pelaſgic or Hetruſcan, which we think were the ſame; and the Celtic, which was the aboriginal tongue of Italy. Hence the primary dialect of the Romans was compoſed of diſcordant materials, which in our opinion never acquired a natural and congenial union. Be that as it may, this motley mixture was certainly the original dialect of the Romans. The Pelaſgic or Hetruſcan part of it retained a ſtrong tincture of the oriental ſtyle. The Celtic part ſeems to have been prevalent, ſince we find that moſt of the names of places (z), eſpecially in the middle and northern parts of Italy, are actually of Celtic original. It is therefore clear that the ſtyle of the firſt Romans was compoſed of the languages above-mentioned. Who thoſe firſt Romans were, we believe it is impoſſible to determine with any degree of certainty. The Roman hiſtorians afford us as little information upon that ſubject, as their etymologiſts do upon the origin of their language. Their moſt celebrated writers upon this point were Ælius Gallus, Quintus Cornificius, Nonius Marcellus, Feſtus, and ſome others of leſs note. At the head of theſe we ought to place Terentius Varro, whom Cicero ſtyles the moſt learned of all the Romans. From theſe writers we are to expect no light. Their etymologies are generally childiſh and futile. Of the language of the moſt ancient Romans we can only reaſon by analogy; and by that rule we can diſcover nothing more than what we have advanced above.

In the firſt place we may reſt aſſured that the dual number, the articles, the participle above-mentioned, the aoriſts, and the whole middle voice, never appeared in the Latin tongue; and accordingly were not current in thoſe languages from which it was copied, at leaſt at the time when it was firſt fabricated.

Beſides all this, many circumſtances concur to make it highly probable that, in the earlieſt periods of the language, very few inflexions were introduced. 1ſt, When the Pelaſgi left Greece, the Greek language itſelf was not fully poliſhed. 2d, The Arcadians were never thoroughly cultivated. They were a ruſtic paſtoral people, and little minded the refinements of a civilized ſtate; conſequently the language they brought into Italy at that era muſt have been of a coarſe and irregular contexture. 3d, When the Theſſalian * Pelaſgi arrived in Italy about the time of Deucalion, the Greek itſelf was rude and barbarous; and, which is ſtill of more conſequence, if we may credit Herodotus quoted in the former ſection, that people had never adopted the Hellenic tongue. Hence it appears, that the part of the Latin language derived from the Pelaſgic or Hetruſcan (for thoſe we believe to have been the ſame) muſt have taken a deep tincture from the oriental tongues (ſee preceding Section). If we may judge of the Celtic of that age by that of the preſent, the ſame character muſt likewiſe have diſtinguiſhed its ſtructure.

(z) For proof of this our readers may conſult Abbé Pezron, Pelloutier, Bullet's *Mem.* Gebelin *Pref. Dict. Lat.* and many others.

193
Hence little inflected in its original ſtate.

From theſe circumſtances, we think it appears that the earlieſt language of the Romans was very little diverſified with inflections. It nearly reſembled the oriental exemplar, and conſequently differed widely from the modern Latin. The effect of this was, that the modern Romans could not underſtand the language of their early progenitors. Polybius *, ſpeaking of the earlieſt treaty between the Romans and Carthaginians, makes the following obſervation: "Believe me (ſays he), the Roman language has undergone ſo many changes ſince that time (A) to the preſent, that even thoſe who are moſt deeply ſkilled in the ſcience of antiquities cannot underſtand the words of that treaty but with the greateſt difficulty."

From this ſource we make no doubt has flowed that vaſt number of oriental words with which the Latin language is impregnated. Theſe were originally inflexible, like their brethren of the eaſt. They were not diſguiſed as they now are with prefixes, affixes, metatheſes, ſyncopas, antitheſes, &c. but plain and unadorned in their natural dreſs.

194
Bent afterwards into the Grecian model.

After the Romans became acquainted with the Æolian Greeks, who gradually ſeized upon both coaſts of Italy towards the ſouth, which they called *Magna Græcia*, they began to affect a Grecian air, and to torture their language into that foreign contexture. It appears, however, that at firſt the Grecian garb ſat rather aukwardly, and ſeveral marks of violence were eaſily diſcerned The moſt ancient ſpecimen of this kind that we can recollect conſiſts of the remains of the *twelve tables*. Here every thing is rude and of a clumſy caſt; for though by this time conſiderable progreſs had been made in refinement, and the language of Rome had begun to appear in a Grecian uniform, ſtill thoſe changes were not altogether natural. Soon after appeared Marcus Fabius Pictor and Siſenna: hiſtorians often quoted by Livy, but whoſe works are long ſince irrecoverably loſt. The Faſti Capitolini are often mentioned; but they too periſhed in the burning of the Capitol during the civil wars between Marius and Sylla. Had thoſe monuments eſcaped the ravages of time, we ſhould have been able to mark the progreſs of the Latin tongue from ſtage to ſtage, and to aſcertain with the greateſt accuracy its gradual configuration in the courſe of its progreſs towards the Grecian ſtandard. We muſt therefore leave the Latin tongue during thoſe periods rude and barbarous, and deſcend to others better known and more characteriſtically marked. Thoſe commenced after that

> *Græcia capta ferum victorem cepit et artes*
> *Intulit agreſti Latio.*

195
The principal authors by whom it was gradually poliſhed.

In this period we find Ennius, who wrote a Roman hiſtory in hexameter verſe in 18 books, which he called *Annals*; moſt part of which is now loſt. He likewiſe tranſlated *Euhemerus de Origine Deorum*; a work often mentioned by the Chriſtian fathers in their diſputes with the Pagans. It is ſometimes quoted by Cicero. Then followed Caius Lucilius the famous ſatyriſt, and a number of other writers, ſuch as Accius, Valerius, Ædituus, Alpinus, &c. whoſe fragments were publiſhed by the Stephens, Paris, 1564. All theſe imitated the writers of Greece or tranſlated from them. By their perſeverance and active exertions the ſpirit of theſe authors was transfuſed into the Latin tongue, and its ſtructure accommodated to the Grecian plan.

Plautus and Terence, by tranſlating the comedies of Menander and Diphilus into their own language, taught the Latin muſes to ſpeak Attic Greek. To ſpeak that language was then the *ton* of the times, as it is now with us to chatter French. Greek tutors were retained in every reputable family; and many Romans of the firſt rank were equally qualified to ſpeak or write both in Greek and Latin. The original jargon or Latium was now become obſolete and unintelligible; and Cato the Ancient condeſcended to learn the Greek language at 80.

196
The golden age of Rome.

To pretend to enumerate the various, and we may add inimitable, examples of the Auguſtan or golden age of the Roman tongue, would be an inſult to the underſtanding of our readers: we ſhall only take the liberty to tranſlate a few lines from a moſt excellent hiſtorian*, who, had his honeſty been equal to his judgment, might have rivalled the moſt celebrated writers of his country. Having obſerved, that the Greek authors, who excelled in every province of literature, had all made their appearance nearly about the ſame ſpace of time, confined within very narrow limits, he adds, "Nor was this circumſtance more conſpicuous among the Greeks than among the Romans; for unleſs we go back to the rough and unpoliſhed times, which deſerve commendation only on account of their invention, the Roman tragedy is confined to Accius and the period when he flouriſhed. The charming wit of Latin elegance was brought to light by Cecilius, Terentius, and Afranius, nearly in the ſame age. As for our hiſtorians (to add Livy alſo to the age of the former), if we except Cato and ſome old obſcure ones, they were all confined to a period of 80 years; ſo neither has our ſtock of poets extended to a ſpace much backward or forward. But the energy of the bar, and the finiſhed beauty of proſe eloquence, ſetting aſide the ſame Cato (by leave of P. Craſſus, Scipio, Lælius, the Gracchi, Fannius, and Ser. Galba, be it ſpoken), broke out all at once under Tully the prince of his

* Dion. Halicar. lib. 1.

* Lib. 3. ſub initio.

* Velleius Paterculus, lib. 1. cap. ult.

(A) This treaty, according to the ſame hiſtorian, was concluded in the conſulſhip of Lucius Junius Brutus and Marcus Valerius, 28 years before Xerxes made his deſcent upon Greece.

his profeſſion; ſo that one can be delighted with none before him, and admire none except ſuch as have either ſeen or were ſeen by that orator."

From this quotation it plainly appears, that the Romans themſelves were convinced of the ſhort duration of the golden age of their language. According to the moſt judicious critics, it commenced with the era of Cicero's oratorical productions, and terminated with the reign of Tiberius, or perhaps it did not reach beyond the middle of that prince's reign. It is generally believed that eloquence, and with it every thing liberal, elevated, and manly, was baniſhed Rome by the deſpotiſm of the Cæſars. We imagine that the tranſition was too inſtantaneous to have been entirely produced by that unhappy cauſe. Deſpotiſm was firmly eſtabliſhed among the Romans about the middle of the reign of Auguſtus; and yet that period produced ſuch a group of learned men as never adorned any other nation in ſo ſhort a ſpace of time. Deſpotiſm, we acknowledge, might have affected the eloquence of the bar; the noble and important objects which had animated the republican orators being now no more: but this circumſtance could not affect poetry, hiſtory, philoſophy, &c. The ſtyle employed upon theſe ſubjects did not feel the fetters of deſpotiſm. The age of Louis XIV. was the golden period of the French tongue; and we think that age produced a race of learned men, in every department ſuperior in number and equal in genius to the literati who flouriſhed under the noble and envied conſtitution of Britain during the ſame age, though the latter is univerſally allowed to have been the golden period of this country. The Britiſh iſles, we hope, enjoy ſtill as much liberty as ever; yet we believe few people will aver, that the writers of the preſent age are equal either in ſtyle or in genius to that noble group who flouriſhed from the middle of the reign of Charles I. to the middle of the reign of George II. and here deſpotiſm is quite unconcerned.

197 Cauſes of the degeneracy of the Latin tongue.

In the eaſt the ſame obſervation is confirmed. The Perſians have long groaned under the Mohammedan yoke; and yet every oriental ſcholar will allow, that in that country, and under the moſt galling tyranny, the moſt amazing productions of taſte, genius, and induſtry, that ever dignified human nature, have been exhibited. Under the Arabian caliphs, the ſucceſſors of Mohammed, appeared writers of a moſt ſublime genius, though never was deſpotiſm more cruelly exerciſed than under thoſe fanatics. The revival of letters at the era of the reformation was chiefly promoted and cheriſhed by petty deſpotical princes.

We cannot therefore be perſuaded to agree, that the deſpotiſm of the Cæſars baniſhed eloquence and learning from Rome. Longinus indeed has attributed this misfortune to that cauſe, and tells us, θρεψαι τε γαρ ἱκανη τα φρονηματα των Μεγαλοφρονων ἡ ΕΛΕΥΘΕΡΙΑ, &c. "It is liberty that is formed to nurſe the ſentiments of great geniuſes, to puſh forward the propenſity of conteſt, to inſpire them with hopes, and the generous ambition of being the firſt in rank." When Longinus wrote this, he did not reflect that he himſelf was a ſtriking inſtance of the unſoundneſs of his obſervation.

198 The writers of the ſilver age greater maſters of ſcience than their predeceſſors.

As to ſcience, the fact is undoubtedly on the other ſide. That Seneca was ſuperior to Cicero in philoſophy, cannot be reaſonably contradicted. The latter had read, and actually abridged, the whole extent of Grecian philoſophy: this diſplayed his reading rather than his learning. The former had addicted himſelf to the ſtoic ſect; and though he does not write with the ſame flow of eloquence as Tully, he thinks more deeply and reaſons more cloſely. Pliny's Natural Hiſtory is a wonderful collection, and contains more uſeful knowledge than all the writings of the Auguſtan age condenſed into one maſs. We think the hiſtorical annals of Tacitus, if inferior to Livy in ſtyle and majeſty of diction, much ſuperior in arrangement and vigour of compoſition. In ſhort, we diſcover in theſe productions a deep inſight into human nature, an extenſive knowledge of the ſcience of government, a penetration which no diſſimulation could eſcape, together with a ſincere attachment to truth both with reſpect to events and characters; nor is he inferior in the majeſty, energy, and propriety of his harangues, wherever an equal opportunity preſents itſelf. Quintilian, Pliny the younger, Suetonius, Petronius Arbiter, and Juvenal, deſerve high eſteem; nor are they inferior to their immediate predeceſſors. We think there is good reaſon to conclude, that the loſs of liberty among the Romans did not produce the extinction of eloquence, ſcience, elevation of ſentiment, or refinement of taſte, There were, we believe, other circumſtances which chiefly contributed to produce that revolution.

The ſame Velleius Paterculus whom we have quoted aſſigns ſome plauſible and very judicious reaſons for this cataſtrophe. "Emulation (ſays he) is the nurſe of genius; and one while envy, and another admiration, fires imitation. According to the laws of nature, that which is purſued with the greateſt ardour mounts to the top: but to be ſtationary in perfection is a difficult matter; and by the ſame analogy, that which cannot go forward goes backward. As at the outſet we are animated to overtake thoſe whom we deem before us, ſo when we deſpair of being able to overtake or to paſs by them, our ardour languiſhes together with our hope, and what it cannot overtake it ceaſes to purſue; and leaving the ſubject as already engroſſed by another, it looks out for a new one upon which to exert itſelf. That by which we find we are not able to acquire eminence we relinquiſh, and try to find out ſome object *elſewhere* upon which to employ our intellectual powers. The conſequence is, that frequent and variable tranſitions from ſubject to ſubject proves a very great obſtacle to perfection in any profeſſion."

This perhaps was the caſe with the Romans. The heroes of the Auguſtan age had borne away the prize of eloquence, of hiſtory, of poetry, &c. Their ſucceſſors deſpaired of being able to equal, much leſs to ſurpaſs them, in any of theſe walks. They were therefore laid under the neceſſity of ſtriking out a new path by which they might arrive at eminence. Conſequently Seneca introduced the *ſtile coupé*, as the French call it; that is, a ſhort, ſparkling, figurative diction, abounding with antitheſes, quaintneſſes, witticiſms, embelliſhed with flowers and meretricious ornaments; whereas the ſtyle of the Auguſtan age was natural, ſimple, ſolid, unaffected, and properly adapted to the nature of the ſubject and the ſentiments of the author.

The hiſtorian Salluſt laid the foundation of the unnatural

natural ſtyle above mentioned. Notwithſtanding all the excellencies of that celebrated author, he every where exhibits an affectation of antiquity, an antithetical caſt, an air of auſterity, an accuracy, exactneſs, and regularity, contrary to that *air degagé* which nature diſplays in her moſt elaborate efforts. His words, his clauſes, ſeem to be adjuſted exactly according to number, weight, and meaſure, without exceſs or defect. Velleius Paterculus imitated this writer; and, as is generally the caſe with imitators, ſucceeded beſt in thoſe points where his archetype had failed moſt egregiouſly. Tacitus, however excellent in other reſpects, deviated from the Auguſtan exemplars, and is thought to have imitated Salluſt; but affecting brevity to exceſs, he often falls into obſcurity. The other contemporary writers employ a cognate ſtyle; and becauſe they have deviated from the Auguſtan ſtandard, their works are held in leſs eſtimation, and are thought to bear about them marks of degeneracy.

That degeneracy, however, did not ſpring from the deſpotic government under which theſe authors lived, but from that affectation of ſingularity into which they were led by an eager but fruitleſs deſire of ſignalizing themſelves in their mode, as their predeceſſors had done in theirs. But the miſchiefs of this rage for innovation did not reach their ſentiments as it had done their ſtyle; for in that point we think they were ſo far from falling below the meaſure of the writers of the former age, that in many inſtances they ſeem to have ſurpaſſed them.

With reſpect to ſentiment and mental exertions, the authors in queſtion preſerved their vigour, till luxury and effeminacy, in conſequence of power and opulence, enervated both the bodies and minds of the Romans. The contagion ſoon became univerſal; and a liſtleſſneſs, or intellectual torpor, the uſual concomitant of luxury, ſpread indolence over the mental faculties, which rendered them not only averſe to, but even incapable of, induſtry and perſeverance. This lethargic diſpoſition of mind ſeems to have commenced towards the concluſion of the ſilver age; that is, about the end of the reign of Adrian. It was then that the Roman eagles began to ſtoop, and the genius of Rome, as well in arts as in arms, began to decline. Once more, the declenſion of the intellectual powers of the writers of that nation did not ariſe from the form of the government, but from the cauſes above ſpecified.

As the Roman genius, about that period, began to decline, ſo the ſtyle of the ſilver age was gradually vitiated with barbariſms and exotic forms of ſpeech. The multitudes of barbarians who flocked to Rome from all parts of the empire; the ambaſſadors of foreign princes, and often the princes themſelves, with their attendants; the prodigious numbers of ſlaves who were entertained in all the conſiderable families of the capital, and over all Italy; the frequent commerce which the Roman armies upon the frontiers carried on with the barbarians; all concurred to vitiate the Latin tongue, and to interlard it with foreign words and idoms. In ſuch circumſtances, it was impoſſible for that or any other language to have continued pure and untainted.

This vitiated character both of ſtyle and ſentiment became more and more prevalent, in proportion as it deſcended from the reign of Adrian towards the era of the removal of the imperial ſeat from Rome to Conſtantinople. Then ſucceeded the iron age, when the Roman language became abſolutely rude and barbarous.

199
Writers of great talents during the ſilver and brazen ages.

Towards the cloſe of the ſilver, and during the whole courſe of the brazen age, there appeared, however, many writers of no contemptible talents. The moſt remarkable was Seneca the ſtoic, the maſter of Nero, whoſe character both as a man and a writer is diſcuſſed with great accuracy by the noble author of the *Characteriſtics*, to whom we refer our readers.

About the ſame time lived Perſius the ſatyriſt, the friend and diſciple of the ſtoic Cornutus; to whoſe precepts, as he did honour by his virtuous life, ſo his works, though ſmall, ſhow an early proficiency in the ſcience of morals.

Under the mild government of Adrian and the Antonines lived Aulus Gellius, or (as ſome call him) Agellius; an entertaining writer in the miſcellaneous way, well ſkilled in criticiſm and antiquity. His works contain ſeveral valuable fragments of philoſophy, which are indeed the moſt curious parts of them.

With Aulus Gellius we may range Macrobius; not becauſe a contemporary (for he is ſuppoſed to have lived under Honorius and Theodoſius), but from his near reſemblance in the character of a writer. His works, like thoſe of the other, are miſcellaneous; filled with mythology and ancient literature, with ſome philoſophy intermixed.

In the ſame age with Aulus Gellius flouriſhed Apuleius of Madaura in Africa; a Platonic writer, whoſe matter in general far exceeds his perplexed and affected ſtyle, too conformable to the falſe rhetoric of the age when he lived.

Boethius was deſcended from one of the nobleſt of the Roman families, and was conſul in the beginning of the ſixth century. He wrote many philoſophical works; but his ethic piece on the Conſolation of Philoſophy deſerves great encomiums, both for the matter and the ſtyle; in which latter he approaches the purity of a far better age than his own. By command of Theodoric king of the Goths this great and good man ſuffered death; with whom the Latin tongue, and the laſt remains of the Roman dignity, may be ſaid to have ſunk in the weſtern world.

There were beſides a goodly number both of poets and hiſtorians who flouriſhed during this period; ſuch as Silius Italicus, Claudian, Auſonius, &c. poets and hiſtorians to a very great number, for whom our readers may conſult *Joh. Alberti Fabricii Bibl. Lat.*

200
Elegant eccleſiaſtical writers in Latin.

There flouriſhed, too, a number of eccleſiaſtical writers, ſome of whom deſerve great commendation. The chief of theſe is Lactantius, who has been deſervedly dignified with the title of the *Chriſtian Cicero*.

The Roman authors amount to a very ſmall number in compariſon of the Greek. At the ſame time, when we conſider the extent and duration of the Roman empire, we are juſtly ſurpriſed to find ſo few writers of character and reputation in ſo vaſt a field. We think we have good reaſon to agree with the prince of Roman poets in the ſentiment quoted p. 553.

Upon the whole, the Latin tongue deſerves our attention beyond any other ancient one now extant. The grandeur of the people by whom it was ſpoken; the

201 Excellency and uſefulneſs of the Latin tongue.

the luſtre of its writers; the empire which it ſtill maintains among ourſelves; the neceſſity we are under of learning it in order to obtain acceſs to almoſt all the ſciences, nay even to the knowledge of our own laws, of our judicial proceedings, of our charters; all theſe circumſtances, and many others too numerous to be detailed, render the acquiſition of that imperial language in a peculiar manner at once improving and highly intereſting. Spoken by the conquerors of the ancient nations, it partakes of all their revolutions, and bears continually their impreſſion. Strong and nervous while they were employed in nothing but battles and carnage, it thundered in the camps, and made the proudeſt people to tremble, and the moſt deſpotic monarchs to bend their ſtubborn necks to the yoke. Copious and majeſtic, when, weary of battles, the Romans inclined to vie with the Greeks in ſcience and the graces, it became the learned language of Europe, and by its luſtre made the jargon of ſavages diſappear who diſputed with it the poſſeſſion of that quarter of the globe. After having controlled by its eloquence, and humanized by its laws, all thoſe people, it became the language of religion. In ſhort, the Latin language will be ſtudied and eſteemed as long as good ſenſe and fine taſte remain in the world.

Sect. IX. *Celtic, Gothic, and Sclavonian Languages.*

§ 1. *Of the Celtic Language.*

In treating of the origin of the Latin tongue (ſee Section VIII.), we obſerved that a great part of it is derived from the Celtic. We ſhall now endeavour to give ſome account of the origin and extent of that ancient language; ſtill leaving the *minutiæ* to grammars and dictionaries, as we have done with reſpect to the other dialects which have fallen under our conſideration. Our candid readers, it is hoped, will remember, that we are acting in the character of philologers, not in that of grammarians and lexicographers.

202 Origin of the Celts,

The deſcendants of Japhet having peopled the weſtern parts of Aſia, at length entered Europe. Some broke into that quarter of the globe by the north, others found means to croſs the Danube near its mouth. Their poſterity gradually aſcended towards the ſource of that river: afterwards they advanced to the banks of the Rhine, which they paſſed, and thence ſpread themſelves as far as the Alps and the Pyrenean hills.

Theſe people, in all probability, were compoſed of different families; all, however, ſpoke the ſame language; their names and cuſtoms bore a near reſemblance; there was no variety among them but that difference which climate always introduces. Accordingly they were all known, in the more early times, by the general name of *Celtoſcythæ*. In proceſs of time, becoming exceedingly numerous, they were divided into ſeveral nations, which were diſtinguiſhed by different names and territorial appellations. Thoſe who inhabited that large country bounded by the ocean, the Mediterranean, the Rhine, the Alps, and the Pyrenees, were denominated *Gauls* or *Celts*. Thoſe people multiplied ſo prodigiouſly in the ſpace of a few centuries, that the fertile regions which they then occupied could not afford them the means of ſubſiſtence. Some of them now paſſed over into Britain; others croſſed the Pyrenees, and formed ſettlements in the northern parts of Spain. Even the formidable barriers of the Alps could not impede the progreſs of the Gauls: they made their way into Italy, and colonized thoſe parts which lie at the foot of the mountains; whence they extended themſelves towards the centre of that rich country.

230 rt of om were omina- Gauls.

By this time the Greeks had landed on the eaſtern coaſts of Italy, and founded numerous colonies in thoſe parts. The two nations vying as it were with each other in populouſneſs, and always planting colonies in the courſe of their progreſs, at length rencountered about the middle of the country. This central region was at that time called *Latium*. Here the two nations formed one ſociety, which was called *the Latin people*. The languages of the two nations were blended together; and hence, according to ſome, the Latin is a mixture of Greek and Gaelic.

204 Reſemblance between their language and that of the Pelaſgi.

As the Gauls were a brave and numerous people, they certainly maintained themſelves in their priſtine poſſeſſions, uninvaded, unconquered, till their civil animoſities and domeſtic quarrels expoſed them as a prey to thoſe very Romans whom they had ſo often defeated, and ſometimes driven to the brink of deſtruction. They were not a people addicted to commerce; and, upon the whole, conſidering their ſituation both in their primary ſeats and afterwards in Italy, they had little temptation or opportunity to mingle with foreigners. Their language, therefore, muſt have remained unmixed with foreign idioms. Such as it was when they ſettled in Gaul, ſuch it muſt have continued till the Roman conqueſts. If therefore there is one primitive language now exiſting, it muſt be found in the remains of the Gaelic or Celtic. It is not, then, ſurpriſing, that ſome very learned men, upon diſcovering the coincidence of very great numbers of words in ſome of the Greek dialects with other words in the Celtic, have been inclined to eſtabliſh a ſtrict affinity between thoſe languages. The ancient Pelaſgic and the Celtic at leaſt muſt have nearly reſembled each other, admitting a dialectical difference only, and that diſcrimination which climate and a long period of time muſt always produce.

Some have thought that the Gauls loſt the uſe of their native language ſoon after their country was conquered by the Romans; but *Monſieur Bullet*, in his *Memoirs de la Langue Celtique*, has proved almoſt to a demonſtration, that the vulgar among thoſe people continued to ſpeak it ſeveral centuries after that period. When a great and populous nation has for many ages employed a vernacular tongue, nothing can ever make them entirely relinquiſh the uſe of it, and adopt unmixed that of their conquerors.

Many learned men, among whom is the lexicographer above-mentioned, have ſhown that all the local names in the north of Italy are actually of Celtic extraction. Theſe names generally point out or deſcribe ſome circumſtances relating to the nature of their ſituation; ſuch as expoſure, eminence, lowneſs, moiſtneſs, dryneſs, coldneſs, heat, &c. This is a very characteriſtic feature of an original language; and in the Celtic it is ſo prominent, that the Erſe names of places all over Scotland are even to this day, peculiarly diſtinguiſhed by this quality. We have heard a gentleman, who was well ſkilled in the dialect of the Celtic ſtill ſpoken in the Highlands of Scotland, propoſe to lay a bet, at very great odds, that if one ſhould pronounce the name of any village, mountain, river, gentleman's ſeat, &c. in the old Scottiſh dialect, he ſhould be able, by its very name, to give a pretty exact deſcription of its local ſituation.

To diſcover the ſources from which the Celtic tongue is derived we muſt have recourſe to the following expedients.

1. We muſt conſult the Greek and Latin authors, who have preſerved ſome Gaelic or Celtic terms in their writings.

2. We muſt have recourſe to the Welſh and *Baſſe Bretagne* dialects; in which, indeed, there are many new words, but theſe are eaſily diſtinguiſhed from the primitive ſtock.

3. If one would trace another ſource of the Celtic, he muſt converſe with the country people and peaſants, who live at a diſtance from cities, in thoſe countries where it was once the vernacular tongue. We have been credibly informed, that a Highland gentleman, croſſing the Alps for Italy, accidentally fell in with an old woman, a native of thoſe parts, who ſpoke a language ſo near akin to his native Erſe, that he could underſtand her with little difficulty; and that ſhe, on the other hand, underſtood moſt of his words. That an event of this nature ſhould actually take place is by no means ſurpriſing, when we conſider that the Erſe ſpoken in the Highlands of Scotland is perhaps the moſt genuine remnant of the Celtic now exiſting, and at the ſame time reflect that there may be ſome remote cantons among thoſe wild and inacceſſible mountains, the Alps, where ſome remains of that tongue may be ſtill preſerved.

205 The moſt genuine remains of the Celtic in the Highlands of Scotland.

4. We have ſaid, that the moſt genuine remains of the Gaelic tongue are to be found in the Highlands of Scotland; and the reaſon is obvious. The Scottiſh Highlanders are the unmixed unconquered poſterity of the ancient Britons, into whoſe barren domains the Romans never penetrated; not, we imagine, becauſe they were not able, ſince they ſubdued both North and South Wales, equally inacceſſible, but becauſe they found no ſcenes there either to fire their ambition or allure their avarice. Amidſt all the revolutions that from time to time ſhook and convulſed Albion, thoſe mountainous regions were left to their primitive lords, who, like their ſouthern progenitors, hoſpitable in the extreme, did not, however, ſuffer ſtrangers to reſide long among them. Their language accordingly, remained unmixed, and continues ſo even to this day, eſpecially in the moſt remote parts and unfrequented iſlands.

The Norwegians ſubdued the weſtern iſlands of Scotland at a time when the Scottiſh monarchy was ſtill in its minority. They erected a kind of principality over them, of which the iſle of *Man* was the capital. Though they maintained the ſovereignty of thoſe iſlands for ſome centuries, built many forts, and ſtrengthened them with garriſons, and in fine were the lawgivers and adminiſtrators of juſtice among the natives; yet we have been informed by the moſt reſpectable authority, that there is not at this day a ſingle vocable of the Norſe or Daniſh tongue to be found among thoſe iſlanders. This fact affords a demonſtration of that ſuperſtitious attachment with which they were devoted to their vernacular dialects.

206 The Welſh dialect not pure, nor the Iriſh.

The Welſh dialect cannot, we think, be pure and unſophiſticated. The *Silures* were conquered by the Romans, to whom they were actually ſubject for the ſpace of three centuries. During this period, a multitude of Italian exotics muſt have been tranſplanted into their language; and indeed many of them are diſcernible at this day. Their long commerce with their Engliſh neighbours and conquerors hath adulterated their language, ſo that a great part of it is now of an Engliſh complexion. The Iriſh is now ſpoken by a race of people whoſe morality and ingenuity are nearly upon a level. Their lateſt hiſtorians have brought them from the confines of Aſia, through a variety of adventures, to people an iſland *extra anni ſoliſque vias*. However this genealogical tale may pleaſe the people for whom it was fabricated, we muſt ſtill ſuſpect that the Iriſh are of Celtic extraction, and that their foreſathers emigrated from the weſtern coaſt of Britain at a period prior to all hiſtorical or even traditional annals. Ireland was once the *native land of ſaints*. The chief actors on this ſacred ſtage were Romaniſts, and deeply tinctured with the ſuperſtition of the times. They pretended to improve the language of the natives; and whatever their ſucceſs was, they improved it in ſuch a manner as to make it deviate very conſiderably from the original Celtic; ſo that it is not in Ireland that we are to look for the genuine characters of the dialect under conſideration.

207 Coincidence between the Celtic and Phœnician.

Though the Hibernian tongue, in our opinion, differs conſiderably from the original Celtic, ſome very ingenious eſſays have been lately publiſhed by the learned and laborious members of the *Antiquarian ſociety of Dublin*; in which the coincidence of that tongue, with ſome of the original dialects, has been ſupported by very plauſible arguments. In a diſſertation publiſhed in the year 1772, they have exhibited a collection of *Punico Malteſe* words compared with words of the ſame import in Iriſh, where it muſt be allowed the reſemblance is palpable. In the ſame diſſertation they have compared the celebrated *Punic* ſcene in Plautus with its tranſlation into the Iriſh; in which the words in the two languages are ſurpriſingly ſimilar. If thoſe criticiſms are well founded, they will prove that the Celtic is coeval and congenial with the moſt ancient languages of the eaſt; which we think highly probable. Be that as it may, the Danes and Norwegians formed ſettlements in Ireland; and the Engliſh have long been ſovereigns of that iſland. Theſe circumſtances muſt have affected the vernacular idiom of the natives; not to mention the neceſſity of adopting the language of the conquerors in law, in ſciences, and in the offices of religion.

The inhabitants of the Highlands and iſlands of Scotland are the deſcendants of thoſe Britons who fled from the power of the Romans, and ſheltered themſelves among the fens, rocks, and faſtneſſes of thoſe rugged mountains and ſequeſtered glyns. They preferred theſe waſtes and wilds, with liberty and independence, to the pleaſant and fertile valleys of the ſouth, with plenty embittered by ſlavery. They no doubt carried the language along with them; that language was a branch of the Celtic. With them, no doubt, fled a number of the druidical prieſts, who unqueſtionably knew their native dialect in all its beauties and varieties. Theſe fugitives in proceſs of time formed a regular government, elected a king, and became a conſiderable ſtate. They were ſequeſtered by their ſituation from the reſt of the world. Without commerce, without agriculture, without the mechanical arts, and without objects of ambition or emulation, they addicted themſelves wholly to the paſtoral life as their buſineſs, and to hunting and fiſhing as their diverſion. Thoſe people were not diſtinguiſhed by an innovating genius; and conſequently their language muſt have remained in the ſame ſtate in which they received it from their anceſtors. They received it genuine *Celtic*, and ſuch they preſerved it.

When the Scots became maſters of the low country, and their kings and a great part of the nobility embraced the Saxon manners, and adopted the Saxon language, the genuine Caledonians tenaciouſly retained their native tongue, dreſs, manners, clanſhips, and feudal cuſtoms, and could never cordially aſſimilate with their ſouthern neighbours. Their language, therefore, could not be polluted with words or idioms borrowed from a people whom they hated and deſpiſed. Indeed it is plain from the whole tenor of the Scottiſh hiſtory, that neither Caledonian chieftains, nor their vaſſals, were ever ſteadily attached to the royal family after they fixed their reſidence in the low country, and became *Saxons*, as the Highlanders called them by way of reproach. Indeed the commerce between them and thoſe of the ſouth, till about a century and a half ago, was only tranſient and accidental; nor was their native dialect in the leaſt affected by it.

208 Cauſes of the purity of the Scotch dialect of this ancient language.

Their language, however, did not degenerate, becauſe there exiſted among them a deſcription of men whoſe profeſſion obliged them to guard againſt that misfortune. Every chieftain retained in his family a bard or poet laureat, whoſe province it was to compoſe poems in honour of his lord, to commemorate the glorious exploits of his anceſtors, to record the genealogy and connections of the family; in a word, to amuſe and entertain the chief and his gueſts at all public entertainments and upon all ſolemn occaſions. Thoſe profeſſors of the Parnaſſian art uſed to vie with each other; and the chiefs of families often aſſembled their reſpective bards, and encouraged them by conſiderable premiums to exert their poetic talents. The victor was rewarded and honoured; and the chieftain deemed it an honour to himſelf to entertain a bard who excelled his peers. The ancient Gauls, as we learn from Diodorus Siculus, Strabo, Tacitus, Lucan, &c. entertained perſons of that profeſſion; and certainly the ancient Britons did the ſame. Thoſe bards were highly revered; their perſons were deemed ſacred; and they were always rewarded with ſalaries in lands or cattle (See ſection *Greek.*) Thoſe poetic geniuſes muſt have watched over their vernacular dialect with the greateſt care and anxiety; becauſe in their compoſitions no word was to be loſt, but as many gained as poſſible.

The uſe of letters was not known among the ancient *Celtæ;* their druidical clergy forbade the uſe of them. All their religious rites, their philoſophical dogmas, their moral precepts, and their political maxims, were compoſed in verſes which their pupils were obliged to commit to memory. Accordingly letters were unknown to the Caledonian Scots, till they learned them either from their ſouthern neighbours or from the Romans. The Iriſh, indeed, pretend to have letters of a very ancient date; the Highlanders of the country in queſtion make no claim to the uſe of that invention. Their bards, therefore, committed every thing to memory; and of courſe the words of their language muſt have been faithfully preſerved. We find that the celebrated poems of Oſſian, and others of an inferior character, or at leaſt fragments of ſuch poems (ſee OSSIAN), have thus been preſerved from father to ſon for more than 1000 years. The beauty, ſignificancy, harmony, variety, and energy of theſe verſes, ſtrike us even in a proſe tranſlation: how infinitely more charming muſt they appear in their native form and poetical attire!

In order to exhibit the genius of the Celtic in as ſtriking a light as the nature of our preſent deſign will permit, we ſhall lay before our readers a very contracted ſketch of the Gaelic or Caledonian dialect as it now ſtands; which we hope will go a great way to convince them that this is the genuine offspring of the other. In doing this we ſhall borrow many hints from a gentleman * whoſe learning ſeems to equal his zeal for his native language; which, in compliance with the modern practice, we ſhall for the future diſtinguiſh by the name of *Gaelic*.

The Gaelic is not derived from any other language as far as we know, being obviouſly reducible to its own roots. Its combinations are formed of ſimple words of a known ſignification; and thoſe words are reſolvable into the ſimpleſt combinations of vowels and conſonants, and even into ſimple ſounds. In ſuch a language we may expect that ſome traces will be found of the ideas and notions of mankind living in a ſtate of primeval ſimplicity; and if ſo, a monument is ſtill preſerved of the primitive manners of the Celtic race while as yet under the guidance of ſimple nature, without any artificial reſtraint or controul.

The ſudden ſenſations of heat and cold, and bodily pain, are expreſſed by articulate ſounds, which, however, are not uſed in this language to denote heat, cold, or bodily pain. A ſudden ſenſation of heat is denoted by an articulate exclamation *hait;* of cold, by *id;* of bodily pain, by *oich*. All theſe ſounds may be called *interjections*, being parts of ſpeech which diſcover the mind to be ſeized with ſome paſſion. Few of the improved languages of Europe preſent ſo great a variety of ſounds which inſtantaneouſly convey notice of a particular paſſion, bodily or mental feeling.

The pronouns *he* and *ſhe* are expreſſed by the ſimple ſounds *e* and *i*, and theſe are the marks of the maſculine and feminine genders; for a neuter gender is unknown in the *Gaelic*. The compoſitions of rude and barbarous ages are univerſally found to approach to the ſtyle and numbers of poetry; and this too is a diſtinguiſhing character of the *Gaelic*. Bodily ſubſiſtence will always be the principal concern of an uncultivated people. Hence *ed* or *eid* is uſed upon diſcovery of any animal of prey or game: it is meant to give notice to the hunting companion to be in readineſs to ſeize the animal: and hence we believe *edo* "to eat" in Latin, and *ed* in Iriſh ſignifies "cattle:" likewiſe in Scotch *edal* "cattle," literally ſignifies

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* Eſſays, &c. by James Grant, Eſq; advocate.

“the offspring or generation of cattle.” *Coed* or *cued*, “ſhare or proportion of any ſubject of property,” literally “common food.” *Faæd* “hunting,” literally “gathering of food.” *Edra* “the time of the morning when cattle are brought home from paſture to give milk,” literally “meal-time.” Theſe are words importing the ſimplicity of a primitive ſtate, and are common in the Gaelic idiom.

Traces of imitative language remain in all countries. The word uſed for *cow* in the Gaelic language is *bo*, plainly in imitation of the lowing of that animal.

209 Excellency of Gaelic compounds.

In joining together original roots in the progreſs of improving language and rendering it more copious, its combinations diſcover an admirable juſtneſs and preciſion of thought, which one would ſcarce expect to find in an uncultivated dialect. It will, however, be found, upon examination, that the Gaelic language, in its combination of words, ſpecifies with accuracy the known qualities, and expreſſes with preciſion the nature and properties which were attributed to the object denominated.

An appears to have been a word of frequent uſe in this language, and ſeems to have been originally a name applied indefinitely to any object. According to *Bullet*, it was uſed to ſignify “a planet;” hence the *ſun* had the name of *grian*, which is a compound of *gri* “hot,” and *an* “a planet.” *Re* ſignifies originally and radically “diviſion.” The changes of the moon and the variety of her phaſes were early employed to point out the diviſions of time. The preſent name for the *moon* is *geulach*; a word derived from her whiteneſs of colour. To theſe we might add a vaſt number more whoſe ſignification preciſely indicates their ſhape, colour, effects, &c. Many of theſe would be found exactly ſimilar to Greek and Latin words of the ſame ſound and ſignification. In order to ſatisfy our curious readers, we ſhall annex a few, though ſome of them may perhaps be queſtionable.

The *Venus* of the Latins is ſaid to be a compound of *ben* and *jus*, which literally ſignify “the firſt woman,” the letter *b* in Gaelic being ſoftened into *v*. Εδαρ and ειδαρ ſignify “food.” Theſe words are compounded of the Gaelic words *ed* or *eid* and *ar*; the former denotes *food* ſimply, and the latter *ploughed land*. Theſe are the roots of the Greek and Latin words εδω *edo*, αροω *aro*. Εδρα, which ſignifies “a ſeat,” has an evident reference to food. It is compounded of two Gaelic words *ed* and *ira*, which literally ſignify “meal-time.” Εδνα, which ſignifies “the preſents which a bridegroom made to his bride,” is a compound of two Gaelic words *ed* and *na* or *nuah*, literally ſignifying “raw food.” From *ar* there are many Greek derivatives. Αρουρα ſignifies “ploughed land,” alſo “crop of corn;” Αρτος “bread.” In Gaelic *a crop of corn and bread* are expreſſed by *arbhar*, commonly pronounced *arar* and *aran*; all being equally derivatives of the root *ar*. So the Greek and Latin words αροτος, *arabilis*, “arable;” αροτρον, *aratrum*, “a plough;” αροτηρ, *arator*, “a ploughman;” and many others, are evidently derived from the ſame ſource. We would not, however, ſuggeſt, in conſequence of this coincidence, that either the Greek or Latin languages were derived from the Gaelic; we rather believe that theſe are remains of a primeval tongue, which are ſtill retained in all the three; and we produce them upon the preſent occaſion as preſumptions that the Gaelic is an original, underived language, and of courſe the moſt pure and unadulterated relick of the Celtic now exiſting. If our readers ſhould incline to know more of this ſubject, they may conſult Pezron's *Origin of Ancient Nations*, Bullet's *Mem. de la Langue Celtique*, Parſon's *Rem. of Japhet*, Gebelin, *Monde prim.* &c.

213 Copiouſneſs and antiquity of the Celtic.

When the Celtic language was generally ſpoken over Europe, it ſeems to have been amazingly copious. By conſulting *Bullet's Memoires*, it appears that its names for the common and various objects of nature were very numerous. The words denoting water, river, wood, foreſt, mountain, lake, &c. were moſt preciſely accommodated to ſpecify each modification and variety, with ſuch peculiar exactneſs as even the Greek, with all its boaſted idiomatical preciſion and copiouſneſs, has not been able to equal. The appearances which diverſify the viſible face of inanimate nature, arreſt the attention of men in an uncultivated ſtate. Unaccuſtomed to thought and abſtract reaſoning, their minds expand and exerciſe their powers upon ſenſible objects, and of courſe mark every *minutia* and almoſt imperceptible diſtinction with an accuracy to us ſeemingly impoſſible.

We hope it now appears to every reader, that the Celtic was one of the dialects of the primitive language; that it once overſpread by far the greateſt part of Europe; that the Gaelic now ſpoken in the northern parts of Scotland and the adjacent iſlands is the moſt pure and unmixed relick of that tongue now anywhere exiſting. We would willingly refer our readers to ſome well compoſed grammar of that language; but indeed we know of none that deſerves our recommendation. Some years ago we were flattered with the proſpect of ſeeing one publiſhed by a gentleman whoſe deep ſkill in that language is univerſally acknowledged. We have likewiſe heard of an intended dictionary of the ſame tongue; but hitherto our hopes have been diſappointed.

We are, however, happy to find that there is now publiſhing an excellent tranſlation of both the Old and New Teſtaments into Gaelic, which has hitherto been a deſideratum among thoſe who ſpeak this language. Such a tranſlation will at once contribute to preſerve that ancient tongue, and diſſeminate the knowledge of the truth among the natives of that country.

Every aſſiſtance towards acquiring the knowledge of a tongue which was once univerſal over a great part of Europe, will certainly be an acceptable preſent to the public. The antiquary, who is deſirous of tracing the affinity of languages, and wiſhes to mark the migrations of people, ought certainly to apply himſelf to the ſtudy of its remaining branches; and, if we miſtake not, he will ſoon be convinced, that they all breathe a ſpirit congenial to the manners and ſentiments of a people who are juſt entering upon the firſt ſtage of improvement and civilization.

211 Origin of the words Gaul and Gal.

Perhaps it may be expected, that, before we concluded this ſhort ſketch of the Celtic tongue, we ſhould give ſome account of the origin of the words *Gaul* and *Gal*, the two names by which this people was diſtinguiſhed by the Greeks and Romans. Mr Mᶜ Pherſon imagines, that the appellation of *Celt* is an adjective derived from *Gael*, the aboriginal name of the inhabitants of ancient Gaul. For our part, we can ſee no connection between *Gael* and *Kelt*, nor do we think that the latter is an adjective. We believe that thoſe people called themſelves *Cael* and not *Gael*. We are ſure that *Caledonia*, or *Cal-don* or *dun*, was an ancient name of the mountainous parts of Scotland.

Though many different opinions have been advanced with relation to the etymology of this word, we imagine that none is ſo probable as that which ſuppoſes that it is compounded of the two Celtic words *Cal* or *Kal*, that is, "Gal or Gaul," and *dun*, which ſignifies "a hill or mountain." Upon this ground, the Caledonii will import the Gauls of the mountains, or, which is the ſame the Highland Gauls. The Iriſh and Highlanders reciprocally denominate themſelves by the general title of *Cael*, *Gael*, or *Gauls*. They alſo diſtinguiſh themſelves, as the Welch originally did, and as the Welch diſtinguiſh them both at preſent, by the appellation of *Guidhill*, *Guthel*, and *Gathel*. The intermediate *th*, they ſay, is left quieſcent in the pronunciation, as it is in many words of the Britiſh language; in which caſe *Gathel* would immediately be formed into *Gael;* and Gathel is actually ſounded like *Gael* by both the Iriſh and Highlanders at preſent. The appellation of *Gathel*, therefore, ſay they, was originally the ſame with *Gael*, and the parent of it. The quieſcent letters in Britiſh are frequently transferred from the middle to the concluſion of the word ; by which manœuvre, *Gathel* is changed into *Galath*, *Galat*, *Galt*, and *Celt*. It is true, that *Gael* of the continent is univerſally denominated *Galatæ* and *Celtæ* by the Grecians, and *Gallt* and *Gallta* by the Iriſh. The appellations, therefore, of *Gathel-i*, *Gall-i*, *Gallat-æ*, *Calet-es*, *An-calit es*, and *Celt-æ*, are all one and the ſame denomination, only varied by the aſtoniſhing ductility of the *Celtic*, and diſguiſed by the alterations ever incident to a language that has been merely oral for ages.

It may perhaps appear preſumptuous in us to differ from two ſuch reſpectable authorities as M'Pherſon and Whitaker: we muſt, however, acknowledge, that neither the one nor the other appears to us well founded. Beſides, they convey no idea of the ſignification of the words, though in the celtic language they muſt have been ſignificant. The name *Cael*, the ſame with *Gal* was probably given them in the Eaſt from the Greek καλ, which in many oriental languages denotes *fair ;* and Γαλατια may be eaſily derived from Γαλ or Γαλαθ, *Gal* or *Galath*.—This denomination might be given them by their neighbours, in alluſion, to their fair complexion.

§ 2. *Of the Gothic Language.*

212
Ancient Gothic.

The Celtic and Gothic tongues at one time divided Europe between them. Both were of equal antiquity, both originated in Aſia, both were dialects of the original language of mankind. The Celtic, however, was firſt imported into Europe. The Gauls or Celts had penetrated fartheſt towards the weſt; a circumſtance which plainly intimates the priority of their arrival. In the population of countries, we believe it may be held as a maxim, that the colonies who emigrated firſt were generally impelled by ſucceeding emigrants; and that of conſequence the moſt early were puſhed forward to the parts moſt diſtant. The Celts, then, having overſpread the moſt weſtern parts of Europe, muſt have arrived more early in thoſe regions.

213
The ſame with the language of the Thracians.

The Goths and Getæ were the ſame race of people, according to Procopius*, *de bello Goth.*; and Strabo† (B) informs us, that they ſpoke the ſame language with the Thracians, from whoſe confines they had ſpread themſelves northward as far as the weſtern banks of the Danube. Vopiſcus, in the Hiſtory of Probus, tells us, that this emperor‡ obliged "the Thracians, and all the Getic tribes, either to ſurrender or accept of his friendſhip." This expreſſion indicates, that the Thracians and the Getic tribes were deemed the ſame race of people. From this deduction it is clear, that the Getæ and Thracians were brethren; that they ſpoke the ſame language: and that their laws, manners, cuſtoms, and religious tenets, were the ſame, might eaſily be ſhown, were this a proper place for an inquiry of that nature.

* Lib. i. cap. 2.
† Lib. ii. cap. 23.
‡ Lib. 7.

The Thracian language, as might be demonſtrated from names of perſons, offices, places, and cuſtoms, among that people, was nearly related to the Chaldean and other oriental languages.

214
Origin of the Goths.

They are thought to have been the deſcendants of Tiras, one of the ſons of Japhet, and conſequently muſt have preſerved the ſpeech of the Noachic family. The Gothic language abounds with *Pahlavi*, or old Perſic words, which are no doubt remains of the primeval dialect of mankind. The Thracians peopled a conſiderable part of the northern coaſt of Aſia Minor; and conſequently we meet with many names of cities, mountains, rivers, &c. in thoſe parts, exactly correſponding with many names in Europe, evidently impoſed by our Gothic progenitors. Any perſon tolerably acquainted with the remains of the Gothic tongue, will be able to trace theſe with little difficulty.

We learn from Herodotus||, that Darius in his expedition againſt the wandering Scythians who lived on the other ſide of the Iſter or Danube, in his progreſs ſubdued the Getæ; and in the ſame paſſage the hiſtorian informs us, that theſe people held the immortality of the human ſoul, and that they were the braveſt and moſt juſt of all the Thracians. After this period, we find them mentioned by almoſt every Greek writer, even familiarly ; for Getæ in the comedies of that nation, is a common name for a ſlave. The Getæ then occupied all that large tract of country

|| Lib. 4. paſſim.

(B) Lib. vii. page 295, B. ; ibid. page 305. G. (Caſaubon). From this paſſage it appears, that the Greeks were of opinion that the Getæ were Thracians. *Plin. Nat. Hiſt.* l. iv. cap. 11. mentions a tribe of the Getæ called *Gaudæ*.

try which extended from the confines of Thrace to the banks of the Danube: were a brave and virtuous people; and ſpoke the ſame language with the Thracians, with whom they are often confounded both by Greek and Roman hiſtorians.

But the name of *Goths* is by no means ſo ancient. It was utterly unknown both to the ancient Greeks and Romans. The firſt time that the name *Goth* is mentioned is in the reign of the Emperor Decius, about the year of Chriſt 250. About that time they burſt out of Getia, and ruſhing like a torrent into the empire, laid waſte every thing with fire and ſword. The name of their leader or king was *Cneva*. Decius, endeavouring to expel them Thrace, was vanquiſhed and ſlain.

After this irruption, we find them frequently in the Latin authors under the name of *Getæ* or *Gothi;* tho' the Greeks generally denominate them *Scythæ*. Torfæus tells us, that *get*[‡] and *got* is actually the ſame word, which anciently, according to him, denoted a "ſoldier." *Got* in Icelandic ſignifies a "houſe or horſeman," and *gata* a "wanderer;" and this laſt was perhaps the import of the term *Geta*, they being originally an unſettled vagrant people. As nations generally aſſume to themſelves ſome high auſpicious denomination, we may believe the Goths did the ſame. We may therefore reſt ſatisfied, that the Getæ aſſumed the Icelandic name above mentioned as their national one: or perhaps, notwithſtanding their Greek denomination, they called themſelves *Gots* or *Goths* from the beginning.

215 Their primary ſeat. The original ſeat of the Goths was the country now called *Little Tartary*, into which they had extended themſelves from the frontiers of Thrace. This country was called *Little Scythia* by the Greek writers; and it was the ſtation whence thoſe innumerable ſwarms advanced, which, in conjunction with the Alani and other barbarous tribes, at length over-ran and ſubverted the weſtern empire. One part of the Gothic nation was allowed by Conſtantine to ſettle in Mœſia. Before the year 420 moſt of the Gothic nations who had ſettled within the limits of the Roman empire had been converted to the Chriſtian faith; but, unhappily, the greater part of the apoſtles by whom they had been proſelyted, were Arians, which proved fatal to many of the orthodox Chriſtians; for the Arian Goths perſecuted them with unrelenting cruelty.

216 Remains of genuine Gothic. About the year 367, Ulphilas biſhop of the Mœſian Goths, tranſlated the New Teſtament into the Gothic language. The remains of this tranſlation furniſh a genuine, and at the ſame time venerable, monument of the ancient Gothic dialect. No more is now extant of that valuable tranſlation than the four Goſples, and another fragment containing part of the epiſtle to the Romans. The Goſpels have been repeatedly publiſhed ſince the firſt edition by Junius 1665, down to that of Mr Lye. Other fragments of the Gothic language have alſo been found, which our curious readers may ſee in Lye's Notes to his Edition of the Gothic Goſpels. The fragment of the Epiſtle to the Romans was lately diſcovered in the library at Wolfenbottle, and publiſhed by Knitel archdeacon of Wolfenbottle.

217 Gothic alphabet. The Goths, prior to the age of Ulphilas, were ignorant of the uſe of alphabetical characters. The biſhop fabricated an alphabet for them, which is a medley of Greek and Roman letters, but rather inclining to the former.

This alphabet conſiſts of 25 letters (ſee PLATE IX). Junius has carefully analyſed thoſe letters, and pointed out their powers and ſounds in his Gothic alphabet, prefixed to his *Gloſſarium Gothicum*. They were long retained in all the European languages derived from the Gothic ſource, which will be enumerated in the ſequel.

What kind of language the ancient Gothic was, is plain from the fragments above mentioned; but in what reſpects it agrees with the oriental tongues, or differs from them, is not eaſy to aſcertain with preciſion. We have obſerved in our ſection on the Greek, that a conſiderable part of that language muſt have been derived from the Thracian, which, according to Strabo there quoted, was the ſame with the Getic or Gothic. The Thracian tongue will, we are convinced upon compariſon, be found analogous to the Chaldean or Syrian. 218 Gothic language derived from the Chaldean &c. The German, which is a genuine deſcendant of the Gothic, is full of Perſian words: the old Perſian or Pahlavi appears to be a dialect of the Chaldean. The learned Junius, near the beginning of his Gothic alphabet, remarks, that a very conſiderable part of the language in queſtion is borrowed from the moſt ancient Greek.

Both the learned Ihre in his *Gloſſarium Suio Gothicum*, and Wachter in his excellent German and Latin Dictonary, often remark the coincidence of Gothic and German words with oriental vocables of the like ſound and of the ſame ſignification. In the old Saxon, which is another ramification of the Gothic tongue, numberleſs terms of the very ſame complexion appear. From this deduction we hope it will follow, that the Gothic tongue, in its original unmixed ſtate as it was ſpoken by the ancient Getæ, was a dialect of the primeval language; that language which the ſons of Tiras brought with them from the plains of Shinar or from Armenia, or from any other region where the primitive mortals had fixed their reſidence. To confirm this poſition, we ſhall annex a few inſtances.

The Thracian tribes, in all probability, firſt took poſſeſſion of thoſe parts of Aſia Minor which ſtretch towards the eaſt. Thence they croſſed the Helleſpont, and ſpread themſelves far and wide northward. Strabo ſuppoſes that they firſt ſettled in the regions to the north of thoſe ſtraits, and thence tranſported numerous colonies into Aſia Minor, The reverſe was probably the caſe. Population, we think, proceeded northward; but be that as it may, is is univerſally agreed, that both ſides of the Helleſpont were peopled with Thracians.

In Aſia Minor we meet with the city Perga, which, throwing away the *a*, is *Perg*. In every tongue deſcended from the Gothic, the word *Berg* ſignifies a "rock," and metaphorically a "town or burgh;" becauſe towns were originally built on rocks for the ſake of defence. Hence likewiſe *Pergamos*, the fort or citadel of Troy. *Beira* in Thracian ſignified a "city;" the Chaldiac and Hebrew word *Beer* imports a "well," and is poſſibly the original of the Gothic word *beer*, *ale*. In ancient times, eſpecially in

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[‡] Hiſtory of Norway, lib. i.

the Eaſt, it was cuſtomary to build cities in the neighbourhood of fountains. The ancients called the Phrygians Βρυγες, *Bryges* or *Bruges*; the Gothic word coinciding is obvious. *Dyndymus*, the name of a city ſacred to Cybele, is compounded of two Gothic words *dun* and *dum*, both ſignifying "a height, an eminence;" and hence *a town, an incloſure*. The word *tros* ſeems to be the very Gothic *troſh*, "brave, valiant." The words *fader*, *mader*, *dochter*, *bruder*, are ſo obviouſly Perſian, that every etymologiſt has aſſigned them to that language.

Many futile etymologies have been given of the ſacred name *God*, which is in reality the Perſian word *Choda*, commonly applied by them to their *Hormazd* or *Oromazes*. The Perſian *bad* or *bod* ſignifies a "city;" the ſame word in Gothic imports a "houſe, a manſion, an abode." *Band*, in Perſic, a "ſtrait place;" in Gothic, "to bend." *Heim* or *ham*, "a houſe," is generally known to be of Perſian original. Much critical ſkill has been diſplayed in tracing the etymology of the Scotch and old Engliſh word *Yule*, "Chriſtmas." *Yule*, derived from *iul*, was a feſtival in honour of the ſun, which was originally celebrated at the winter ſolſtice. *Wick* or *wich* is a gothic term ſtill preſerved in many names of towns; it ſignifies "a narrow corner, or ſmall ſtrip of land jutting into the ſea, or into a lake or river:" hence Latin *vicus*, and the Greek φοικος. In Spaniſh, we have many old Gothic words; among others *hijo* a "ſon," the ſame with the Greek υιος. In ſome places of Scotland, we call any thing that is little, ſmall, *wee*; originally ſpelt *wi*, if we miſtake not, from the very ſame word.

Theſe few examples we have thrown together, without any regard to order, perſuaded that almoſt every word of the language, truly Gothic, may with a little pains and judgment be traced to ſome oriental root or cognate. We may obſerve in paſſing, that many Gothic nouns end in *a*, like the Chaldiac and Syriac; that their ſubſtantive verb very much reſembles that of the Perſian, Greek, and Latin: and that their active and auxiliary verb has furniſhed the common præterperfect tenſe of Greek verbs in the active voice: that verb is *haban*, but originally *ha*, as the common people pronounce it at this day, eſpecially in the north of Scotland, and among the Swedes, Danes, Norwegians, and Icelanders.

219
Modern tongues deduced from the Gothic.

We ſhall now leave the other inferior arrangements of this ancient language to grammarians and lexicographers, and proceed to inquire what modern tongues are deduced from it as their ſtock, and which of them makes the neareſt approaches to its ſimplicity and ruſticity.

We have already obſerved that the Goths, formerly Getæ, were poſſeſſed of a vaſt extent of country, reaching from the frontiers of Thrace to the banks of the Iſter or Danube. We have ſeen that a colony of them ſettled in Mœſia under Conſtantine II. They then ſpread themſelves into Dacia, and from thence into Germany. All theſe countries were ſituated in ſuch a manner, that the progreſs of population was forward, and according to the natural courſe of emigration. From Germany they extended themſelves into Scandinavia, that is, Sweden, Denmark, and Norway. Their whole ancient *Edda*, *Sagas*, "Chronicles," ſhow that the Goths arrived in Scandinavia by this route, without, however, fixing the era of that event with any tolerable degree of accuracy. By the Germans, we believe the ancients underſtood all the nations eaſtward, weſtward, and northward, reaching from the Danube on the ſouth up to the extremity of Scandinavia on the Northern Ocean; and from the Rhine and German Ocean on the weſt, to the river Chronus or Niemen on the eaſt. All thoſe nations ſpoke one or other of the Gothic dialects, ſome approaching nearer, and others deviating farther from, the parent language.

The Francic is a dialect of the Teutonic, *Tudeſque*, or old German; and the Goſpels of Ulphilas bear ſuch a reſemblance to the Francic, fragments of which are preſerved in the early French hiſtorians, that ſome learned men have pronounced thoſe goſpels to be part of an old Francic verſion; but others of equal reſpectability have refuted this opinion, both from hiſtory and compariſon of the dialects. Schilter has given us large monuments of the Tudeſque or old German from the ſeventh century, which evidently prove that the Gothic of Ulphilas is the ſame language. Wachter's learned Gloſſary of the ancient German likewiſe confirms this poſition. Mr Ihre, after heſitating whether the Goſpels of Ulphilas bear moſt reſemblance to the German or Scandinavian dialect of the Gothic, declares at laſt in favour of the former. The Anglo-Saxon is alſo known to be a venerable dialect of the Tudeſque; and is ſo intimately connected with the Goſpels, that ſome valuable works on this ſubject are wholly built upon the ſuppoſition.

The Icelandic is the oldeſt relict of the Scandinavian. It begins with Arius Frode in the eleventh century, and is a dialect of the German. The remains we have of it are more modern by four centuries than thoſe of the German: they are more poliſhed than the other. The words are ſhortened, not only becauſe they are more modern than the German, but becauſe the Icelandic was poliſhed by a long ſucceſſion of poets and hiſtorians almoſt equal to theſe of Greece and Rome. Hence the Icelandic, being a more poliſhed language than the German, has leſs affinity with the parent Gothic. The Swediſh is more nearly related to the Icelandic than either the Daniſh or Norwegian. That the Swediſh is the daughter of the Gothic, is fully ſhown by Mr Ihre above mentioned in his *Gloſſarium Suio Gothicum*. There is, therefore, no manner of doubt as to the identity of the Gothic, preſerved in Ulphilas and other ancient remains, with the German and Scandinavian tongue.

The modern German, a language ſpoken in a far greater extent than any other of modern Europe, reſembles the Gothic Goſpels more than the preſent Daniſh, Norwegian, or Swediſh; and has certainly more ancient *ſtamina*. Its likeneſs to the Aſiatic tongues, in harſhneſs and inflexible thickneſs of ſound, is very apparent.

Buſbequius ſhows, that the clowns of Crim Tartary, remains of the ancient Goths, ſpeak a language almoſt German. Theſe clowns were no doubt deſcendants of the ancient Goths, who remained in their native country after the others had emigrated. It is therefore apparent from the whole of this inveſtigation,

tion, that the Gothic was introduced into Europe from the Eaſt, and is probably a dialect of the language originally ſpoken by men.

§ 3. *Of the Sclavonian Language.*

220 Sclavonic language,

THERE is another language which pervades a conſiderable part of Europe, and this, like the Gothic, ſeems to have originated in the Eaſt. The language we mean is the Sclavonic or rather Slavonic, which prevails far and wide in the eaſtern parts of this diviſion of the globe. It is ſpoken by the Dalmatians, by the inhabitants of the Danubian provinces, by the Poles, Bohemians, and Ruſſians. The word *ſlab*, that is, "ſlave" (whence the French word *eſclave*, and our word *ſlave*), ſignifies "noble, illuſtrious;" but becauſe, in the lower ages of the Roman empire, vaſt multitudes of theſe people were ſpread over all Europe in the quality of ſlaves, that word came to denote the ſervile tribe by way of diſtinction, in the ſame manner as the words *Geta*, *Davus*, and *Syrus*, did among the Greeks at a more early period.

221 Spoken by the Slavi one of the tribes of the Sarmatians,

The Slavi dwelt originally on the banks of the Boryſthenes, now the Dnieper or Nieper. They were one of the tribes of the European Sarmatians who in ancient times inhabited an immenſe tract of country, bounded on the weſt by the Viſtula, now the Weiſel; on the ſouth-eaſt by the Euxine Sea, the Boſphorus Cimmerius, the Palus Mœotis, and the Tanais or Don, which divides Europe from Aſia.

In this vaſt tract of country, which at preſent comprehends Poland, Ruſſia, and a great part of Tartary, there dwelt in ancient times many conſiderable tribes. To enumerate theſe, we believe, would not much edify our readers: we ſhall only inform them, that among theſe Sarmatian clans were the Roxolani, now the Ruſſians, and likewiſe the Slavi, who dwelt near the Boryſthenes, as was obſerved above.

The Slavi gradually advanced towards the Danube; and in the reign of Juſtinian having paſſed that river, they made themſelves maſters of that part of Illyricum which lies between the Drave and the Save, and is to this day from them called *Sclavonia*. Theſe barbarians by degrees over-ran Dalmatia, Liburnia, the weſtern parts of Macedonia, Epirus; and on the eaſt they extended their quarters all along to the weſtern bank of the Danube, where that river falls into the Euxine. In all theſe countries, the Sclavonian was deeply impregnated with the Greek, which was a thing of courſe, ſince the barbarian invaders ſettled in thoſe regions, and mingled with the aborigines, who ſpoke a corrupt dialect of that language.

222 The Poles,

The Poles are the genuine deſcendants of the ancient Sarmatæ (c), and conſequently ſpeak a dialect of their language, but much adulterated with Latin words, in conſequence of the attachment the Polanders have long profeſſed to the Roman tongue.

223 Sileſians, and

The Sileſians and Bohemians have corrupted their dialects in the very ſame manner. In thoſe countries, then, we are not to ſearch for the genuine remains of the ancient Sarmatian.

224 Ruſſians deſcended from the Slavi.

The modern Ruſſians, formerly the Rhoxani or Roxolani, are the poſterity of the Sarmatæ, and are a branch of the Slavi: they inhabit a part of the country which that people poſſeſſed before they fell into the Roman provinces; they ſpeak the ſame language, and wear the very ſame dreſs; for, on the hiſtorical pillar at Conſtantinople, the Sclavonians are dreſſed like the Ruſſian boors. If then the Slavi are Sarmatæ, the Ruſſians muſt of courſe be the deſcendants of the ſame people. They were long a ſequeſtered people, and conſequently altogether unconnected with the other nations of Europe. They were ſtrangers to commerce, inhoſpitable to ſtrangers, tenacious of ancient uſages, averſe to improvements of every kind, wonderfully proud of their imaginary importance; and, in a word, a race of people juſt one degree above abſolute ſavagiſm. A people of this character are, for the moſt part, enemies to innovations; and if we may believe the Ruſſian hiſtorians, no nation was ever more averſe to innovations than the one in queſtion. From the ninth century, at which era they embraced Chriſtianity, it does not appear that they moved one ſtep forward towards civilization, till Peter the Great, not a century ago, in conſequence of his deſpotic authority, compelled them to adopt the manners and cuſtoms of their more poliſhed neighbours.

We may then conclude, that the Ruſſians made as little change in their language during that period, as they did in their dreſs, habits, and manner of living. Whatever language they ſpoke in the ninth century, the ſame they employed at the beginning of the 18th. They were, indeed, according to *Appian de bel. Mithrid.* once conquered by Diophantus, one of Mithridates's generals; but that conqueſt was for a moment only: they were likewiſe invaded, and their country over-run, by the great Timor or Tamerlane; but this invaſion was like a torrent from the mountains, which ſpreads devaſtation far and wide while it rages, but makes little alteration on the face of the country.

We find, likewiſe, that upon ſome occaſions they made incurſions upon the frontiers of the Roman empire; but we hear of no permanent ſettlements formed by them in theſe quarters. Upon the whole, we take the Ruſſians to have been, with reſpect to their language, in the very ſame predicament with the Highlanders and Iſlanders of Scotland, who, according to the general opinion, have preſerved the Celtic dialect pure and entire, in conſequence of their having never mingled with foreigners.

225 The Ruſſian language genuine Sclavonic.

From this deduction we may infer two things; firſt, that the Ruſſian language is the genuine Sclavonian; and, ſecondly, that the latter is the ſame, or nearly the ſame, with the ancient Sarmatian.

In the Ruſſian, there are found a great number of words reſembling the old ſimple roots of the Greek both in ſound and ſignification; its grammatical genius is nearly the ſame: and we are informed by the very beſt authority, that there is in this language a tranſlation of Epictetus, in which there are whole pages, in both the original and tranſlation, without one ſingle tranſpoſition. Monſ. Leveque, who has publiſhed a tranſlation of a hiſtory of Ruſſia, is ſo entirely convinced of the ſtrict analogy between the ancient Greek and the modern Ruſſe, that he is poſitive that the former is derived from the latter. Monſ. Freret, a very learned French academician, is clearly of the ſame opinion. We are, however, perſuaded that this opinion is ill founded. We rather imagine, that thoſe coincidences ariſe from the relicks of the primitive language of mankind; veſtiges of which, we believe, are to be found almoſt in every tongue now exiſting.

(c) This appears by their character, their laws, their manners, their form of government, their military equipage, their impetuoſity, their ariſtocratic ſplendour.

226
Reſemblance between Ruſſian and oriental words.

It is, however, we allow, uncommonly difficult to render a reaſon for the ſyntaxical analogy of the two languages, without admitting the truth of the one or the other hypotheſis. We have examined with ſome care a good number of Ruſſian vocables, and compared them with Greek ones of the ſame ſignification. We have not, however, found ſuch a reſemblance as we think neceſſary to ſupport the poſition advanced above. We have indeed found a very ſtrong reſemblance between the former and many oriental words, eſpecially Hebrew, Chaldean, and old Perſian, of which we could produce ſeveral inſtances, did the nature of our preſent inquiry admit ſuch a deviation. Every body knows that the Sarmatæ were divided into two great nations, the Aſiatic and European; the former extended very far eaſtward, behind the mountain Caucaſus, the northern ſhore of the Euxine Sea, and ſo forth. Theſe, we may believe, derived their language from the original tongue long before the Greek language exiſted. This, in compariſon of the Hebrew, Phœnician, Egyptian, Arabian, Chaldean, &c. was but of yeſterday. The Greek, moſt learned men are now convinced, was a late compoſition of many different dialects, incorporated with the jargon of the aboriginal Ionim or Greeks. The Sarmatian, on the contrary, was the tongue of a great and populous nation, civilized, in all appearance, long before the Greeks began to emerge from a ſtate of ſavagiſm. We are, therefore, by no means diſpoſed to allow, either that the Greek is derived from the Ruſſian, or the Ruſſian from the Greek. We believe there is juſt the ſame reaſon for this concluſion that the Abbé Pezron and Monſ. Gebelin pretend to have diſcovered, in order to ſupport their poſition that the Greek is derived from the Celtic. Certain it is, that the reſemblance among the oriental languages, of which we take the Sarmatian to have been one, is ſo palpable, that any perſon of a moderate capacity who is perfectly maſter of one, will find little difficulty in acquiring any other. If, therefore, the coincidence between the Greek and Ruſſian ſhould actually exiſt, we think this circumſtance will not authenticate the ſuppoſition, that either of the two is derived from the other.

In the courſe of this argument, our readers will be pleaſed to obſerve, that we all along ſuppoſe, that the Sclavonian, of which we think the Ruſſian is the moſt genuine remain, is the ſame with the old Sarmatian. We ſhall now take the liberty to hazard a conjecture with reſpect to the ſyntaxical coincidence of that language with the Greek; for we acknowledge that we are not ſo profoundly verſed in the Ruſſian dialect of the Sclavonian as to pretend to pronounce a definitive ſentence.

227
Origin of the ſyntaxical coincidence between this and the Greek language.

As the Ruſſians were a generation of ſavages, there is no probability that they were acquainted with the uſe of letters and alphabetical writing till they acquired that art by intercourſe with their neighbours. It is certain, beyond all contradiction, that few nations had made leſs proficiency in the fine arts than that under conſideration: and we think there is little appearance of their having learned this art prior to their converſion to Chriſtianity. Certain it is, that the Slavi, who ſettled in Dalmatia, Illyria, and Liburnia, had no alphabetical characters till they were furniſhed with them by St Jerome. The Servian character, which very nearly reſembles the Greek, was invented by St Cyril; on which account the language written in that character is denominated *Chiurilizza*. Theſe Sclavonic tribes knew nothing of alphabetic writing prior to the era of their converſion. The Mœſian Goths were in the ſame condition till their Biſhop Ulphilas fabricated them a ſet of letters.

If the Slavi and Goths, who reſided in the neighbourhood of the Greeks and Romans, had not learned alphabetical writings prior to the era of their converſion to Chriſtianity, it muſt hold *à fortiori*, that the Ruſſians, who lived at a very great diſtance from thoſe nations, knew nothing of this uſeful art antecedent to the period of their embracing the chriſtain faith.

The Ruſſians pretend that they were converted by St Andrew; but this is known to be a fable. Chriſtianity was firſt introduced among them in the reign of the grand Duke Wolodimar, who marrying the daughter of the Grecian emperor Baſilius, became her convert about the year 989. About this period, we imagine, they were taught the knowledge of letters by the Grecian miſſionaries, who were employed in teaching them the elements of the Chriſtian doctrines. Their alphabet conſiſts of 31 letters, with a few obſolete additional ones; and theſe characters reſemble thoſe of the Greeks ſo exactly, that there can be no doubt of their being copied from them. It is true, the ſhape of ſome has been ſomewhat altered, and a few barbarian ones have been intermingled. The Ruſſian liturgy, every body knows, was copied from that of the Greeks; and the beſt ſpecimen of the old Ruſſian is the church offices for Eaſter, in the very words of Chryſoſtom, who is called by his name *Zlato uſtii*, "golden-mouthed" The power of the clergy in Ruſſia was exceſſive; and no doubt their influence was proportioned to their power. The firſt race of clergy in that country were undoubtedly Greeks. We know how active and induſtrious thoſe people were in propagating their language as well as their religion. The offices of religion might be at firſt written and pronounced in the Greek tongue, but it would ſoon be found expedient to have them tranſlated into Ruſſian. The perſons employed in this work muſt have been Greeks, who underſtood both languages.

As it is confeſſedly impoſſible that a people ſo dull and uninventive as the Ruſſians originally were, could ever have fabricated a language ſo artificially conſtructed as their preſent dialect; and as it is obvious, that, till Chriſtianity was introduced among them by the Greeks, they could have no correſpondence with that people—

people—it muſt appear ſurpriſing by what means their language came to be faſhioned ſo exactly according to the Greek model. We have obſerved above, that the Ruſſian letters muſt have been invented and introduced into that country by the Greek miſſionaries. We think it probable, that thoſe apoſtles, at the ſame time that they taught them a new religion, likewiſe introduced a change into the idiom of their language. The influence of thoſe ghoſtly teachers over a nation of ſavages muſt have been almoſt boundleſs; the force of their precepts and example almoſt incontrolable. If the ſavage converts accepted a new religion from the hands of thoſe Grecian apoſtles, they might with equal ſubmiſſion adopt improvements in their language. Such of the natives as were admitted to the ſacerdotal function muſt have learned the Greek language, in order to qualify them for performing the offices of their religion. A predilection for that language would be the immediate conſequence. Hence the natives, who had been admitted into holy orders, would co-operate with their Grecian maſters in improving the dialect of the country; which, prior to the period above mentioned, muſt have greatly deviated from the original ſtandard of the Sarmatian tongue.

Upon this occaſion, we imagine the Greek apoſtles, in conjunction with their Ruſſian diſciples, reduced the language of the country to a reſemblance with the Greek idiom. They retained the radical vocables as they found them; but by a variety of flexions, conjugations, derivations, compoſitions, and other modifications, transformed them into the Grecian air and apparel. They muſt have begun with the offices of the church; and among a nation of ſavages newly converted, the language of the new religion would quickly obtain a very extenſive circulation. When the Grecian garniture was introduced into the church, the laity would in proceſs of time aſſume a ſimilar dreſs. The fabric of the Grecian declenſions, conjugations, &c. might be grafted upon Ruſſian ſtocks without affecting the radical parts of the language. If the dialect in queſtion, like moſt others of a very ancient date, laboured under a penury of vocables, this manœuvre would contribute exceedingly to ſupply that defect. By this expedient the Greek language itſelf had been enlarged from about 300 radical terms to the prodigious number of words of which it now conſiſts.

The Latin tongue we have ſeen above in its original conſtitution differed widely from the Greek; and notwithſtanding this incongruity, the improvers of the former have preſſed it into a very ſtrict agreement with the latter. This, we think, was ſtill a more difficult taſk; as, in our opinion, the genius of the Latin differs in a much greater degree than that of the Ruſſian does from the Greek. We know, that the genius of the Gothic tongue and thoſe of all its deſcendants are much more in uniſon with the Greek than with that of the Latin. The Spaniſh, Italian, and French, have worked many of their Gothic, Teutonic, and Celtic verbs, into a kind of conjugations, imitating or rather aping thoſe of the Latin. The Perſians have formed moſt elegant and energetic declenſions and conjugations, upon inflexible roots, borrowed from the Pahlavi and Deri, and even from Tartar originals.

Upon the grounds above-mentioned we have taken the liberty to hazard the following conjectures, which we cheerfully ſubmit to the cognizance of our more enlightened readers.

1. That the Sarmatian was a dialect of the original language of mankind.
2. That the Sclavonian was a dialect of the Sarmatian.
3. That the Ruſſe is the moſt genuine unſophiſticated relic of the Sclavonian and Sarmatian.
4. That the Ruſſians had no alphabetic characters prior to the era of the introduction of Chrſtianity, that is, towards the end of the tenth century.
5. That they were converted by Grecian miſſionaries.
6. That thoſe miſſionaries copied their preſent letters from thoſe of Greece; and in conjunction with the more enlightened natives, reduced the original unimproved Ruſſe to its preſent reſemblance to the Greek ſtandard.

228 Ruſſian nouns. The Ruſſian language, like moſt others, contains eight parts of ſpeech, noun, pronoun, &c. Its nouns have three genders, maſculine, feminine, and neuter; it has alſo a common gender for nouns, intimating both ſexes. It has only two numbers, ſingular and plural. Its caſes are ſeven, nominative, genitive, dative, accuſative, vocative, inſtrumental, and prepoſitive. Theſe caſes are not formed by varying the termination, as in Greek and Latin: but generally by placing a vowel after the word, as, we imagine, was the original practice of the Greeks (See *Greek* Section). Thus in Ruſſe, рук *ruk*, "hand;" nominative, рук-а "the hand;" genitive, рук-и́ "of the hand," &c. See *Les Elem. de la Langue Ruſſe par Charpentier*. Nouns ſubſtantive are

229 Adjectives. reduced to four declenſions, and adjectives make a fifth. Theſe agree with their ſubſtantives in caſe, gender, and number. They have three degrees of compariſon, as is common in other languages; the poſitive, comparative and ſuperlative. The comparative is formed from the feminine of the nominative ſingular of the poſitive, by changing *a* into *te*, that is *aie* in Engliſh; the ſuperlative is made by prefixing пре, *pre*, before the poſitive. Theſe rules are general; for the exceptions, recourſe muſt be had to the Ruſſian grammar above-mentioned.

The numeral adjectives in Ruſſe have three genders like the reſt, and are declined accordingly. Their pronouns have nothing peculiar, and are divided and arranged in the ſame manner as in other languages.

230 Verbs. Verbs in the Ruſſian language are comprehended under two conjugations. The moods are only three; the indicative, the imperative, and the infinitive; the ſubjunctive is formed by placing a participle before the indicative. Its tenſes are eight in number; the preſent, the imperfect, the preterite ſimple, the preterite compound, the pluperfect, the future indeterminate, the future ſimple, the future compound. The verbs have their numbers and perſons as in other languages. To enter into a detail of their manner of conjugating their verbs would neither be conſiſtent with our plan, nor, we are perſuaded, of much conſequence to our readers. Their other parts of ſpeech differ nothing from thoſe of other languages. Their ſyntax nearly reſembles that of the Greek and Latin. All theſe articles muſt be learned from a grammar of the language. Whether there is any grammar of the Ruſſian language compoſed

Sclavonian Language.

ſed in Engliſh we know not. That of Monſ. Charpentier in French, printed at Peterſburgh in 1768, is the only one we have ſeen, and which appears to us a very excellent one. We could wiſh to be able to gratify our readers with a more authentic account of the origin of the Sclavonian language; but this we find impoſſible, in conſequence of the want of memorials relating to the ſtate of the ancient Sarmatæ. Towards the era of the ſubverſion of the weſtern empire, the nations who inhabited the countries in queſtion were ſo blended and confounded with each other, and with Huns and other Scythian or Tartar emigrants, that we believe the moſt acute antiquarian would find it impoſſible to inveſtigate their reſpective tongues, or even their original reſidence or extraction. We have ſelected the Ruſſe as the moſt genuine branch of the old Sclavonian, and to this predilection we were determined by the reaſons above mentioned. We are ſorry that we are not ſo well acquainted with the idiom of the Ruſſian language as to be able to compare it with thoſe of the eaſt: but upon ſuch a compariſon, we are perſuaded that the radical materials of which it is compoſed would be found to have originated in the oriental regions. The word *Tſar*, for example, is probably the Phœnician and Chaldean *Sar* or *Zar*, "a prince, a grandee." Diodorus Siculus calls the queen of the Maſſagetæ, who, according to Cteſias, cut off Cyrus's head, *Zarina;* which was not many years ago the general title of the empreſs of all the Ruſſias. Herodotus calls the ſame princeſs *Tomyris*, which is the very name of the famous Timor or Tamur, the conqueror of Aſia. The former ſeems to have been the title, and the latter the proper name, of the queen of the Maſſagetæ. In the old Perſian or Pahlavi, the word *Gard* ſignifies "a city;" in Ruſſian *Gorad* or *Grad* intimates the very ſame idea: hence *Conſtantinople* in old Ruſſe is called *Tſargrad* or *Tſargorad*. Theſe are adduced as a ſpecimen only; an able etymologiſt might, we believe, diſcover a great number.

231 Phœnician and Chaldean words in Ruſſe.

The Sclavonian language is ſpoken in Epirus, the weſtern part of Macedonia, in Boſnia, Servia, Bulgaria, in part of Thrace, in Dalmatia, Croatia, in Poland, Bohemia, Ruſſia, and Mingrelia in Aſia, whence it is frequently uſed in the ſeraglio at Conſtantinople. Many of the great men of Turkey underſtand it, and frequently uſe it; and moſt of the janizaries having been ſtationed in garriſons in the Turkiſh frontiers in Europe, uſe it as their vulgar tongue. The Hungarians, however, and the natives of Wallachia, ſpeak a different language: and this language bears evident ſignatures of the Tartarian dialect, which was the tongue of the orginal Huns. Upon the whole, the Sclavonian is by much the moſt extenſive language in Europe, and extends far into Aſia.

Sect. X. *Modern Languages.*

Modern Languages.

If we call all the different dialects of the various nations that now inhabit the known earth, languages, the number is truly great; and vain would be his ambition who ſhould attempt to learn them, though but imperfectly. We will begin with naming the principal of them: There are four, which may be called original or mother languages, and which ſeem to have given birth to all that are now ſpoken in Europe. Theſe are the *Latin, Celtic, Gothic,* and *Sclavonian.* It will not, however, be imagined, from the term *original* given to theſe languages, that we believe them to have come down to us, without any alteration, from the confuſion of tongues at the building of the tower of Babel. We have repeatedly declared our opinion, that there is but one truly original language, from which all others are derivatives variouſly modified. The four languages juſt mentioned are original only as being the immediate parents of thoſe which are now ſpoken in Europe.

232 Parent dialects of Europe, with their reſpective offspring.

I. From the *Latin* came,

1. The Portugueſe.
2. Spaniſh.
3. French.
4. Italian.

From the *Celtic,*

5. The Erſe, or Gaelic of the Highlands of Scotland.
6. The Welſh.
7. The Iriſh.
8. Baſſe-Bretagne.

From the *Gothic,*

9. The German.
10. The Low Saxon or Low German.
11. The Dutch.
12. The Engliſh; in which almoſt all the noun-ſubſtantives are German, and many of the verbs French, Latin, &c. and which is enriched with the ſpoils of all other languages.
13. The Daniſh.
14. The Norwegian.
15. Swediſh.
16. Icelandic.

From the *Sclavonian,*

17. The Poloneſe.
18. The Lithuanian.
19. Bohemian.
20. Tranſylvanian.
21. Moravian.
22. The modern Vandalian, as it is ſtill ſpoken in Luſatia, Pruſſian Vandalia, &c.
23. The Croatian.
24. The Ruſſian or Muſcovite; which, as we have ſeen, is the pureſt dialect of this language.
25. The language of the Calmucs and Coſſacs.
26. Thirty-two different dialects of nations who inhabit the north-eaſtern parts of Europe and Aſia, and who are deſcended from the Tartars and Huno-Scythians. There are polyglott tables which contain not only the alphabets, but alſo the principal diſtinct characters of all theſe languages.

II. The languages at preſent generally ſpoken in Aſia are,

233 Aſiatic languages.

27. The Turkiſh and Tartarian, with their different dialects.
28. The Perſian.
29. The Georgian or Iberian.
30. The Albanian or Circaſſian,
31. The Armenian.

These languages are ſpoken by the Greek Chriſtians in Aſia, under the patriarch of Conſtantinople.

32.

Modern Languages.

32. The modern Indian.
33. The Formoſan.
34. The Indoſtanic.
35. The Malabarian.
36. The Warugian.
37. The Talmulic or Dalmulic.

The Daniſh miſſionaries who go to Tranquebar, print books at Hall in theſe languages.

38. The modern Arabic.
39. The Tanguſian.
40. The Mungalic.
41. The language of the Nigarian or Akar Nigarian.
42. The Gruſnic or Gruſinian.
43. The Chineſe.
44. The Japoneſe.

We have enumerated here thoſe Aſiatic languages only of which we have ſome knowledge in Europe, and even alphabets, grammars, or other books that can give us information concerning them. There are doubtleſs other tongues and dialects in thoſe vaſt regions and adjacent iſlands; but of theſe we are not able to give any account.

234 African language.

III. The principal languages of Africa are,
45. The modern Egyptian.
46. The Fetuitic, or the language of the kingdom of Fetu.
47. The Moroccan; and,
48. The jargons of thoſe ſavage nations who inhabit the deſert and burning regions. The people on the coaſt of Barbary ſpeak a corrupt dialect of the Arabic. To theſe may be added the Chilhic language, otherwiſe called *Tamazeght;* the Negritian and that of Guinea; the Abyſſinian; and the language of the Hottentots.

235 American languages.

IV. The languages of the American nations are but little known in Europe. Every one of theſe, though diſtant but a few days journey from each other, have their particular language or rather jargon. The languages of the Mexicans and Peruvians ſeem to be the moſt regular and poliſhed. There is alſo one called *Poconchi* or *Pocomana*, that is uſed in the bay of Honduras and toward Guntimal, the words and rules of which are moſt known to us. The languages of North America are in general the Algonhic, Apalachian, Mohogic, Savanahamic, Virginic, and Mexican: and in South America, the Peruvian, Caribic, the language of Chili, the Cairic, the Tucumanian, and the languages uſed in Paraguay, Braſil, and Guiana.

236 General reflections on modern languages.

V. We have already ſaid, that it would be a vain and ſenſeleſs undertaking for a man of letters to attempt the ſtudy of all theſe languages, and to make his head an univerſal dictionary; but it would be ſtill more abſurd in us to attempt the analyſis of them in this place: ſome general reflections therefore muſt here ſuffice. Among the modern languages of Europe, the French ſeems to merit great attention; as it is elegant and pleaſing in itſelf; as it is become ſo general, that with it we may travel from one end of Europe to the other without ſcarce having any occaſion for an interpreter; and as in it are to be found excellent works of every kind, both in verſe and proſe, uſeful and agreeable. There are, beſides, grammars and dictionaries of this language, which give us every information concerning it, and very able maſters who teach it; eſpecially ſuch as come from thoſe parts of France where it is ſpoken correctly; for with all its advantages, the French language has this inconvenience, that it is pronounced ſcarce any where purely but at Paris and on the banks of the Loire. The language of the court, of the great world, and of men of letters, is moreover very different from that of the common people; and the French tongue, in general, is ſubject to great alteration and novelty. What pity it is, that the ſtyle of the great Corneille, and that of Moliere, ſhould already begin to be obſolete, and that it will be but a little time before the inimitable *chefs d'œuvres* of thoſe men of ſublime genius will be no longer ſeen on the ſtage! The moſt modern ſtyle of the French, moreover, does not ſeem to be the beſt. We are inclined to think, that too much conciſeneſs, the epigrammatic point, the antitheſis, the paradox, the ſententious expreſſion, &c. diminiſh its force; and that, by becoming more poliſhed and refined, it loſes much of its energy.

Modern Languages.

VI. The German and Italian languages merit likewiſe a particular application; as does the Engliſh, perhaps above all, for its many and great excellencies (See LANGUAGE). Authors of great ability daily labour in improving them; and what language would not become excellent, were men of exalted talents to make conſtant uſe of it in their works? If we had in Iroquois books like thoſe which we have in Engliſh, Italian, French, and German, ſhould we not be tempted to learn that language? How glad ſhould we be to underſtand the Spaniſh tongue, though it were only to read the Araucana of Don Alonzo D'Ercilia, Don Quixote, ſome dramatic pieces, and a ſmall number of other Spaniſh works, in the original; or the poem of Camoens in Portugueſe.

VII. The other languages of Europe have each their beauties and excellencies. But the greateſt difficulty in all living languages conſtantly conſiſts in the pronunciation, which it is ſcarce poſſible for any one to attain unleſs he be born or educated in the country where it is ſpoken: and this is the only article for which a maſter is neceſſary, as it cannot be learned but by teaching or by converſation: all the reſt may be acquired by a good grammar and other books. In all languages whatever, the poetic ſtyle is more difficult than the proſaic: in every language we ſhould endeavour to enrich our memories with great ſtore of words (*copia verborum*), and to have them ready to produce on all occaſions: in all languages it is difficult to extend our knowledge ſo far as to be able to form a critical judgment of them. All living languages are pronounced rapidly, and without dwelling on the long ſyllables (which the grammarians call *moram*): almoſt all of them have articles which diſtinguiſh the genders.

VIII. Thoſe languages that are derived from the Latin have this further advantage, that they adopt without reſtraint, and without offending the ear, Latin and Greek words and expreſſions, and which by the aid of a new termination appear to be natives of the language. This privilege is forbidden the Germans, who in their beſt tranſlations dare not uſe any foreign word, unleſs it be ſome technical term in caſe of great neceſſity.

PHILOMATHES, a lover of learning or ſcience.

PHILOMELA, in fabulous hiſtory, was a daughter of Pandion king of Athens, and ſiſter to Procne, who had married Tereus king of Thrace. Procne ſeparated from Philomela, to whom ſhe was much attached, ſpent her time in great melancholy till ſhe prevailed upon her huſband to go to Athens and bring her ſiſter to Thrace. Tereus obeyed, but he had no ſooner obtained Pandion's permiſſion to conduct Philomela to Thrace, than he fell in love with her, and reſolved to gratify his paſſion. He diſmiſſed the guards whom the ſuſpicions of Pandion had appointed to watch him; offered violence to Philomela; and afterwards cut out her tongue, that ſhe might not diſcover his barbarity, and the indignities ſhe had ſuffered. He confined her in a lonely caſtle; and having taken every precaution to prevent a diſcovery, he returned to Thrace, and told Procne that Philomela had died by the way, and that he had paid the laſt offices to her remains. At this ſad intelligence Procne put on mourning for the loſs of Philomela; but a year had ſcarcely elapſed before ſhe was ſecretly informed that her ſiſter was not dead. Philomela, in her captivity, deſcribed on a piece of tapeſtry her misfortunes and the brutality of Tereus, and privately conveyed it to Procne. She was going to celebrate the orgies of Bacchus when ſhe received it, but ſhe diſguiſed her reſentment; and as during thoſe feſtivals ſhe was permitted to rove about the country, ſhe haſtened to deliver her ſiſter Philomela from her confinement, and concerted with her on the beſt meaſures of puniſhing the cruelty of Tereus. She murdered her ſon Itylus, then in the ſixth year of his age, and ſerved him up as food before her huſband during the feſtival. Tereus, in the midſt of his repaſt, called for Itylus; but Procne immediately informed him that he was then feaſting on his fleſh, when Philomela, by throwing on the table the head of Itylus, convinced the monarch of the cruelty of the ſcene. He drew his ſword to puniſh Procne and Philomela; but as he was going to ſtab them to the heart, he was changed into a hoopoe, Philomela into a nightingale, Procne into a ſwallow, and Itylus into a pheaſant. This tragedy happened at Daulis in Phocis; but Pauſanias and Strabo, who mention the whole of the ſtory, are ſilent about the tranſformation; and the former obſerves, that Tereus, after this bloody repaſt, fled to Megara, where he laid violent hands on himſelf. The inhabitants of the place raiſed a monument to his memory, where they offered yearly ſacrifices, and placed ſmall pebbles inſtead of barley. It was on this monument that the birds called hoopoes were firſt ſeen; hence the fable of his metamorphoſis. Procne and Philomela died thro' exceſs of grief and melancholy; and as the nightingale's and the ſwallow's voice is peculiarly plaintive and mournful, the poets have embelliſhed the fable by ſuppoſing that the two unfortunate ſiſters were changed into birds.

PHILONIUM, in pharmacy, a kind of ſomniferous anodyne opiate, taking its name from Philo the inventor.

Ancient Univerſal Hiſtory, vol. vi.

PHLOPŒMEN, a celebrated general of the Achæan league, was born in Megalopolis, a city of Arcadia in Peloponneſus; and from his very infancy diſcovered a ſtrong inclination to the profeſſion of arms. He was nobly educated by Caſſander of Mantinea; a man of great probity, and uncommon abilities. He was no ſooner able to bear arms than he entered among the troops which the city of Megalopolis ſent to make incurſions into Laconia, and in theſe inroads never failed to give ſome remarkable inſtance of his prudence and valour. When there were no troops in the field, he uſed to employ his leiſure time in hunting and ſuch other manly exerciſes. When Cleomenes king of Sparta attacked Megalopolis, Philopœmen diſplayed much courage and greatneſs of ſoul. He ſignalized himſelf no leſs ſome time after, in the battle of Sellaſia, where Antigonus gained a complete victory over Cleomenes. Antigonus, who had been an eye-witneſs of his prudent and intrepid behaviour, made very advantageous offers to gain him over to his intereſt; but he rejected them, having an utter averſion to a court life, which he compared to that of a ſlave, ſaying, that a courtier was but a ſlave of a better condition. As he could not live idle and inactive, he went to the iſle of Crete, which was then engaged in war, and ſerved there as a volunteer till he acquired a complete knowledge of the military art; for the inhabitants of that iſland were in thoſe days accounted excellent warriors, being ſcarce ever at peace among themſelves. Philopœmen, having ſerved ſome years among the troops of that iſland, returned home, and was upon his arrival appointed general of the horſe; in which command he behaved ſo well, that the Achæan horſe, heretofore of no reputation, became in a ſhort time famous all over Greece. He was ſoon after appointed general of the Achæan forces, when he applied himſelf to the re eſtabliſhing of military diſcipline among the troops of the republic, which he found in a very low condition, and univerſally deſpiſed by their neighbours. Aratus, indeed, was the firſt that raiſed the Achæan ſtate to that pitch of power and glory to which it arrived; but the ſucceſs of his enterpriſes was not ſo much owing to his courage and intrepidity as to his prudence and politics. As he depended on the friendſhip of foreign princes, and their powerful ſuccours, he neglected the military diſcipline at home; but the inſtant Philopœmen was created prætor, or commander in chief, he rouſed the courage of his countrymen, in order to put them into a condition to defend themſelves without the aſſiſtance of foreign allies. With this view he made great improvements in the Achæan diſcipline; changing the manner of their exerciſe and their arms, which were both very defective. He had thus, for the ſpace of eight months, exerciſed his troops every day, making them perform all the motions and evolutions, and accuſtoming them to manage with dexterity their arms, when news was brought him that Machanidas was advancing, at the head of a numerous army to invade Achaia. He was glad of this opportunity to try how the troops had profited by his diſcipline; and accordingly, taking the field, met the enemy in the territories of Mantinea, where a battle was fought. Philopœmen, having killed Machanidas with his own hand, ſtruck off his head, and carried it from rank to rank, to encourage his victorious Achæans, who continued the purſuit with great ſlaughter, and incredible ardour to the city of Tegea, which they entered together with the fugitives. The Lacedemonians loſt on this occaſion above 8000 men, of which 4000 were killed on the ſpot, and as many taken priſoners. The loſs of the Achæans was very inconſiderable, and thoſe that fell were moſtly mercenaries. This happened about the year before Chriſt 204.

But what moſt of all raiſed the fame and reputation of Philopœmen was his joining the powerful city of Lacedæmon to the Achæan commonwealth; by which means the Achæans came to eclipſe all the other ſtates of Greece. This memorable event happened in the year 191. In this tranſaction we cannot help taking notice of one circumſtance, which in our opinion, reflects greater luſtre on Philopœmen than all his warlike exploits. The Lacedæmonians, overjoyed to ſee themſelves delivered from the oppreſſions they had long groaned under, ordered the palace and furniture of Nabis to be ſold; and the ſum accruing from thence, to the amount of 120 talents, to be preſented to Philopœmen, as a token of their gratitude. Deputies therefore were to be appointed, who ſhould carry the money, and deſire Philopœmen, in the name of the ſenate, to accept of the preſent. On this occaſion it was that the virtue of the generous Achæan appeared in its greateſt luſtre; for ſo great was the opinion which the Spartans had of his probity and diſintereſtedneſs, that no one could be found who would take upon him to offer the preſent: ſtruck with veneration, and fear of diſpleaſing him, they all begged to be excuſed. At laſt they obliged, by a public decree, one Timolaus, who had formerly been his gueſt, to go to Megalopolis, where Philopœmen lived, and offer him this teſtimony of their regard. Timolaus, with great reluctance, ſet out for Megalopolis, where he was kindly received and entertained by Philopœmen. Here he had an opportunity of obſerving the ſtrictneſs of his whole conduct, the greatneſs of his mind, the frugality of his life, and the regularity of his manners; which ſtruck him with ſuch awe, that he did not dare once to mention the preſent he was come to offer; inſomuch that, giving ſome other pretence to his journey, he returned home with the money. The Lacedæmonians ſent him again; but he could no more prevail upon himſelf now than the firſt time to mention the true cauſe of his journey. At laſt, going a third time, he ventured, with the utmoſt reluctance, to acquaint Philopœmen with the offer he had to make in the name of the Lacedæmonians. Philopœmen heard him with great calmneſs; but the inſtant he had done ſpeaking, he ſet out with him for Sparta, where after having acknowledged his obligation to the Spartans, he adviſed them to lay out their money in reforming or purchaſing thoſe miſcreants who divided the citizens, and ſet them at variance by means of their ſeditious diſcourſes; to the end that being paid for their ſilence, they might not occaſion ſo many diſtractions in the government: "for it is much more adviſeable (ſaid he) to ſtop an enemy's mouth than a friend's: as for me, I ſhall always be your friend, and you ſhall reap the benefit of my friendſhip without expence." Such was the diſintereſtedneſs of this noble Achæan!

About two years after this the city of Meſſene withdrew itſelf from the Achæan league. Philopœmen attacked them; but was wounded, taken priſoner, and poiſoned by the magiſtrates. Thus died one of the greateſt heroes that Greece or any other country ever produced. He was no way inferior in valour, military knowledge, and virtue, to any of the boaſted heroes of Rome. Had Achaia been nearer to an equality with Rome, he would have preſerved his country from the yoke which the Roman republic forced it to bear. Both the Greek and Roman writers put him upon the level with Hannibal and Scipio, who were his contemporaries, and happened to die the ſame year. They allow him to have been not only one of the greateſt commanders, but alſo one of the greateſt ſtateſman of his age. To his valour and prudence Achaia owed her glory, which upon his death began to decline, there being none after him in that republic able to oppoſe her enemies with the like ſteadineſs and prudence; whence Philopœmen was called the laſt of the Greeks, as Brutus was afterwards ſtyled the laſt of the Romans.

PHILOSOPHER, a perſon verſed in philoſophy; or one who makes profeſſion of, or applies himſelf to, the ſtudy of nature and morality.

Philosopher's Stone, the greateſt object of alchemy, is a long ſought for preparation, which, when found, is to convert all the true mercurial part of metal into pure gold, better than any that is dug out of mines or perfected by the refiner's art.

Some Greek writers in the fourth and fifth centuries ſpeak of this art as being then known; and towards the end of the 13th century, when the learning of the Eaſt had been brought hither by the Arabians, the ſame pretenſions began to ſpread through Europe. It is ſuppoſed that this art called *alchemy*, was of Egyptian origin; and that, when the ancient Greek philoſophers travelled into Egypt, they brought back ſome of the allegoric language of this Egyptian art, ill underſtood, which afterwards paſſed into their mythology. Alchemy was the earlieſt branch of chemiſtry, conſidered as a philoſophical ſcience; in the other parts of chemical knowledge, facts preceded reaſoning or ſpeculation; but alchemy was originally ſpeculative. See Transmutation.

The alchemiſts ſuppoſed the general principles of metals to be chiefly two ſubſtances, which they called mercury and ſulphur; they apprehended alſo, that the pure mercurial, ſulphureous, or other principles of which they imagined gold to be compoſed, were contained ſeparately in other bodies; and theſe principles, therefore, they endeavoured to collect, and to concoct and incorporate by long digeſtions; and by thus conjoining the principles of gold, if they could be ſo procured and conjoined, it might be expected that gold would be produced. But the alchemiſts pretend to a product of a higher order, called *the elixir*, *the medicine for metals*, *the tincture*, *the philoſopher's ſtone*; which, by being projected on a large quantity of any of the inferior metals in fuſion, ſhould change them into fine gold; which being laid on a plate of ſilver, copper, or iron, and moderately heated, ſhould ſink into the metal, and change into gold all the parts to which it was applied; which on being properly heated with pure gold, ſhould change the gold into a ſubſtance of the ſame nature and virtue with itſelf, ſo as thus to be ſuſceptible of perpetual multiplication; and which, by continued coction, ſhould have its power more and more exalted, ſo as to be able to tranſmute greater and greater quantities of the inferior metals, according to its different degrees of perfection.

Alchemiſts have attempted to arrive at the making of gold by three methods: the firſt by ſeparation; for every metal yet known, it is affirmed, contains ſome quantity of gold; only, in moſt, the quantity is ſo little as not to defray the expence of getting it out.

The ſecond is by maturation; for the alchemiſts think mercury is the baſis and matter of all metals; that quickſilver purged from all heterogeneous bodies would be much heavier, denſer, and ſimpler, than the native quickſilver; and that by ſubtilizing, purifying, and digeſting it with much labour, and long operations, it is poſſible to convert it into pure gold.

This method is only for mercury. With reſpect to the other metals, it is ineffectual, 1. Becauſe their matter is not pure mercury, but has other heterogeneous bodies adhering to it; and, 2. Becauſe the digeſtion, whereby mercury is turned into gold, would not ſucceed in other metals, becauſe they had not been long enough in the mines.

Weight is the inimitable character of gold, &c. Now mercury, they ſay, has always ſome impurities in it, and theſe are lighter than mercury. Could they be purged away, which they think is not impoſſible, mercury would be as heavy as gold; and what is as heavy as gold is gold, or at leaſt might very eaſily be made gold.

The third method is by tranſmutation, or by turning all metals readily into pure gold, by melting them in the fire, and caſting a little quantity of a certain preparation into the fuſed matter; upon which the feces retire, are volatilized and burnt, and carried off, and the reſt of the maſs is turned into pure gold. That which works this change in the metals is called the *philoſopher's ſtone*. See TRANSMUTATION.

Whether this third method be poſſible or not, it is difficult to ſay. We have ſo many teſtimonies of it from perſons who on all other occaſions ſpeak truth, that it is hard to ſay they are guilty of direct falſehood, even when they ſay that they have been maſters of the ſecret. We are told, that it is only doing that by art which nature does in many years and ages. For as lead and gold differ but little in weight, therefore there is not much in lead beſide mercury and gold. Now, if we had any body which would ſo agitate all the parts of lead as to burn all that is not mercury therein, and had alſo ſome ſulphur to fix the mercury, would not the maſs remaining be converted into gold? There is nothing in nature ſo heavy as lead except gold, mercury, and platina, which was not known to theſe reaſoners; it is evident, therefore, there is ſomething in lead that comes very near to gold. But in lead there is likewiſe ſome heterogeneous matter different both from mercury and gold. If therefore 19 ounces of lead be diſſolved by the fire, and 8 ounces be deſtroyed by theſe means, it is argued that we ſhall have the reſt good gold; the ratio of lead to gold being as 11 to 19. If then the philoſopher's ſtone can purify the mercurial matter in lead, ſo as that nothing ſhall remain but the pure mercurial body, and you can fix and coagulate this by means of ſulphur, out of 19 ounces of lead you will have 11 of gold: or, if you reduce the lead from 18 to 14, you will then have converted it into mercury; and if you farther purify this mercury to the proper ſtandard, you will have gold; provided you have but a ſulphur with which to fix and coagulate it. Such is the foundation of the opinion of the philoſopher's ſtone; which the alchemiſts contend to be a moſt ſubtile, fixed, concentrated fire, which as ſoon as it melts with any metal, does, by a magnetic virtue, immediately unite itſelf to the mercurial body of the metal, volatiliſe and cleanſe off all that is impure therein, and leave nothing but a maſs of pure gold. Many frauds and artifices have unqueſtionably been practiſed in this operation, and there might be political reaſons why princes and others ſhould encourage thoſe who pretended to a power of furniſhing this inexhauſtible ſource of wealth; but it would be wrong to cenſure as impoſtors all thoſe who have declared themſelves convinced, from their own experiments, of the tranſmutability of baſe metals into gold. There are ſtrong reaſons, however, to believe that the authors have been deceived themſelves by fallacious appearances. Mr Boyle gives an account of a proceſs by which he imagines part of the ſubſtance of gold to have been tranſmuted into ſilver. He alſo relates a very extraordinary experiment, under the title of the degradation of gold by an anti-elixir, which was publiſhed in his own life-time, and ſince re-printed in 1739. Hence many have been led to conclude in favour of the alchemical doctrine of the tranſmutability of metals. See an account of this experiment, with remarks upon it by Dr Lewis, in his *Commerce of Arts*, ſect. 12. p. 297, &c.

Characters of the Kings and Queens of England

“ The opinion (ſays Holt) that one metallic or other foreign ſubſtance might be changed into another, was, it ſeems, at this time (reign of Henry VI. of England) propagated by certain chemiſts, whoſe obſervations on the ſurpriſing effects and alterations produced in certain ſubſtances by the force of heat carried their imaginations beyond what ſound judgment might warrant. The firſt inſtance of which on record is in vol. xi. p. 68. of the *Fœdera*; wherein Henry VI. grants a licence to John Cobbe, freely to work in metals; he having, by philoſophical art, found out a method of transferring imperfect metals into perfect gold and ſilver.

“ This pretended ſecret, known afterwards by the name of the *philoſopher's ſtone* or *powder*, was encouraged by four licences, granted to different projectors during this reign, and at ſundry times after, during this century particularly, and in ſucceeding times, all over Europe. The phrenzy has not entirely ceaſed even to this day, although it meets with neither public encouragement nor countenance from men of ſober reaſon; the projectors having yet found nothing from their airy ſchemes in this mode of ſearch but certain ruin to their property.”

The ſame author, when ſpeaking of the commerce of the kingdom, and the wonderful increaſe and riches of commercial cities, ſpeaks thus: “ This is the true philoſopher's ſtone, ſo much ſought after in former ages, the diſcovery of which has been reſerved to genius, when ſtudying to improve the mechanic arts. Hence a pound of raw materials is converted into ſtuffs of fifty times its original value. And the metals too are not, indeed, tranſmuted into gold—they are more:

Philoſophic.

for the labour of man has been able to work the baſer metal, by the ingenuity of art, ſo as to become worth more than many times its weight in gold."

PHILOSOPHIC, or **Philosophical**, ſomething belonging to **Philosophy**.

Philoſophical, Philoſophizing.

PHILOSOPHICAL egg, among chemiſts, a thin glaſs body or bubble, of the ſhape of an egg, with a long neck or ſtem, uſed in digeſtions.

PHILOSOPHIZING, rules of. See *Newtonian Philoſophy*, n° 16. and the following article.

PHILOSOPHY,

1 Definitions of philoſophy.

IS a word derived from the Greek, and literally ſignifies the *love of wiſdom* (A). In its uſual acceptation, however, it denotes a ſcience, or collection of ſciences, of which the univerſe is the object; and of the term thus employed many definitions have been given, differing from one another according to the different views of their ſeveral authors. By Pythagoras, philoſophy is defined επιστημη των οντων, "the knowledge of things exiſting;" by Cicero, after Plato, *ſcientia rerum divinarum et humanarum cum cauſis;* and by the illuſtrious Bacon, *interpretatio naturæ*. Whether any of theſe definitions be ſufficiently preciſe, and at the ſame time ſufficiently comprehenſive, may be queſtioned; but if philoſophy in its utmoſt extent be capable of being adequately defined, it is not here that the definition ſhould be given. "Explanation (ſays an acute writer *), is the firſt office of a teacher; definition if it be good, is the laſt of the inquirer after truth; but explanation is one thing, and definition quite another." It may be proper however, to obſerve, that the definition given by Cicero is better than that of Pythagoras, becauſe the chief object of the philoſopher is to aſcertain the *cauſes* of things; and in this conſiſts the difference between his ſtudies and thoſe of the natural hiſtorian, who merely enumerates phenomena, and arranges them into ſeparate claſſes.

* Tatham's Chart and Scale of Truth, vi. p. 8.

2 Its objects.

The principal objects of philoſophy are, God, nature, and man. That part of it which treats of God is called *theology;* that which treats of nature, *phyſics* and *metaphyſics;* and that which treats of man, *logic* and *ethics*. That theſe are not ſeparate and independent ſciences, but, as Bacon expreſſes (B), branches from the ſame trunk, we ſhall endeavour to ſhow, after we have given, agreeably to our uſual plan, a ſhort hiſtory of philoſophy from the earlieſt ages to the preſent day.

History of Philoſophy

To attempt to aſſign an *origin* to philoſophy, would be ridiculous; for every man endeavours to aſcertain the cauſes of thoſe changes which he obſerves in nature; and even children themſelves are inquiſitive after that which produces the ſound of their drums and their rattles. Children, therefore, and the moſt illiterate vulgar, have in all ages been philoſophers. But the firſt people among whom philoſophy was cultivated as a profeſſion, was probably the Chaldeans. We certainly read of none earlier; for though we have more authentic accounts of the Hebrews than of any other nation of remote antiquity, and have reaſon to believe that no people was civilized before them, yet the peculiar circumſtances in which they were placed, rendered all philoſophical inveſtigation to them uſeleſs, and even tended to ſuppreſs the very ſpirit of enquiry. The Egyptians indeed pretended to be the firſt of nations, and to have ſpread the bleſſings of religion and the light of ſcience among every other people; but, from the earlieſts records now extant, there is reaſon to believe that the Chaldeans were a civilized and powerful nation before the Egyptian monarchy was founded.

3 Philoſophy of the Chaldeans.

Of the Chaldean philoſophy much has been ſaid, but very little is known. Aſtronomy ſeems to have been their favourite ſtudy; and at the era of Alexander's conqueſt of their country, they boaſted that their anceſtors had continued their aſtronomical obſervations through a period of 470,000 years. Extravagant claims to antiquity have been common in all nations (C). Caliſthenes, who attended the Macedonian conqueror, was requeſted by Ariſtotle to inform himſelf concerning the origin of ſcience in Chaldea; and upon examining into the grounds of this report, he found that their obſervations reached no farther backwards than 1903 years, or 2234 years before the Chriſtian era. Even this is a remoter antiquity than Ptolemy allows to their ſcience: for he mentions no Chaldean obſervations prior to the era of Nabonaſſar, or

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(A) The origin uſually attributed to the term *philoſophy* has been already aſſigned in the article Philology. M. Chauvin gives it a term ſomewhat different. According to him, the term is derived from φιλια, *deſire* or *ſtudy*, and σοφια, *wiſdom;* and therefore he underſtands the word to mean *the deſire or ſtudy of wiſdom*; for (ſays he) Pythagoras, conceiving that the application of the human mind ought rather to be called *ſtudy* than *ſcience*, ſet aſide the appellation of *wiſe* as too aſſuming, and took that of *philoſopher*.

(B) Convenit igitur partiri *philoſophiam* in *doctrinas* tres; *doctrinam* de *numine*, *doctrinam* de *naturâ*, *doctrinam* de *homine*. Quoniam antem partitiones *ſcientiarum* non ſunt lineis diverſis ſimiles, quæ coeunt ad unum angulum; ſed potius ramis arborum, qui conjunguntur in uno trunco, qui etiam truncus ad ſpatium nonnullum integer eſt et continuus, antequam ſe partiatur in ramos. *De. aug. Scient.* lib. iii. cap. 1.

(C) This claim of the Babylonians is thus rejected with contempt by Cicero; "Contemnamus Babylonios, et eos, qui e Caucaſo cœli ſigna ſervantes, numeris, et motibus, ſtellaram curſus perſequuntur: Condemnemus, inquam, hos aut *ſtultitiæ*, aut *vanitatis*, aut *imprudentiæ*, qui 470 millia annorum, ut ipſi dicunt, monumentis comprehenſa continent, et mentiri judicemus, nec *ſeculorum* reliquorum *judicium*, quod de ipſis futurum ſit *pertimeſcere*. *De Divinatione*, lib. i. § 19.

or 747 years before Chriſt. That they cultivated ſomething which they called philoſophy at a much earlier period than this, cannot be queſtioned; for Ariſtotle *, on the credit of the moſt ancient records, ſpeaks of the Chaldean magi as prior to the Egyptian prieſts, who were certainly men of learning before the time of Moſes. For any other ſcience than that of the ſtars, we do not read that the Chaldeans were famous; and this ſeems to have been cultivated by them merely as the foundation of judicial aſtrology. Perſuading the multitude that all human affairs are influenced by the ſtars, and profeſſing to be acquainted with the nature and laws of this influence, their *wiſe men* pretended to calculate nativities, and to predict good and bad fortune †. This was the ſource of idolatry and various ſuperſtitions; and whilſt the Chaldeans were given up to ſuch dotages, true ſcience could not be much indebted to their labours. If any credit be due to Plutarch and Vitruvius, who quote Beroſus, (ſee BEROSUS), it was the opinion of the Chaldean *wiſe men* that an eclipſe of the moon happens when that part of its body which is deſtitute of fire is turned towards the earth. "Their coſmogony, as given by Beroſus, and preſerved by Syncellus, ſeems to be this, that all things in the beginning conſiſted of darkneſs and water; that a divine power dividing this humid maſs, formed the world; and that the human mind is an emanation from the Divine nature ‡.

The large tract of country which comprehended the empires of Aſſyria and Chaldea, was the firſt peopled region on earth. From that country, therefore, the rudiments of ſcience muſt have been propagated in every direction through the reſt of the world; but what particular people made the earlieſt figure, after the Chaldeans, in the hiſtory of philoſophy, cannot be certainly known. The claim of the Egyptians is probably beſt founded; but as their ſcience was the immediate ſource of that of the Greeks, we ſhall defer what we have to ſay of it on account of the connection between the parent and the offſpring, and turn our attention from Chaldean to Indian philoſophy, as it has been cultivated from a very early period by the Brachmans and Gymnoſophiſts. We paſs over Perſia, becauſe we know not of any ſcience peculiar to that kingdom, except the doctrines of the magi, which were religious rather than philoſophical; and of them the reader will find ſome account under the words MAGI, POLYTHEISM, and ZOROASTER.

4 Indian philoſophy.

From whatever quarter India received its wiſdom, we are certain that its philoſophers were held in high repute at a period of very remote antiquity, ſince they were viſited by Pythagoras and other ſages of ancient Greece, who travelled in purſuit of knowledge. Yet they ſeem to have been in that early age, as well as at preſent, more diſtinguiſhed for the ſeverity of their manners than for the acquiſition of ſcience; and, as Dr Enfield obſerves, to have more reſembled modern monks than ancient philoſophers. The brachmans or bramins, it is well known, are all of one tribe; and the moſt learned of them are in their own language called *Pundits* or *Pandits*. The Greek writers, however, mention a ſociety called *Samanæans*, who, voluntarily devoting themſelves to the ſtudy of divine wiſdom, gave up all private property, committed their children to the care of the ſtate, and their wives to the protection of their relations. This ſociety was ſupported at the public expence; and its members ſpent their time in contemplation, in converſation on divine ſubjects, or in acts of religion.

5 Ingrafted on religion.

The philoſophy of the Indians has indeed from the beginning been engrafted on their religious dogmas, and ſeems to be a compound of fanatic metaphyſics and extravagant ſuperſtition, without the ſmalleſt ſeaſoning of rational phyſics. Very unlike the philoſophers of modern Europe, of whom a great part labour to exclude the agency of mind from the univerſe, the Pandits of Hindoſtan allow no powers whatever to matter, but introduce the Supreme Being as the immediate cauſe of every effect, however trivial. "Brehm, *the Spirit of God*, (ſays one of their moſt revered Bramins), is abſorbed in ſelf-contemplation. The ſame is the mighty Lord who is preſent in every part of ſpace, whoſe omnipreſence, as expreſſed in the Reig Beid or Rigveda, I ſhall now explain. Brehm is one, and to him there is no ſecond; ſuch is truly Brehm. His omniſcience is ſelf-inſpired or ſelf-intelligent, and its comprehenſion includes every poſſible ſpecies. To illuſtrate this as far as I am able; the moſt comprehenſive of all comprehenſive faculties is omniſcience; and being ſelf-inſpired, it is ſubject to none of the accidents of mortality, *conception*, *birth*, *growth*, *decay*, or *death*; neither is it ſubject to paſſion or vice. To it the three diſtinctions of time, *paſt*, *preſent*, and *future*, are not. To it the three modes of being (D) are not. It is ſeparated from the univerſe, and independent of all. This omniſcience is named *Brehm*. By this omniſcient Spirit the operations of God are enlivened. By this Spirit alſo the 24 powers (E) of nature are animated. How is this? As the eye by the ſun, as the pot by the fire, as iron by the magnet (F) as variety of imitations by the mimic, as fire by the fuel, as the ſhadow by the man, as duſt by the wind, as the arrow by the ſpring of the bow, and as the ſhade by the tree; ſo by this Spirit the world is endued with the powers of intellect, the powers of the will, and the powers of action; ſo that if it emanates from the heart by the channel of the ear, it cauſes the perception of ſounds: if it emanates from the heart by the channel of the ſkin, it cauſes the perception of touch; if it emanates from the heart by the channel of the eye, it cauſes the perception of viſible objects; if it emanates from the the heart by the channel of the tongue, it cauſes the perception of taſte; if it emanates from the heart by the channel of the noſe, it cauſes the perception of ſmell. This alſo invigorating the five members of action, and invigorating the five members of perception, and invigorating the five elements, and invigorating the five ſenſes, and invigorating the three diſpoſitions of the mind, &c. cauſes the creation or the annihilation of the univerſe, while itſelf beholds every thing as an indifferent ſpectator *."

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* Apud Laert. lib 1. § 8.

† Sext. Emp. ad Matth. lib. 5. § 2. Strabo, lib. 100. Cic. de Div. lib. 1. § 1.

‡ Enfield's Hiſt. Phil. v. i.

(D) To be awake, to ſleep, and to be abſorbed in a ſtate of unconſciouſneſs— a kind of trance.

(E) The 24 powers of nature, according to the Bramins, are the five elements, *fire*, *air*, *earth*, *water*, and *akaſh* (a kind of ſubtile æther); the five members of action, the *hand*, *foot*, *tongue*, *anus*, and *male-organ of generation*; the five organs of perception, the *ear*, *eye*, *noſe*, *mouth*, and *ſkin*; the five ſenſes which they diſtinguiſh from the organs of ſenſation; the three diſpoſitions of the mind, *deſire*, *paſſion*, and *tranquillity*; and the power of *conſciouſneſs*.

(F) If the work from which this extract is quoted be of as great antiquity as Mr Halhed ſuppoſes, the Bramins muſt have been acquainted with the phenomena of magnetiſm at a much earlier period than any other philoſophers of whom hiſtory makes mention.

6 Admits not the ſeparate exiſtence of matter, and

From this paſſage it is plain that all the motions in the univerſe, and all the perceptions of man, are, according to the bramins, cauſed by the immediate agency of the Spirit of God, which ſeems to be here conſidered as the ſoul of the world. But it appears from ſome papers in the Aſiatic reſearches, that the moſt profound of theſe oriental philoſophers, and even the authors of their ſacred books, believe not in the exiſtence of matter as a ſeparate ſubſtance, but hold an opinion reſpecting it very ſimilar to that of the the celebrated Berkeley. The Védantis (ſays Sir William Jones) unable to form a diſtinct idea of brute matter independent of mind, or to conceive that the work of Supreme Goodneſs was left a moment to itſelf, imagine that the Deity is ever preſent to his work, and conſtantly ſupports a ſeries of perceptions, which in one ſenſe they call *illuſory*, though they cannot but admit the reality of all created forms, as far as the happineſs of creatures can be affected by them.

This is the very immaterialiſm of Berkeley; and in proof that it is the genuine doctrine of the Bramins, the learned preſident quotes the *Bhágavat*, which is believed to have been pronounced by the Supreme Being, and in which is the following ſentence:

"Except the *firſt cauſe*, whatever may appear and may not appear, in the mind, know that to be the mind's *Máyá*, or "deluſion," as light, as darkneſs."

7 Teaches the metempſychoſis.

We have ſhown elſewhere (ſee METAPHYSICS, nº 269.) that the metaphyſical doctrines of the Bramins, reſpecting the human ſoul, differ not from thoſe of Pythagoras and Plato; and that they believe it to be an emanation from the great ſoul of the world, which, after many tranſmigrations, will be finally abſorbed in its parent ſubſtance. In proof of their believing in the metempſychoſis, Mr Halhed gives us the following tranſlation of what (he ſays) is a beautiful ſtanza in the Geētā: "As throwing aſide his old clothes, a man puts on others that are new; ſo our lives, quitting the old, go to other newer animals."

8 Phyſics of the Bramins.

From the Bramins believing in the ſoul of the world not only as the *ſole agent*, but as the *immediate* cauſe of every motion in nature, we can hardly ſuppoſe them to have made any great progreſs in that ſcience which in Europe is cultivated under the name of *phyſics*. They have no inducement to inveſtigate the laws of nature; becauſe, according to the firſt principles of their philoſophy, which together with their religion, they believe to have been revealed from heaven, every phenomenon, however regular, or however anomalous, is produced by the voluntary act of an intelligent mind. Yet if they were acquainted with the uſe of fire arms 4000 years ago, as Mr Halhed ſeems to believe, he who made that diſcovery muſt have had a very conſiderable knowledge of the powers of nature; for though gunpowder may have been diſcovered by accident in the Eaſt, as it certainly was in the Weſt many ages afterwards, it is difficult to conceive how mere accident could have led any man to the invention of a gun. In aſtronomy geometry, and chronology too, they appear to have made ſome proficiency at a very early period. (See ASTRONOMY, nº 4.) Their chronology and aſtronomy are indeed full of thoſe extravagant fictions which ſeem to be eſſential to all their ſyſtems; but their calculations of eclipſes, and their computations of time, are conducted upon ſcientific principles.

9 Their aſtronomy.

"It is ſufficiently known, ſays Mr Davis † that the Hindoo diviſion of the ecliptic into ſigns, degrees, &c. is the ſame as ours; that their aſtronomical year is ſidereal, or containing that ſpace of time in which the ſun departing from a ſtar, returns to the ſame; that it commences on the inſtant of his entering the ſign Aries, or rather the Hindoo conſtellation Méſha; that each aſtronomical month contains as many even days and fractional parts as he ſtays in each ſign; and that the civil differs from the aſtronomical account of time only in rejecting thoſe fractions, and beginning the year and month at ſunriſe, inſtead of the intermediate inſtant of the artificial day or night. Hence ariſes the unequal portion of time aſſigned to each month dependent on the ſituation of the ſun's apſis, and the diſtance of the vernal equinoxial colure from the beginning of Méſha in the Hindoo ſphere; and by theſe means they avoid thoſe errors which Europeans, from a different method of adjuſting their kalendar by intercalary days, have been ſubject to."

Mr Davis obſerves, that an explanation of theſe matters would have led him beyond his purpoſe, which was only to give a general account of the method by which the Hindoos compute eclipſes, and to ſhow that the ſcience of aſtronomy is as well known among them now as ever it was among their anceſtors. This he does very completely: but in the preſent ſhort hiſtorical ſketch, we can neither copy nor abridge his memoir. Suffice it to ſay, that he has ſhown the practical part of the Hindoo aſtronomy to be founded on mathematical principles; and that the learned Pandits appear to have truer notions of the form of the earth, and the economy of the univerſe than thoſe which are aſcribed to their countrymen in general.

The ſame writer ſhows likewiſe, that the prodigious duration which the Hindoos attribute to the world, is the reſult of a ſcientific calculation founded indeed on very whimſical principles. "It has been common with aſtronomers to fix on ſome epoch, from which, as from a radix, to compute the planetary motions; and the ancient Hindoos choſe that point of time counted back, when, according to their motions as they had determined them, they muſt have been in conjunction in the beginning of Méſha or Aries, and coeval with which circumſtance they ſuppoſed the *creation*. This, as it concerned the planets only, would have produced a moderate term of years compared with the enormous antiquity that will be hereafter

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* Preliminary Diſc. to Halhed's Gentoo Laws.

† Aſiatic Reſearches vol. ii.

ſtated that having diſcovered a ſlow motion of the nodes and apſides alſo, and taken it into the computation, they found it would require a length of time correſponding with 1955884890 years now expired, when they were ſo ſituated, and 2364115110 years more before they would return to the ſame ſituation again, forming together the grand anomaliſtick period denominated a *Calpa*, and fancifully aſſigned as the day of Brahmá."

But though the mathematical part of the aſtronomy of the Pandits is undoubtedly reſpectable, their phyſical notions of the univerſe are in the higheſt degree ridiculous and extravagant. In the Vedas and Puranas, writings of which no devout Hindoo can diſpute the divine authority, eclipſes are ſaid to be occaſioned by the intervention of the monſter *Rahu;* and the earth to be ſupported by a ſeries of animals. "They ſuppoſe (ſays Mr Halhed) that there are 14 ſpheres, ſeven below and ſix above the earth. The ſeven inferior worlds are ſaid to be altogether inhabited by an infinite variety of ſerpents, deſcribed in every monſtrous figure that the imagination can ſuggeſt. The firſt ſphere above the earth is the immediate vault of the viſible heavens, in which the ſun, moon, and ſtars, are placed. The ſecond is the firſt paradiſe, and general receptacle of thoſe who merit a removal from the lower earth. The third and fourth are inhabited by the ſouls of thoſe men who, by the practice of virtue and dint of prayer have acquired an extraordinary degree of ſanctity. The fifth is the reward of thoſe who have all their lives performed ſome wonderful act of pennance and mortification, or who have died martyrs for their religion. The higheſt ſphere is the reſidence of Brahma and his particular favourites, ſuch as thoſe men who have never uttered a falſehood during their whole lives, and thoſe women who have voluntarily burned themſelves with their huſbands. All theſe are abſorbed in the divine eſſence."

10
Strange notions of the univerſe.

11
Ethics of the Hindoos.

On ethics, the Hindoos have nothing that can be called philoſophy. Their duties, moral, civil, and religious, are all laid down in their *Vedas* and *Shaſters;* and enjoined by what they believe to be divine authority, which ſuperſedes all reaſoning concerning their fitneſs or utility. The buſineſs of their Pandits is to interpret thoſe books, which are extremely ancient, and written in a language that has long been unintelligible to every other order of men; but no Pandit will alter the text however impoſſible to be reconciled to principles eſtabliſhed in his own practice of aſtronomy. On ſuch occaſions the uſual apology for their ſacred books is, that "ſuch things may have been ſo formerly, and may be ſo ſtill; but that for aſtronomical purpoſes, aſtronomical rules muſt be followed [*]." The great duties of morality have been preſcribed in every religious code; and they are not overlooked in that of the Hindoos, though the higheſt merit that a Bramin can have conſiſts in voluntary acts of abſtinence and mortification, and in contempt of death.

12
Philoſophy of the Arabians and Chineſe.

Of the ancient philoſophy of the Arabians and Chineſe nothing certain can be ſaid; and the narrow limits of ſuch an abſtract as this; do not admit of our mentioning the conjectures of the learned, which contradict each other, and are all equally groundleſs.

There is indeed ſufficient evidence that both nations were at a very early period obſervers of the ſtars; and that the Chineſe had even a theory by which they foretold eclipſes (ſee ASTRONOMY, n° 2, 3.); but there is reaſon to believe that the Arabians, like other people in their circumſtances, were nothing more than judicial aſtrologers, who poſſeſſed not the ſmalleſt portion of aſtronomical ſcience.

Pliny makes mention of their magi, whilſt later writers tell us, that they were famous for their ingenuity in ſolving enigmatical queſtions, and for their ſkill in the arts of divination: but the authors of Greece are ſilent concerning their philoſophy; and there is not an Arabian book of greater antiquity than the Koran extant. (See PHILOLOGY, Section II.)

13
Early ſcience of the Phœnicians

Leaving therefore regions ſo barren of information, let us paſs to the Phœnicians, whoſe commercial celebrity has induced many learned men to allow them great credit for early ſcience. If it be true, as ſeems highly probable, that the ſhips of this nation had doubled the Cape and almoſt encompaſſed the peninſula of Africa long before the era of Solomon (See OPHIR, n° 10), we cannot doubt but that the Phœnicians had made great proficiency in the art of navigation, and in the ſcience of aſtronomy, at a period of very remote antiquity. Nor were theſe the only ſciences cultivated by that ancient people: the learned Cudworth has, in our opinion, ſufficiently proved that *Moſchus* or *Mochus* a Phœnician, who, according to Strabo, flouriſhed before the Trojan war, was the author of the atomic philoſophy afterwards adopted by Leucippus, Democritus, and others among the Greeks; and that it was with ſome of the ſucceſſors of this ſage that Pythagoras, as Jamblicus tells us, converſed at Sidon, and from them received his doctrine of *Monads* See PYTHAGORAS). Another proof of the early progreſs of the Phœnicians in philoſophy may be found in the fragments of their hiſtorian Sanchoniathon which have been preſerved by Euſebius[†]. We are indeed aware that men of great celebrity have called in queſtion the authenticity of thoſe fragments, and even the very exiſtence of ſuch a writer as Sanchoniathon; but for this ſcepticiſm we can diſcover no foundation (See SANCHONIATHON). His hiſtory may have been interpolated in ſome places by the tranſlator Philo-Byblius; but Porphyry, Euſebius, and Theodoret, ſpeak of it as a work of undoubted credit, and affirm that its author flouriſhed before the Trojan war. Now this ancient writer teaches that, according to the *wiſe men* of his country, all things aroſe at firſt from the neceſſary agency of an active principle upon a paſſive chaotic maſs which he calls *mot*. This chaos Cudworth thinks was the ſame with the elementary *water* of Thales, who was alſo of Phœnician extraction; but Moſheim juſtly obſerves that it was rather *dark air*, ſince Philo tranſlates it αερα ζοφωδη. Be this as it may, nothing can be more evident than that the Phœnicians muſt have made ſome progreſs in what muſt ſurely be conſidered as philoſophy, however falſe, ſo early as the era of Sanchoniathon; for ſpeculations about the origin of the world never occur to untaught barbarians. Beſides Moſchus and Sanchoniathon, Cadmus, who introduced letters into Greece may undoubtedly be reckoned among the Phœnician philoſophers; for though it is not pretended that the alphabet was of his invention, and though it is by no means certain that the Greeks, at the time of his arrival among them, were wholly deſtitute of alphabetic characters (See PHILOLOGY, n° 130.); yet the man who could prevail with illiterate ſavages to adopt the uſe of ſtrange characters, muſt have been a great maſter of the ſcience of human nature. Several other Phœnician philoſophers are mentioned by Strabo; but as they flouriſhed at a later period, and philoſophiſed after the ſyſtematic mode of the Greeks, they fall not properly under our notice. We paſs on therefore to the philoſophy of Egypt.

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[*] Davis's Memoir, Aſiatic Reſearches, vol. ii.

[†] Prep. Evi

14 Egyptian philoſophy

It has been already obſerved that the Egyptians boaſted of being the firſt of nations, and the authors of all the ſcience which in ſeparate rays illuminated the reſt of the world. But though this claim was undoubtedly ill-founded, their high antiquity and early progreſs in the arts of civil life cannot be controverted. The Greeks with one voice confeſs that all their learning and wiſdom came from Egypt, either imported immediately by their own philoſophers, or brought through Phœnicia by the ſages of the eaſt: and we know from higher authority than the hiſtories of Greece, that at a period ſo remote as the birth of Moſes, the wiſdom of the Egyptians was proverbially famous. Yet the Hiſtory of Egyptian learning and philoſophy, though men of the firſt eminence both ancient and modern have beſtowed much pains in attempts to elucidate it, ſtill remains involved in clouds of uncertainty. That they had ſome knowledge of phyſiology, arithmetic, geometry, and aſtronomy, are facts which cannot be queſtioned; but there is reaſon to believe that even theſe ſciences were in Egypt puſhed no farther than to the uſes of life. That they believed in the exiſtence of incorporeal ſubſtances is certain; becauſe Herodotus aſſures us that they were the firſt aſſerters of the immortality, pre-exiſtence, and tranſmigration of human ſouls, which they could not have been without holding thoſe ſouls to be at leaſt *incorporeal*, if not *immaterial*.

The author of Egyptian learning is generally acknowledged to have been *Thoth*, *Theut* or *Taaut*, called by the Greeks *Hermes*, and by the Romans *Mercury*; but of this perſonage very little is known. Diodorus Siculus ſays that he was chief miniſter to Oſiris, and that he improved language, invented letters, inſtituted religious rites, and taught aſtronomy, muſic, and other arts. The ſame thing is affirmed by *Sanchoniatho*, whoſe antiquity has been already mentioned; by *Manetho* an Egyptian prieſt, who flouriſhed during the reign of Ptolemy Philadelphus; and by Plato whoſe authority, as he reſided long in Egypt, and was himſelf an eminent philoſopher, is perhaps more to be depended upon than that of the other two. In the Philebus we are told that Thoth was the inventor of letters: and leſt we ſhould ſuppoſe that by thoſe letters nothing more is meant than picture writing or ſymbolical hieroglyphics, it is added that he diſtinguiſhed between *vowels* and *conſonants*, determining the number of each. The ſame philoſopher, in his Phædrus, attributes to Thoth the invention of *arithmetic*, *geometry*, *aſtronomy*, and *hieroglyphic* learning; and ſubjoins a diſputation ſaid to have been held between him and *Thamus* then king of Egypt, concerning the advantage and diſadvantage of his newly invented letters. Thoth boaſted that the invention, by aiding memory, would greatly contribute to the progreſs of ſcience; whilſt the monarch contended, that it would enervate mens natural faculties by making them truſt to written characters without exerting the powers of their own minds.

All this, if real, muſt have happened before the era of Moſes: and ſince it is almoſt certain that alphabetical characters were in uſe prior to the *exod* of the Iſraelites from Egypt (See PHILOLOGY, n° 24, 25.) we may as well allow the invention to Thoth, as give it to an earlier author of unknown name. That arithmetic, geometry, and aſtronomy, were cultivated in Egypt from the moſt remote antiquity, is affirmed by all the ancients, and made in the higheſt degree probable by the ſituation of the country. The firſt elements of aſtronomy have certainly been diſcovered by various nations, whoſe habits of life led them to the frequent obſervation of the heavens; and it is obſerved by Cicero, that the Egyptians and Babylonians, dwelling in open plains where nothing intercepted the view of the heavenly bodies, naturallly devoted themſelves to the ſtudy of that ſcience. The annual overflowing of the Nile, which broke up the boundaries of their lands, would lay the Egyptians under the neceſſity of adopting ſome method of ſettling thoſe boundaries anew; and neceſſity we know to be the parent of invention. Hence their early acquaintance with practical geometry cannot well be doubted. Their cuſtom of embalming their dead, and the perfection to which they carried that art (G), ſhows infallibly their knowledge of the properties of natural ſubſtances, and gives ſome reaſon to believe that they were not altogether ſtrangers to anatomy; but if we allow them to have been at this early period anatomiſts acquainted with the powers of drugs, we can hardly refuſe them ſome ſkill in the art of phyſic, which they themſelves traced up to their gods and demigods, to *Serapis*, *Iſis*, and her ſon *Horus* or *Apollo*.

The art of alchymy has been ſaid to have been known by the ancient Egyptians; and from the author of the Egyptian philoſophy it has been called the *Hermetic art*. But though this is unqueſtionably a fiction, there is evidence that they were poſſeſſed of one art which is even yet a *deſideratum* in the practice of chemiſtry. "Moſes (we are told †) took the golden calf, which his brother had made for idolatrous purpoſes, and *burnt it in the fire*, and *ground it to powder*, and ſtrowed it on the water, and made the children of Iſrael drink of it." Had this fact been related by Herodotus or Diodorus Siculus, it would

† Exod. xxii. 20.

(G) It is true that the diſſection of ſome mummies has leſſened the high opinion long entertained of the ſkill of the ancient Egyptians in the art of embalming; yet it muſt be granted that their knowledge of antiſeptic drugs was great, ſince it is now certainly known even from theſe diſſections, that by means of ſuch drugs they contrived to preſerve rags of cloth from corruption for upwards of 3000 years.

have been deemed ſufficient evidence that the Egyptians were even at that early period no ſtrangers to the art of chemiſtry; and ſurely the evidence ſhould not be the worſe for coming from the pen of the Hebrew lawgiver, who was himſelf educated in the court of Egypt.

15 Not carried to high perfection.

But though it is thus evident that the rudiments of almoſt every uſeful ſcience were known in Egypt from the remoteſt antiquity, it does not appear that any of them was carried to a great degree of perfection, unleſs perhaps chemiſtry alone muſt be excepted. One would think that no ſcience could have been more indiſpenſably requiſite to them than geometry. And yet though Pythagoras is ſaid to have ſpent 22 years in Egypt ſtudying that ſcience and aſtronomy, he himſelf diſcovered (H) the famous 47th Prop. of Euclid's firſt book after his return to Samos. This, though a very uſeful, is yet a ſimple theorem; and ſince it was not reached by the Egyptian geometry, we cannot ſuppoſe that thoſe people had then advanced far in ſuch ſpeculations. The ſame concluſion muſt be drawn with reſpect to aſtronomy; for Thales is ſaid to have been the firſt that calculated an eclipſe of the ſun; and we nowhere read that the *Egyptians* pretended to diſpute that honour with him. To this it may be replied, that Pythagoras was in Egypt undoubtedly taught the true conſtitution of the ſolar ſyſtem, and what is more extraordinary, the doctrine of comets in particular, and of their revolutions, like the other planets, round the ſun (I) We grant that he was taught all this; but it was not ſcientificially, but dogmatically, as facts which the prieſts had received by tradition from their early anceſtors, and of which they had never queſtioned the truth nor inquired into the reaſons. Of this we need no better proof than that the Pythagorean ſyſtem of the ſun was totally neglected by the Greeks as ſoon as they began to frame hypotheſes and to ſpeculate in philoſophy (K).

16 Their knowledge of the ſolar ſyſtem.

But it may ſeem ſtrange, and it certainly is ſo, that the Egyptian prieſts, in the days of Pythagoras, ſhould have preſerved ſo great a diſcovery of their anceſtors, and at the ſame time have totally forgotten the principles and reaſoning which led to a concluſion apparently contrary to the evidence of ſenſe. This is a difficulty which we pretend not to remove, though the fact which involves it ſeems to be beyond the reach of controverſy. Perhaps the following obſervations may throw upon it a feeble light. According to Manetho, the written monuments of the firſt Thoth were loſt or neglected in certain civil revolutions or natural calamities which befel the kingdom of Egypt. After many ages great part of them were recovered by an ingenious interpretation of the ſymbols which he had inſcribed upon ancient columns; and the man who made this interpretation was called the ſecond *Thoth* or *Hermes Triſmegiſtus*. But *thrice illuſtrious* as this perſonage was, it is at leaſt poſſible that he may have been much inferior to the former Hermes, and have read his writings and tranſcribed his concluſions without being able to comprehend the principles or reaſoning which led to thoſe concluſions. Any man who underſtands Latin might tranſlate into his own tongue the concluſions of Newton; but much more would be requiſite to make him comprehend the demonſtrations of his ſublime geometry. By what mode of reaſoning the firſt Hermes (L) was led to the true idea of the ſolar ſyſtem, or whether it was by reaſoning at all, cannot now be known; but it ſeems very evident, that when the intercourſe between the Egyptians and Greeks firſt commenced, the wiſdom of the former people conſiſted chiefly in the ſcience of legiſlation and civil policy, and that the philoſopher,

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(H) This diſcovery he claimed; and his claim was admitted by the Greek writers without having been *directly* controverted ſince. An excellent mathematician, however, has lately ſhown that the equality between the ſquare of the hypothenuſe of a right angled triangle, and the ſum of the ſquares on the other two ſides, was known to the aſtronomers of India at a period long prior that of Pythagoras. Notwithſtanding this, it is certainly poſſible that the ſage of Samos may have made the diſcovery himſelf, though we think the contrary much more probable; for we agree with the able writer already mentioned, that Pythagoras who is generally believed to have converſed with Indian brachmans as well as Egyptian prieſts, may have derived from them "ſome of the ſolid as well as the viſionary ſpeculations with which he delighted to inſtruct or amuſe his diſciples." See *Tranſactions of the Royal Society of Edinburgh*, vol. ii. Memoir xiii. Phyſic Claſs.

(I) This is recorded by Ariſtotle and Plutarch; and thus expreſſed by Ammianus Marcelinus.—"Stellas quaſdam, *ceteris ſimiles*, quarum *ortus orbituſque*, quibus ſint temporibus *præſtituti* humanis mentibus ignorari. Lib. xxv. cap. 10.

(K) *Fixas* in ſupremis mundi partibus immotas perſiſtere, et planetas his inferiores circa ſolem revolvi, terram pariter moveri curſu annuo, diurno vero circa axem propriam, et ſolem ceu focum univerſi in omnium centro quieſcere, antiquiſſima fuit philoſophantium ſententia. Ab Ægyptiis autem aſtrorum antiquiſſimis obſervationibus propagatam eſſe hanc ſententiam veriſimile eſt. Et etiam ab illis et a gentibus conterminis ad Græcos, gentem magis philologicam quam philoſophicam, philoſophia omnis antiquior juxta et ſenior manaſſe videtur. Subinde docuerunt Anaxagoras, Democritus, et alii nonnulli, terram in centro mundi immotam ſtare, et aſtra omnia in occaſum, aliqua celerius, alia tardius moveri, idque in ſpatiis liberrimis. Namque orbis ſolidi poſtea ab Eudoxo, Calippo, Ariſtotele, introducti ſunt; declinante indies philoſophia primitus introducta, et novis Græcorum commentis paulatim prævalentibus. Quibus *vinculis* ANTIQUI planetas in ſpatiis liberis retineri, deque curſu rectilineo perpetuo retractas in orbem regulariter agi docuere, non conſtat. *Newton de Mundi Syſtemate.*

(L) Some authors, deeply ſkilled in the Hebrew language, have thought that the true ſyſtem of the ſun and planets may be perceived in the Scriptures of the Old Teſtament, and that it is only from the ignorance or careleſſneſs of the tranſlators that it does not appear in the Engliſh bible and other verſions. The writer of this article confeſſes pher, the divine, the legiſlator, and the poet, were all united in the ſame perſon. Their coſmogony (for all the ancients who pretended to ſcience framed coſmogonies) differed little from that of the Phœnicians already mentioned. They held that the world was produced from chaos by the energy of an intelligent principle: and they likewiſe conceived that there is in nature a continual tendency towards diſſolution. In Plato's Timæus, an Egyptian prieſt is introduced deſcribing the deſtruction of the world, and aſſerting that it will be effected by means of water and fire. They conceived that the univerſe undergoes a periodical conflagration; after which all things are reſtored to their original form, to paſs again through a ſimilar ſucceſſion of changes.

17 Their moral ſcience. Enfield's Hiſt. of Philoſophy

"Of preceptive doctrine the Egyptians had two kinds, the one ſacred, the other vulgar. The former, which reſpected the ceremonies of religion and the duties of the prieſts, was doubtleſs written in the ſacred books of Hermes, but was too carefully concealed to paſs down to poſterity. The latter conſiſted of maxims and rules of virtue, prudence, or policy. Diodorus Siculus relates many particulars concerning the laws, cuſtoms, and manners of the Egyptians; whence it appears that ſuperſtition mingled with and corrupted their notions of morals. It is in vain to look for accurate principles of ethics among an ignorant and ſuperſtitious people. And that the ancient Egyptians merited this character is ſufficiently evident from this ſingle circumſtance, that they ſuffered themſelves to be deceived by impoſtors, particularly by the profeſſors of the fanciful art of aſtrology; concerning whom Sextus Empiricus juſtly remarks, that they have done much miſchief in the world, by enſlaving men to ſuperſtition, which will not ſuffer them to follow the dictates of right reaſon." See EGYPT, MYSTERIES, MYTHOLOGY, &c.

18 Grecian philoſophy.

From Egypt and Phœnicia philoſophy paſſed into Greece; where it was long taught without ſyſtem, as in the countries from which it was derived. Phoroneus, Cecrops, Cadmus, and Orpheus, were among the earlieſt inſtructors of the Greeks; and they inculcated Egyptian and Phœnician doctrines in detached maxims, and enforced them, not by ſtrength of argument, but by the authority of tradition. Their coſmogonies were wholy Phœnician or Egyptian diſguiſed under Grecian names; and they taught a future ſtate of rewards and puniſhments. The planets and the moon Orpheus conceived to be habitable worlds, and the ſtars to be fiery bodies like the ſun: but he taught that they are all animated by divinities; an opinion which prevailed both in Egypt and the eaſt: and it does not appear that he gave any other proof of his doctrines than a confident aſſertion that they were derived from ſome god. See ORPHEUS.

Hitherto we have ſeen philoſophy in its ſtate of infancy and childhood, conſiſting only of recollection of ſententious maxims and traditionary opinions; but among the Greeks, an ingenious and penetrating people, it ſoon aſſumed the form of profound ſpeculation and ſyſtematic reaſoning. Two eminent philoſophers aroſe nearly at the ſame period, who may be conſidered as the parents not only of Grecian ſcience, but of almoſt all the ſcience which was cultivated in Europe prior to the era of the great Lord Bacon: Theſe were Thales and Pythagoras; of whom the former founded the Ionic ſchool and the latter the Italic: from which two ſprung the various ſects into which the Greek philoſophers were afterwards divided. A bare enumeration of theſe ſects is all that our limits will admit of; and we ſhall give it in the perſpicuous language and juſt arrangement of Dr Enfield, referring our readers for a fuller account than we can give of their reſpective merits to his abridged tranſlation of Brucker's hiſtory.

19 The Ionic ſchool.

Of the IONIC SCHOOL were, 1. The Ionic ſect proper, whoſe founder Thales had as his ſucceſſors Anaximenes, Anaxagoras, Diogenes Apolloniates, and Archelaus. 2. The Socratic ſchool, founded by Socrates, the principal of whoſe diſciples were Xenophon, Æſchines, Simon, Cebes, Ariſtippus, Phædo, Euclid, Plato, Antiſthenes, Critias, and Alcibiades. 3. The Cyrenaic ſect, of which Ariſtippus was the author: his followers were, his daughter Arete, Hegeſias, Anicerris, Theodorus, and Bion. 4. The Megaric or Eriſtic ſect, formed by Euclid of Megara; to whom ſucceeded Eubulides, Diodorus, and Stilpo, famous for their logical ſubtlety. 5. The Eliac or Eretriac ſchool, raiſed by Phædo of Elis, who though he cloſely adhered to the doctrine of Socrates, gave name to his ſchool. His ſucceſſors were Pliſtanus and Menedemus; the latter of whom, being a native of Eretria, transferred the ſchool and name to his own country. 6. The Academic ſect, of which Plato was the founder. After his death, many of his diſciples deviating from his doctrine, the ſchool was divided into the old, new, and middle academies. 7 The Peripatetic ſect, founded by Ariſtotle, whoſe ſucceſſors in the Lyceum were Theophraſtus, Strato, Lycon, Ariſto, Critolaus, and Diodorus. Among the Peripatetics, beſides thoſe who occupied the chair, were alſo Dicæarchus, Eudemus, and Eudemus Phalereus. 8. The Cynic ſect, of which the author was Antiſthenes, whom Diogeneus, Oneſicritus, Crates, Netrocles, Menipus, and Menedemus, ſucceeded. In the liſt of Cynic philoſophers muſt alſo be reckoned Hipparchia, the wife of Crates. 9. The Stoic ſect, of which Zeno was the founder. His ſucceſſors in the porch were Perſæus, Ariſto of Chios, Herillus, Sphærus, Cleanthes,

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feſſes that his knowledge of the Hebrew is very limited, which is probably the reaſon that to him the arguments of theſe men appear weak and their criticiſms fanciful. No man, however, has a higher veneration than he for the ſacred volume, which he believes to have been given for nobler purpoſes that to teach its readers the ſcience of aſtronomy; but could the principles of that ſcience be found in it, he ſhould be ſtrongly inclined to think that the firſt Thoth was Joſeph, and that the monarch to whome he was miniſter was the far-famed Oſiris. Were there any ſolid foundation for this ſuppoſition, it would be eaſy to conceive how Thoth acquired his ſcience, and how the Egyptian prieſts might retain juſt notions of the ſolar ſyſtem in general, long after they had frrgotton the evidence upon which he communicated thoſe notions to their anceſtors.

Chryſippus, Zeno of Tarſus, Diogenes the Babylonian, Antipater, Panætius, and Poſidonius.

20 The Italic ſchool

Of the ITALIC SCHOOL were, 1. The Italic ſect proper: it was founded by Pythagoras, a diſciple of Pherecydes. The followers of Pythagoras were Ariſtæus, Mneſarchus, Alcmæon, Ecphantus, Hippo, Empedocles, Epicharmus, Ocellus, Timæus, Archytas, Hippaſus, Philolaus, and Eudoxus. 2. The Eleatic ſect, of which Xenophanes was the author: his ſucceſſors, Parmenides, Meliſſus, Zeno, belonged to the metaphyſical claſs of this ſect; Leucippus Democritus, Protagoras, Diagoras, and Anaxarchus, to the phyſical. 3. The Heraclitean ſect, which was founded by Heraclitus, and ſoon afterwards expired; Zeno and Hippocrates philoſophiſed after the manner of Heraclitus, and other philoſophers borrowed freely from his ſyſtem. 4. The Epicurean ſect, a branch of the Eleatic, had Epicurus for its author; among whoſe followers were Metrodorus, Polyænus, Hermachus, Polyſtratus, Baſilides, and Protarchus. 5. The Pyrrhonic or Sceptic Sect, the parent of which was Pyrrho: his doctrine was taught by Timon the Phliaſian; and after ſome interval was continued by Ptolemy a Cyrenean, and at Alexandria by Æneſidemus.

Pauw's Philoſophical Diſſertations, &c.

Of the peculiar doctrines of theſe ſects, the reader will in this work find a ſhort account either in the lives of their reſpective founders, or under the names of the ſects themſelves. We ſhall only obſerve at preſent, that though many of them were undoubtedly abſurd, and many wicked, it would yet perhaps be going too far to ſay with ſome, that the philoſophy of Greece became impious under Diagoras, vicious under Epicurus, HYPOCRITICAL UNDER ZENO, impudent under Diogenes, covetous under Demochares, voluptuous under Metrodorus, fantaſtical under Crates, ſcurrilous under Menippus, licentious under Pyrrho, and quarrelſome under Cleanthes. Of the truth of this heavy charge every reader muſt judge for himſelf. We are ſtrongly inclined to think, that there were virtues and vices peculiar to each ſect; and that the ſects themſelves had an affinity more or leſs direct with the different temperaments of man; whence the choice of ſectators often depended on phyſical influence, or a peculiar diſpoſition of their organs. Nothing appears more natural than that thoſe men who were born with great force of mind and ſtrong nerves ſhould diſcover a predilection for ſtoiciſm; while mortals, endowed by nature with more delicacy of fibres and keener ſenſibility, fled for refuge to the myrtles of Epicurus. People, whoſe temperaments partook of no extremes, were always inclined either for the Lyceum or the academy. Such as poſſeſſed ſolidity of underſtanding ranged themſelves with Ariſtotle; and thoſe who had only genius, or even pretenſions to that endowment, went to augment the crowd of Platoniſts."

21 Grecian mode of philoſophizing.

All the ſyſtematical philoſophers, however, purſued their inquiries into nature by nearly the ſame method. Of their philoſophy as well as of ours, the univerſe, with all that it contains, was the vaſt object: but the individual things which compoſe the univerſe are infinite in number and ever changing; and therefore, according to an eſtabliſhed maxim of theirs, incapable of being the ſubjects of human ſcience *. To reduce this infinitude, and to fix thoſe fleeting beings, they eſtabliſhed certain definite arrangements or claſſes, to ſome of which every thing paſt, preſent, or to come, might be referred; and having aſcertained, as they thought, all that could be affirmed or denied of theſe claſſes, they proved, by a very ſhort proceſs of ſyllogiſtic reaſoning, that what is true of the claſs muſt be true of every individual comprehended under it. The moſt celebrated of theſe arrangements is that which is known by the name of *categories*; which Mr Harris thinks at leaſt as old as the era of Pythagoras, and to the forming of which mankind would, in his opinion, be neceſſarily led by the following conſiderations: Every ſubject of human thought is either *ſubſtance* or *attribute*; but *ſubſtance* and *attribute* may each of them be modified under the different characters of *univerſal* or *particular*. Hence there ariſes a quadruple arrangement of things into *ſubſtance univerſal* and *ſubſtance particular*; into *attribute univerſal* and *attribute particular*; to ſome one of *which four* not only our words and ideas, but every individual of that immenſe multitude of things which compoſe the univerſe may be reduced. This arrangement, however, the learned author thinks too limited; and he is of opinion, that, by attending to the ſubſtances with which they were ſurrounded, the Grecian ſchools muſt ſoon have diſtinguiſhed between the attributes *eſſential* to all ſubſtances and thoſe which are only *circumſtantial*; between the attributes proper to *natural* ſubſtances or bodies, and thoſe which are peculiar to *intelligible* ſubſtances or minds. He likewiſe thinks, that the *time* and *place* of the exiſtence of ſubſtances not preſent, muſt ſoon have attracted their attention; and that in conſidering the place of this or that ſubſtance, they could hardly avoid thinking of its *poſition* or *ſituation*. He is of opinion, that the ſuperinduction of one ſubſtance upon another would inevitably ſuggeſt the idea of *cloathing* or *habit*, and that the variety of *co-exiſting ſubſtances* and *attributes* would diſcover to them another attribute, viz. that of *relation*. Inſtead therefore of confining themſelves to the ſimple diviſion of *ſubſtance* and *attribute*, they divided *attribute* itſelf into nine diſtinct ſorts, ſome *eſſential* and others *circumſtantial*; and thus by ſetting ſubſtance at their head, made ten *comprehenſive* and *univerſal genera*, called, with reference to their Greek name, *categories*, and with reference to their Latin name, *predicaments*. Theſe categories are, SUBSTANCE, QUALITY, QUANTITY, RELATION, ACTION, PASSION, WHEN, WHERE, POSITION, and HABIT; which, according to the ſyſtematic philoſophy of the Greeks, comprehend every human ſcience and every ſubject of human thought. *Hiſtory*, natural and civil, ſprings, ſays Mr Harris, out of SUBSTANCE; *mathematics* out of QUANTITY; *optics* out of QUALITY and QUANTITY; *medicine* out of the *ſame*; *aſtronomy* out of QUANTITY and MOTION; *muſic* and *mechanics* out of the *ſame*; *painting* out of QUALITY and SITE; *ethics* out of RELATION; *chronology* out of WHEN; *geography* out of WHERE; *electricity*, *magnetiſm*, and *attraction*, out of ACTION and PASSION; and ſo in other inſtances.

22 The categories.

To theſe categories, conſidered as a mere arrangement of ſcience, we are not inclined to make many objections. The arrangement is certainly not complete: but this is a matter of comparatively ſmall importance; for a complete arrangement of ſcience cannot, we believe, be formed. The greateſt objection to the categories ariſes from the uſe that was made of them by almoſt

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* Boeth. in Prædic. et Ariſt. Phyſic. lib. i.

23 And predicables

24 Are no inſtruments of ſcience.

almoſt every philoſopher of the Grecian ſchools; for thoſe ſages having reduced the objects of all human ſcience to ten general heads or general terms, inſtead of ſetting themſelves to inquire by a painful induction into the nature and properties of the real objects before them, employed their time in conceiving what could be predicated of *ſubſtance* in general, of this or that *quality*, *quantity*, *relation*, &c. in the abſtract; and they ſoon found, that of ſuch general conception as the *categories* there are but five *predicables* or claſſes of *predicates* in nature. The firſt claſs is that which the *predicate* is the *genus* of the *ſubject;* the ſecond that in which it is the *ſpecies* of the *ſubject;* the third, is when the *predicate* is the *ſpecific difference* of the *ſubject;* the fourth, when it is a *property* of the *ſubject;* and the fifth, when it is ſomething *accidental* to the *ſubject;* (ſee Logic, Part II. chap ii. and iii.) Having proceeded thus far in their ſyſtem, they had nothing to do with individuals but to arange them under their proper categories, which was commonly done in a very arbitrary manner; and then, with the formality of a ſyllogiſm, to predicate of each the predicable of the genus or ſpecies to which it belonged, But by this method of proceeding, it is obvious that no progreſs whatever could be made in phyſical, metaphyſical, or ethical ſcience; for if the individual truly belongs to the category under which it is arranged, we add nothing to our ſtock of knowledge by affirming or denying of it what we had before affirmed or denied of the whole genus: and if it belong not to the category under which we arrange it, our ſyllogiſing will only give the appearance of proof to what muſt, from the nature of things, be an abſolute falſehood. It is only by experiments made on various ſubſtances apparently of the ſame kind that they can be certainly known to belong to the ſame category; and when this is done, all ſyllogiſtic reaſoning from the genus to the ſpecies, and from the ſpecies to the individual, is but ſolemn trifling, as every propoſition in this retrograde courſe takes for granted the thing to be proved.

25 This philoſophy diſſeminated through the whole world.

Yet this mode of philoſophizing ſpread from Greece almoſt over the whole world. It was carried by Alexander into Aſia, by his ſucceſſors into Egypt; and it found its way to Rome after Greece became a province of the empire. It was adopted by the Jews, by the fathers of the Chriſtian church, by the Mohammedan Arabs during the caliphate, and continued to be cultivated by the ſchoolmen through all Europe, till its futility was expoſed by Lord Bacon (M). The profeſſors of this philoſophy often diſplayed great acuteneſs; but their ſyſtems were built on mere hypotheſes, and ſupported by ſyllogiſtic wrangling. Now and then indeed a ſuperior genius, ſuch as Alhazen and our countryman Roger Bacon, broke through the tramels of the ſchools, and, regardleſs of the authority of the Stagyrite and his *categories*, made real diſcoveries in phyſical ſcience by experiments judiciouſly conducted on individual ſubſtances (ſee Bacon (*Roger*); and Optics, n° 6.); but the ſcience in repute ſtill continued to be that of *Generals*.

It was indeed a combination of abſurd metaphyſics with more abſurd theology: and that which is properly called *phyſics*, had in Europe no place in a liberal education from the end of the eighth century to the end of the fourteenth. Towards the beginning of this period of darkneſs, the whole circle of inſtruction, or the liberal arts as they were called, conſiſted of two branches, the *trivium* and the *quadrivium;* of which the former comprehended *grammar*, *rhetoric*, and *dialectics;* the latter *muſic*, *arithmetic*, *geometry*, and *aſtronomy*, to which was added about the end of the eleventh century the ſtudy of a number of *metaphyſical ſubtleties* equally uſeleſs and unintelligible.

Hitherto the works of the ancient Greek philoſophers had been read only in imperfect Latin tranſlations; and before the ſcholaſtic ſyſtem was completely eſtabliſhed, Plato and Ariſtotle had been alternately looked up to as the oracle in ſcience. The rigid ſchoolmen, however univerſally gave the preference to the Stagyrite, becauſe his analyſis of body into matter and form is peculiarly calculated to keep in countenance the moſt incredible doctrine of the Romiſh church (ſee Transubstantiation): and upon the revival of Greek learning, this preference was continued after the ſchool philoſophy had begun to fall into contempt, on account of much uſeful information contained in ſome of his writings on ſubjects of natural hiſtory, and his ſuppoſed merit as a natural philoſopher. At laſt the intrepid ſpirit of Luther and his aſſociates ſet the minds of men free from the tyranny of ancient names, as well in human ſcience as in theology; and many philoſophers ſprung up in different countries of Europe, who profeſſed either to be *eclectics*, or to ſtudy nature, regardleſs of every authority but that of reaſon. Of theſe the moſt eminent beyond all compariſon was Francis Bacon Lord Verulam.

26 Expoſed as futile by Lord Bacon.

This illuſtrious man having read with attention the writings of the moſt celebrated ancients, and made himſelf maſter of the ſciences which were then cultivated, ſoon diſcovered the abſurdity of pretending to account for the phœnomena of nature by ſyllogiſtic reaſoning from hypothetical principles; and with a boldneſs becoming a genius of the firſt order, undertook to give a new chart of human knowledge. This he did in his two admirable works, intitled, 1. *De dignitate et augmentis ſcientiarum;* and, 2. *Novum organum Scientiarum;* ſive *Judicia vera de interpretatione Naturæ*. In the former of theſe works, he takes a very minute ſurvey of the whole circle of human ſcience, which he divides into three great branches, *hiſtory*, *poetry*, and *philoſophy*, correſponding to the three faculties of the mind, *memory*, *imagination*, and *reaſon*. Each of theſe general heads is ſubdivided into minuter branches, and reflections are made upon the whole, which, though we can neither copy nor abridge them, will amply reward

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(M) Scientiæ, quas habemus, fere a Græcis fluxerunt. Quæ enim ſcriptores Romani, aut Arabes, aut recentiores addiderunt, non multa, aut magni momenti ſunt: et qualiacunque ſint, fundata ſunt ſuper baſin eorum quæ inventa ſunt a Græcis. *Bacon*.

ward the peruſal of the attentive reader. The purpoſe of the *Novum Organum* is to point out the proper method of interpreting nature; which the author ſhows can never be done by the logic which was then in faſhion, but only by a painful and fair induction. "Homo naturæ miniſter (ſays he) et interpres tantum facit et intelligit, quantum de naturæ ordine re, vel mente obſervaverit; nec amplius ſcit aut poteſt. Syllogiſmus ad principia ſcientiarum non adhibetur, ad media axiomata fruſtra adhibetur, cum ſit ſubtilitati naturæ longe impar. Aſſenſum itaque conſtringit, non res. Syllogiſmus ex propoſitionibus conſtat, propoſitiones ex verbis, verba notionum teſſeræ ſunt. Itaque ſi notiones ipſæ (id quod baſis rei eſt) confuſæ ſint et temere a rebus abſtractæ, nihil in iis quæ ſuperſtruuntur, eſt firmitudinis. Itaque ſpes eſt una in *inductione vera*."

27 Who eſtabliſhes a better method of inquiry.

To hypotheſes and preconceived opinions, which he calls *idola theatri*, this great man was not leſs inimical than to ſyllogiſms; and ſince his days almoſt every philoſopher of eminence, except Deſcartes and his followers (ſee Descartes and Cartesians), has profeſſed to ſtudy nature according to the method of induction ſo accurately laid down in the *Novum Organum*. On this method a few improvements have perhaps been made; but notwithſtanding theſe, Lord Bacon muſt undoubtedly be conſidered as the author of that philoſophy which is now cultivated in Europe, and which will continue to be cultivated as long as men ſhall have more regard for matters of fact than for hypothetical opinions. Of this mode of philoſophizing we ſhall now give a ſhort, though we hope not inaccurate, view, by ſtating its objects, comparing it with that which it ſuperſeded, explaining its rules, and pointing out its uſes; and from this view it will appear, that its author ſhares with Ariſtotle the empire of ſcience.

28 View of his philoſophy.

The univerſe, that unbounded object of the contemplation, the curioſity and the reſearches of man, may be conſidered in two different points of view.

In the firſt place, it may be conſidered merely as a collection of exiſtences, related to each other by means of reſemblances and diſtinction, ſituation, ſucceſſion, and derivation, as making parts of a whole. In this view it is the ſubject of pure deſcription.

To acquire an acquaintance with, or a knowledge of, the univerſe in this point of view, we muſt enumerate all the beings in it, mention all their ſenſible qualities, and mark all theſe relations for each. But this would be labour immenſe; and when done, an undiſtinguiſhable chaos. A book containing every word of a language would only give us the materials, ſo to ſpeak, of this language. To make it comprehenſible, it muſt be put into ſome form, which will comprehend the whole in a ſmall compaſs, and enable the mind to paſs eaſily from one word to another related to it. Of all relations among words, the moſt obvious are thoſe of reſemblance and derivation. An etymological dictionary, therefore, in which words are claſſed in conſequence of their reſemblances, and arranged by means of their derivative diſtinctions, will greatly facilitate the acquiſition of the language.

Juſt ſo in nature: The objects around us may be grouped by means of their reſemblance, and then arranged in thoſe groups by means of their diſtinctions and other relations. In this claſſification we are enabled to proceed by means of our faculty of abſtracting our attention from the circumſtances in which things differ, and turning it to thoſe only in which they agree. By the judicious employment of this faculty we are able not only to diſtribute the individuals into claſſes, but alſo to diſtribute thoſe claſſes into others ſtill more comprehenſive, by diſcovering circumſtances of reſemblance among them: for the fewer the circumſtances are which concur to form that reſemblance which has engaged our attention, the greater is the number of diſſimilar circumſtances which are neglected; and the more extenſive will be the claſs of individuals in which the reſemblance is obſerved. Thus a number of individuals reſembling each other in the ſingle circumſtance of life, compoſes the moſt extenſive KINGDOM of ANIMALS. If it be required, that they ſhall further reſemble in the circumſtance of having feathers, a prodigious number of animals are excluded, and we form the inferior *claſs* of BIRDS. We exclude a great number of birds, by requiring a further ſimilarity of web feet, and have the *order* of ANSERES. If we add lingua citiata, we confine the attention to the *genus* of ANATES. In this manner may the whole objects of the univerſe be grouped, and arranged into kingdoms, claſſes, orders, genera, and ſpecies.

29 Natural hiſtory.

Such a claſſification and arrangement is called Natural History; and muſt be conſidered as the only foundation of any extenſive knowledge of nature. To the natural hiſtorian, therefore, the world is a collection of exiſtences, the ſubject of deſcriptive arrangement. His aim is threefold.

1. To obſerve with care, and to deſcribe with accuracy, the various objects of the univerſe.

2. To determine and enumerate all the great claſſes of objects; to diſtribute and arrange them into all their ſubordinate claſſes, through all degrees of ſubordination, till he arrive at what are only accidental varieties, which are ſuſceptible of no farther diſtribution; and to mark with preciſion the principles of this diſtribution and arrangement, and the characteriſtics of the various aſſemblages.

3. To determine with certainty the particular group to which any propoſed Individual belongs.

Description therefore, ARRANGEMENT, and REFERENCE, conſtitute the whole of his employment; and in this conſiſts all his ſcience.

30 Diſtinguiſhed from philoſophy.

Did the univerſe continue unchanged, this would conſtitute the whole of our knowledge of nature: but we are witneſſes of an uninterrupted ſucceſſion of changes, and our attention is continually called to the EVENTS which are inceſſantly happening around us. Theſe form a ſet of objects vaſtly more intereſting to us than the former; being the ſources of almoſt all the pleaſures or pains we receive from external objects.

We are therefore much intereſted in the ſtudy of the events which happen around us, and ſtrongly incited to proſecute it: but they are ſo numerous and ſo multifarious, that the ſtudy would be immenſe, without ſome contrivance for abbreviating and facilitating the taſk. The ſame help offers itſelf here as in the ſtudy of what may be called *quieſcent nature*. Events, like exiſtences, are ſuſceptible of claſſification, in conſequence of reſemblances and diſtinction; and by attention to theſe, we can acquire a very extenſive acquaintance with active nature. Our attention muſt be chiefly directed to thoſe circumſtances in which many events reſemble each other, while they differ perhaps in a thouſand others. Then we muſt attend to their moſt general diſtinctions; then to diſtinctions of ſmaller extent, and ſo on.

It is in this way accordingly that we have advanced in our knowledge of active nature, and are gradually, and by no means ſlowly forming aſſemblages of events more and more extenſive, and diſtributing theſe with greater and greater preciſion into their different claſſes.

31 Conſtancy in the changes of nature

In the zealous and attentive proſecution of this taſk a very remarkable, and intereſting obſervation occurs: In deſcribing thoſe circumſtances of ſimilarity among events, and particularly in diſtributing them according to thoſe ſimilarities, it is impoſſible for us to overlook that conſtancy which is obſerved in the changes of nature in the events which are the objects of our contemplation. Events which have once been obſerved to accompany each other are obſerved always to do ſo. The riſing of the ſun is always accompanied by the light of day, and his ſetting by the darkneſs of night. Sound argument is accompanied by conviction, impulſe by motion, kindneſs by a feeling of gratitude, and the perception of good by deſire. The unexcepted experience of mankind informs us, that the events of nature go on in certain regular trains; and if ſometimes exceptions ſeem to contradict this general affirmation, more attentive obſervation never fails to remove the exception. Moſt of the ſpontaneous events of nature are very complicated; and it frequently requires great attention and penetration to diſcover the ſimple event amidſt a croud of uneſſential circumſtances which are at once exhibited to our view. But when we ſucceed in this diſcovery, we never fail to acknowledge the perfect uniformity of the event to what has been formerly obſerved.

32 Univerſally expected.

But this is not all: We firmly *believe* that this uniformity will *ſtill continue;* that fire will melt wax, will burn paper, will harden clay, as we have formerly obſerved it to do; and whenever we have undoubted proof that the circumſtance of ſituation are preciſely the ſame as in ſome former caſe, though but once obſerved, we expect with irreſiſtible and unſhaken confidence that the event will alſo be the ſame.

It is not ſurely neceſſary to adduce many proofs of the univerſality of this law of human thought. The whole language and actions of men are inſtances of the fact. In all languages there is a mode of conſtruction which is uſed to expreſs this relation as diſtinct from all others, and the converſation of the moſt illiterate never confounds them, except when the conceptions themſelves are confounded. The general employment of the active and paſſive verb is regulated by it. *Turris everſa eſt a militibus; turris everſa eſt terræ motu*, expreſs two relations, and no ſchool-boy will confound them. The diſtinction therefore is perceived or felt by all who can ſpeak gramatically. Nor is any language without general terms to expreſs this relation. cauſe—effect—to occaſion. Nay, it is a fact in the mind of brutes, who hourly ſhow that they expect the ſame uſes of every ſubject which they formerly made of it; and without this, animals would be incapable of ſubſiſtence, and man incapable of all improvement. From this alone memory derives all its value; and even the conſtancy of natural operation would be uſeleſs if not matched or adapted to our purpoſes by this expectation of and confidence in that conſtancy.

After all the labours of ingenious men to diſcover the foundation of this irreſiſtible expectation, we muſt be contented with ſaying that ſuch is the conſtitution of the human mind. It is an *univerſal fact* in human thought, and for any thing that has been yet diſcovered, it is an *ultimate* fact, not included in any other ſtill more general. We ſhall ſoon ſee that this is ſufficient for making it the foundation of true human knowledge; all of which muſt in like manner be reduced to ultimate facts in human thought.

We muſt conſider this undoubted feeling, this perſuaſion of the conſtancy of nature, as an *inſtinctive* anticipation of events ſimilar to thoſe which we have already experienced. The general analogy of nature ſhould have diſpoſed philoſophers to acquieſce in this, however unwelcome to their vanity. In no inſtance of eſſential conſequence to our ſafety or well-being are we left to the guidance of our boaſted reaſon; God has given us the ſurer conduct of natural inſtincts. No caſe is ſo important as this: In none do we ſo much ſtand in need of a guide which ſhall be powerful, infallible, and rapid in its deciſions. Without it we muſt remain incapable of all inſtruction from experience, and therefore of all improvement.

Our ſenſations are undoubtedly feelings of our mind. But all thoſe feelings are accompanied by an inſtinctive reference of them to ſomething diſtinct from the feelings themſelves. Hence ariſes our preception of external objects, and our very notions of this externeity (pardon the term). In like manner, this anticipation of events, this irreſiſtible connection of the idea of fire with the idea of burning, is alſo a feeling of the mind: and this feeling is by a law of human nature referred, without reaſoning, to ſomething external as its cauſe; and like our ſenſation, it is conſidered as a *ſign* of that external ſomething. It is like the conviction of the truth of a mathematical propoſition. This is referred by us to ſomething exiſting in nature, to a neceſſary and external relation ſubſiſting between the ideas which are the ſubjects of the propoſition. The conviction is the ſign or indication of this relation by which it is brought to our view. In preciſely the ſame manner, the irreſiſtible connection of ideas is interpreted as the ſenſation or ſign of a *neceſſary connection* of external things or events. Theſe are ſuppoſed to include ſomething in their nature which renders them inſeparable companions. To this bond of connection between external things we give the name of CAUSATION. All our knowledge of this relation of cauſe and effect, is the knowledge or conſciouſneſs of what paſſes in our own minds during the contemplation of the phenomena of nature. If we adhere to this view of it, and put this branch of knowledge on the ſame footing with thoſe called the *abſtract ſciences*, conſidering only the *relations*, of ideas, we ſhall acquire *demonſtrative ſcience*. If we take any other view of the matter, we ſhall be led into inextricable mazes of uncertainty and error.

33 Our knowledge of cauſation.

We ſee then that the natural procedure of our faculty of abſtraction and arrangement, in order to acquire a more ſpeedy and comprehenſive knowledge of natural events, preſents them to our view in another form. We not only ſee them as *ſimilar* events, but as events naturally and neceſſarily *conjoined*. And the expreſſion of *reſemblance* among events is alſo an expreſſion of *concomitancy*; and this arrangement of events in conſequence of their reſemblance is in fact the *diſcovery* of thoſe accompaniments. The trains of natural appearance being conſidered as the appointments of the Author of Nature, has occaſioned them to be conſidered alſo as conſequences of *laws* impoſed on his works by their great author, and every thing is ſaid 34 Laws of nature explained. to be regulated by fixed laws. But this is the language of analogy. When a ſovereign determines on certain trains of conduct for his ſubjects, he iſſues his orders. Theſe orders are laws. He inforces the obſervance of them by his authority: and thus a certain regularity and conſtancy of conduct is produced. But ſhould a ſtranger, ignorant of the promulgation of theſe laws, and of the exerted authority of the magiſtrate, obſerve this uniformity of conduct, he would aſcribe it to the genius and diſpoſition of the people; and his obſervation would be as uſeful to him for directing the tenor of his own conduct, as the knowledge of the ſubject himſelf of the real ſource of this conſtancy is for directing his.

Juſt ſo in nature, while the theologian profeſſes from his diſcoveries concerning the exiſtence and ſuperintendance of God, to know that the conſtant accompaniment of events is the conſequence of laws which the great Author and Governor of the univerſe has impoſed on his works, the ordinary philoſopher, a ſtranger to this ſcene, and to the unſearchable operations of the SUPREME MIND, muſt aſcribe this conſtancy to the nature of the things. There is a great reſemblance between the expreſſion *natural law* and *grammatical rule*. Rule in ſtrict language implies command; but in grammar it expreſſes merely a generality of *fact*, whether of flexion or conſtruction. In like manner, a LAW OF NATURE is to the philoſopher nothing but the expreſſion of a generality of fact. A natural or phyſical law is a generally obſerved fact; and whenever we treat any ſubject as a generally obſerved fact, we treat it phyſically. It is a phyſical law of the underſtanding that argument is accompanied by conviction; it is a phyſical law of the affection that diſtreſs is accompanied by pity; it is a phyſical law of the material world that impulſe is accompanied by motion.

And thus we ſee that the arrangement of events, or the diſcovery of thoſe general points of reſemblance, is in fact the diſcovery of the laws of nature; and one of the greateſt and moſt important is, that the laws of nature are conſtant.

There is no queſtion that this view of the univerſe is incomparably more intereſting and important than that which is taken by the natural hiſtorian; contemplating every thing that is of value to us, and, in ſhort, the whole life and movement of the univerſe. 35 Object of philoſophy. This ſtudy, therefore, has been dignified with the name of PHILOSOPHY and of SCIENCE; and natural hiſtory has ben conſidered as of importance only in ſo far as it was conducive to the ſucceſsful proſecution of philoſophy.

But the philoſopher claims a ſuperiority on another account: he conſiders himſelf as employed in the diſcovery of cauſes, ſaying that philoſophy is the ſtudy of the objects of the univerſe, as related by cauſation, and that it is by the diſcovery of theſe relations that he communicates to the world ſuch important knowledge. Philoſophy, he ſays, is the ſcience of cauſes. The vulgar are contented to conſider the prior of two inſeparably conjoined events as the cauſe of the other; the ſtroke on a bell, for inſtance, as the cauſe of ſound. But it has been clearly ſhown by the philoſopher that between the blow on the bell and the ſenſation of ſound there are interpoſed a long train of events. The blow ſets the bell a trembling; this agitates the air in contact with the bell; this agitates the air immediately beyond it; and thus between the bell and the ear may be interpoſed a numberleſs ſeries of events, and as many 32 Called gravitation. more between the firſt impreſſion on the ear and that laſt impreſſion on the nerve by which the mind is affected. He can no longer therefore follow the nomenclature of the vulgar. Which of the events of this train therefore is the cauſe of the ſenſation? None of them: It is that *ſomething* which inſeparably connects any two of them, and conſtitutes their bond of union. Theſe bonds of union or cauſes he conſiders as reſiding in one or both of the connected objects; diverſities in this reſpect muſt therefore conſtitute the moſt important diſtinctions between them. They are therefore with great propriety called the *qualities*, the *properties*, of theſe reſpective ſubjects.

As the events from which we infer the exiſtence of theſe qualities of things reſemble in many reſpects ſuch events as are the conſequences of the exertion of our own powers, theſe qualities are frequently denominated POWERS, forces, energies. Thus, in the inſtance juſt now given of the ſound of a bell, we infer the powers of impulſe, elaſticity, nervous irritability, and animal ſenſibility.

In conſequence of this inference of a neceſſary connection between the objects around us, we not only infer the poſterior event from the prior, or, in common language, the effect from the cauſe, but we alſo infer the prior from the poſterior, the cauſe from the effect. We not only expect that the preſence of a magnet will be followed by certain motions in iron-filings, but when we obſerve ſuch motions, we infer the preſence and agency of a magnet. Joy is inferred from merriment, 37 Inferred from effects. poiſon from death, fire from ſmoke, and impulſe from motion. And thus the appearances of the univerſe are the indications of the powers of the objects in it. Appearances are the language of nature, informing us of their cauſes. And as all our knowledge of the ſentiments of others is derived from our confidence in their veracity; ſo all our knowledge of nature is derived from our confidence in the conſtancy of natural operations. A veracity and credulity neceſſarily reſulting from that law of our mental conſtitution by which we are capable of ſpeech, conduct us in the one caſe; and the conſtancy of nature, and and the principle of induction, by which we infer general laws from particular facts, conduct us in the other. As human ſentiment is inferred from language, and the exiſtence of external things from ſenſation; ſo are the laws of nature, and the powers of natural objects inferred from the phenomena. It is by the ſucceſsful ſtudy of this language of nature that we derive uſeful knowledge. The knowledge of the influence of motives on the mind of man enables the ſtateſman to govern kingdoms, and the knowledge of the powers of magnetiſm enables the mariner to pilot a ſhip through the pathleſs ocean.

38 Diſcoveries of Ariſtotle and Newton compared.

Such are the lofty pretenſions of philoſophy. It is to be wiſhed that they be well founded; for we may be perſuaded that a miſtake in this particular will be fatal to the advancement of knowledge. An author of great reputation * gives us an opportunity of deciding this queſtion in the way of experiment. He ſays that the ancients were philoſophers, employed in the diſcovery of cauſes, and that the moderns are only natural hiſtorians, contenting themſelves with obſerving the laws of nature, but paying no attention to the cauſes of things. If he ſpeaks of their *profeſſed* aim, we apprehend that the aſſertion is pretty juſt in general. With very few exceptions indeed it may be affirmed of his favourite Ariſtotle, the philoſopher κατ' ’εξοχην, and of Sir Iſaac Newton. We ſelect theſe two inſtances, both becauſe they are ſet in continual oppoſition by this author, and becauſe it will be allowed that they were the moſt eminent ſtudents of nature (for we muſt not yet call them philoſophers) in ancient and modern times. Ariſtotle's profeſſed aim, in his moſt celebrated writings, is the inveſtigation of cauſes; and in the opinion of this author, he has been ſo ſucceſsful that he has hardly left any employment for his ſucceſſors beſide that of commenting upon his works. We muſt on the other hand acknowledge that Newton makes no ſuch pretenſions, at leaſt in that work which has immortaliſed his name, and that his profeſſed aim is merely to inveſtigate the *general* laws of the planetary motions, and to apply theſe to the explanation of particular phenomena. Nor will we ſay that he has left no employment for ſucceding inquirers; but, on the contrary, confeſs that he has only begun the ſtudy, has diſcovered but one law, and has enabled us to explain only the phenomena comprehended in it alone. But he has not been unſucceſsful; his inveſtigation has been complete; and he has diſcovered beyond all poſſibility of contradiction a *fact* which is obſerved through the whole extent of the ſolar ſyſtem; namely, that every body, nay that every particle in it, is continually DEFLECTED toward every other body; and that this deflection is, in every inſtance, proportional to the quantity of matter in that body toward which the deflection is directed, and to the reciprocal of the ſquare of the diſtance from it. He has therefore diſcovered a phyſical law of immenſe extent. Nor has he been leſs ſucceſsful in the explanation of particular phenomena. Of this there cannot be given a better inſtance than the explanation of the lunar motions from the theory of gravity begun by Newton "Matheſi ſua facem præferente;" and now brought to ſuch a degree of perfection, that if the moon's place be computed from it for any moment within the period of two thouſand years back, it will not be found to differ from the place on which ſhe was actually obſerved by one hundreth part of her own breadth.

Diſcimus hinc tandem qua cauſa argentea Phœbe
Paſſibus haud æquis eat, et cur, ſubdita nulli
Hactenus aſtronomo, numerorum fræna recuſat.
Quæ toties animos veterum torſere ſophorum,
Quæque ſcholas hodie rauco certamine vexant,
Obvia conſpicimus, nube pellente matheſi;
Qua ſuperos penetrare domos, et ardua cœli
Newtoni auſpiciis jam dat contingere templa.

We may now deſire the champions of the ſcience of cauſes to name any one cauſe which has really been diſcovered by their great maſter, whether in the operations of mind or of body. But they muſt not on this occaſion adduce the inveſtigation of any natural law in which he has ſometimes ſucceeded. With ſtill greater confidence may we challenge them to produce any remarkable inſtance of the explanation of natural phenomena either of mind or body. By explanation, we mean an account of the production, and an appreciation of all the circumſtances, ſuſceptible of a ſcrupulous compariſon with fact, and perfectly conſiſtent with it. It is here that the weakneſs of this philoſopher's pretenſions is moſt conſpicuous; and his followers candidly acknowledge, that in the enquiries which proceed by experiment, we have not derived great aſſiſtance from Ariſtotle's philoſophy. But this, ſay they, does not derogate from the pre-eminence of his philoſophy, becauſe he has ſhown that the *particular* fields of obſervation are to be cultivated only by means of experiment. But ſurely every field of *obſervation* is particular. There is no *abſtract* object of philoſophical reſearch, the ſtudy of which ſhall terminate in the philoſophy of univerſals. In every kind of inquiry, that cauſe alone muſt be ſuppoſed to act which we underſtand ſo far as to be able to appreciate its effects in particular circumſtances, and compare them with fact, and ſee their perfect coincidence. If we have diſcovered cauſes, they are *known* as far as they are diſcovered. Their genuine effects are known, and therefore the phenomena which reſult from their agency are underſtood. When therefore it is acknowledged, as it muſt be acknowledged, that mankind have made but little advances in the knowledge of nature, notwithſtanding the pretended diſcovery of cauſes by Ariſtotle, and the conducting clue of his philoſophy, till of late years; and when it is alſo allowed that *now*, while we are every day making great additions to this ſubordinate knowledge, the cauſes which Ariſtotle has diſcovered are forgotten, and his philoſophy is neglected; there is great room for ſuſpecting (to ſay the leaſt), that either the cauſes which philoſophy pretends to have diſcovered are not real, or that Ariſtotle and his followers have not aimed at the diſcovery of cauſes, but only at the diſcovery of natural laws, and have failed in the attempt.

39 Philoſophical cauſes diſcovered only

There ſeems here to be a previous queſtion: *Is it poſſible to diſcover a philoſophical cauſe*, that ſomething which is neither the prior nor the poſterior of the two *immediately* adjoining events, but their bond of union, and this diſtinct from the union itſelf? It is evident that this is an enquiry purely experimental. It is of *human knowledge* we ſpeak. This muſt depend on the nature of the human mind. This is a matter of contingency, known to us only by experiment and obſervation. By obſerving all the feelings and operations of the mind, and claſſing and arranging them like any other object of ſcience, we diſcover the general laws of human thought and human reaſoning; and this is all the knowledge we can ever acquire of it, or of any thing elſe.

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* Ancient Metaphyſics.

Much has been written on this ſubject. The moſt acute obſervation and ſound judgment have been employed in the ſtudy; and we may venture to ſay, that conſiderable progreſs has been made in pneumatology. Many laws of human thought have been obſerved, and very diſtinctly marked; and philoſophers are buſily employed, ſome of them with conſiderable ſucceſs, in the diſtribution of them into ſubordinate claſſes, ſo as to know their comparative extent, and to mark their diſtinguiſhing characters with a preciſion ſimilar to what has been attained in botany and other parts of natural hiſtory; ſo that we may hope that this ſtudy will advance like others. But in all theſe reſearches, no phenomena have occurred which look like the perception or contemplation of theſe ſeparate objects of thought, theſe philoſophical cauſes, this POWER in abſtracto. No philoſopher has ever pretended to ſtate ſuch an object of the mind's obſervation, or attempted to group them into claſſes.

40
In the events.

We may ſay at once, without entering into any detail, that thoſe cauſes, thoſe bonds of neceſſary union between the naturally conjoined events or objects, are not only perceived *by means* of the events alone, but are perceived ſolely *in* the events, and cannot be diſtinguiſhed from the conjunctions themſelves. They are neither the objects of ſeparate obſervation, nor the productions of memory, nor inferences drawn from reflection on the laws by which the operations of our own minds are regulated; nor can they be derived from other perceptions in the way of argumentative inference. We cannot infer the paroxyſm of terror from the appearance of impending deſtruction, nor the fall of a ſtone when not ſupported, as we infer the incommenſurability of the diagonal and ſide of a ſquare. This laſt is *implied* in the very conception or notion of a ſquare; not as a conſequence of its other properties, but as one of its eſſential attributes: and the contrary propoſition is not only falſe, but incapable of being diſtinctly conceived. This is not the caſe with the other phenomenon, or any matter of fact. The proofs which are brought of a mathematical propoſition, are not the reaſon of its being true, but the ſteps by which this truth is brought into our view; and frequently, as in the inſtance now given, this truth is perceived, not directly, but conſequentially, by the inconceivableneſs of the contrary propoſition.

41
Mr Hume's theory a petitio principii.

Mr Hume derives this irreſiſtible expectation of events from the known effect of cuſtom, the aſſociation of ideas. The corelated event is brought into the mind by this well known power of cuſtom, with that vivacity of conception which conſtitutes belief or expectation. But without inſiſting on the futility of his theory of belief, it is ſufficient to obſerve, that this explanation begs the very thing to be proved, when it aſcribes to cuſtom a *power* of any kind. It is the origin of this very power which is the ſubject in diſpute. Beſides, on the genuine principles of ſcepticiſm, this cuſtom involves an acknowledgment of paſt events, of a ſomething different from preſent impreſſions, which, in this doctrine (if doctrine it can be called), are the only certain exiſtences in nature: and, laſtly, it is known that *one* clear experience is a ſufficient foundation for this unſhaken confidence and anticipation. General cuſtom can never, on Mr Hume's principles, give ſuperior vivacity to any particular idea.

42
Another hypotheſis reſpecting cauſal connection.

This certain nonentity of it as a ſeparate object of obſervation, and this impoſſibility to derive this notion of neceſſary and cauſal connection between the events of the univerſe from any ſource, have induced two of the moſt acute philoſophers of Europe, Mr Leibnitz and Father Malebranche, to deny that there is any ſuch connection, and to aſſert that the events of the univerſe go on in correſponding trains, but without any cauſal connection, juſt as a well-regulated clock will keep time with the motions of the heavens without any kind of dependence on them. This harmony of events was pre-eſtabliſhed by the Author of the Univerſe, in ſubſerviency to the purpoſes he had in view in its formation.

All thoſe purpoſes which are cogniſable by us, may certainly be accompliſhed by this perfect adjuſtment. But without inſiſting on the fantaſtic wildneſs of this ingenious whim, it is quite enough to obſerve, that it alſo is a begging of the queſtion, becauſe it ſuppoſes cauſation when it aſcribes all to the agency of the Deity.

Thus we have ſearched every quarter, without being able to find a ſource from which to derive this perception of a neceſſary connection among the events of the univerſe, or of this confident expectation of the continuance of phyſical laws; and yet we are certain of the feeling, and of the perſuaſion, be its origin what it may: for we ſpeak intelligibly on this ſubject; we ſpeak familiarly of cauſe, effect, power, energy, neceſſary connection, motives and their influence, argument and conviction, reaſons and perſuaſion, allurements and emotions, of gravity, magnetiſm, irritability, &c.; and we carry on converſations on theſe ſubjects with much entertainment and ſeeming inſtruction. Language is the expreſſion of thought, and every word expreſſes ſome notion or conception of the mind; therefore it muſt be allowed, that we have ſuch notions as are expreſſed by cauſe, power, energy. But it is here, as in many caſes, we perceive a diſtinction without being able to expreſs it by a definition; and that we do perceive the relation of cauſation as diſtinct from all others, and in particular as diſtinct from the relation of contiguity in time and place; or the relation of agent, action, and patient, muſt be concluded from the uniformity of language, which never confounds them except on purpoſe, and when it is perceived. But even here we ſhall find, that none of the terms uſed for expreſſing thoſe powers of ſubſtance which are conceived as the cauſes of their characteriſtic phenomena, really expreſs any thing different from the phenomena themſelves. Let any perſon try to define the terms gravity, elaſticity, ſenſibility, and the like, and he will find that the definition is nothing but a deſcription of the phenomenon itſelf. The words are all derivatives, moſt of them verbal derivatives, implying action, gravitation, &c. As the general reſemblances in ſhape, colour, &c. are expreſſed by the natural hiſtorian by generic terms, ſo the general reſemblances in event are expreſſed by the philoſopher in generic propoſitions, which, in the progreſs of cultivation, are alſo abbreviated into generic terms.

This abundantly explains the conſiſtency of our language on this ſubject, both with itſelf and with

43 The perception of this connection a firſt principle.

the operations of nature, without however affording any argument for the truth of the aſſumption, that cauſes are the objects of philoſophic reſearch as ſeparate exiſtences; or that this ſuppoſed neceſſary connection is a *neceſſary truth*, whether ſupreme or ſubordinate. But ſince the perception of it has its foundation in the conſtitution of the human mind, it ſeems intitled to the name of a *firſt principle*. We are hardly allowed to doubt of this, when we conſider the importance of it, and the care of nature to ſecure us in all things eſſential to our ſafety and well-being, from all danger, from inattention, ignorance, or indolence, by an inſtinct infallible in its information, and inſtantaneous in its deciſions. "It would not be like her uſual care (ſays Hume), if this operation of the mind, by which we infer like effects from like cauſes, and *vice verſa*, were entruſted to the fallacious deduction of our reaſon, which is ſlow in its operations, appears not in any degree during the firſt years of infancy, and in every age and period of human life is extremely liable to error. It is more conformable to her *ordinary caution* (mark the acknowledgment) to ſecure ſo neceſſary an act of the mind by ſome inſtinct, or blind tendency, which may be infallible and rapid in all its operations, may diſcover itſelf at the firſt appearance of life, and may be independent of all the laboured deductions of reaſon. As ſhe has taught us the uſe of our limbs, without giving us any knowledge of the nerves and muſcles by which they are actuated; ſo ſhe has implanted in us an inſtinct, which carries forward the thought in a courſe conformable to that eſtabliſhed among external objects, though we be ignorant of the powers and forces on which this regularity depends."

Such a knowledge is quite unneceſſary, and therefore cauſes are no more cognoſcible by our intellectual powers than colours by a man born blind: nay, whoever will be at the pains to conſider this matter agreeably to the received rules and maxims of logic, will find that neceſſary connection, or the bond of cauſation, can no more be the ſubject of philoſophical diſcuſſion by man, than the ultimate nature of truth. It is preciſely the ſame abſurdity or incongruity, as to propoſe to examine light with a microſcope. Other rational creatures may perceive them as eaſily as we hear ſounds. All that we can ſay is, that their exiſtence is probable, but by no means certain. Nay, it may be (and we may never know it) that we are not the efficient cauſes of our own actions, which may be effected by the Deity or by miniſtering ſpirits; and this may even be true in the material world. But all this is indifferent to the real occupation of the philoſopher, and does not affect either the certainty, the extent, or the utility of the knowlege which he may acquire.

44 The object of the philoſopher the diſcovery of phyſical laws.

We are now able to appreciate the high pretenſions of the philoſopher, and his claim to ſcientific ſuperiority. We now ſee that this can neither be founded on any ſcientific ſuperiority of his object, nor of his employment. His object is not cauſes; and his diſcoveries are nothing but the diſcovery of general facts, the diſcovery of phyſical laws: and his employment is the ſame with that of the deſcriptive hiſtorian. He obſerves and deſcribes with care and accuracy the events of nature; and then he groups them into claſſes, in conſequence of reſembling circumſtances, detected in the midſt of many others which are diſſimilar and occaſional. By gradually throwing out more circumſtances of reſemblance, he renders his claſſes more extenſive; and, by carefully marking thoſe circumſtances in which the reſemblance is obſerved, he characteriſes all the different claſſes; and, by a compariſon of theſe with each other, in reſpect to the number of reſembling circumſtances, he diſtributes his claſſes according to their generality and ſubordination; thus exhauſting the whole aſſemblage, and leaving nothing unarranged but accidental varieties. In this procedure it is to be remarked, that every grouping of ſimilar events is, *ipſo facto*, diſcovering a general fact, a phyſical law; and the expreſſion of this aſſemblage is the expreſſion of the phyſical law. And as every obſervation of this conſtancy of fact affords an opportunity for exerting the inſtinctive inference of natural connection between the related ſubjects, every ſuch obſervation is the diſcovery of a power, property, or quality, of natural ſubſtance. And from what has been ſaid, this obſervation of event is all we know of the connection, all we know of the natural power. And when the philoſopher proceeds farther to the arrangement of events, according to their various degrees of complication, he is, *ipſo facto*, making an arrangement of all natural powers according to their various degrees of ſubordinate influence. And thus his occupation is perfectly ſimilar to that of the deſcriptive hiſtorian, claſſification and arrangement; and this conſtitutes all the ſcience attainable by both.

45 Philoſophy defined.

PHILOSOPHY may therefore be defined, the ſtudy of the phenomena of the univerſe, with a view to diſcover the general laws which indicate the powers of natural ſubſtances, to explain ſubordinate phenomena, and to improve art: Or, in compliance with that natural inſtinct ſo much ſpoken of, Philoſophy is the ſtudy of the phenomena of the univerſe, with a view to diſcover their cauſes, to explain ſubordinate phenomena, and to improve art.

The taſk is undoubtedly difficult, and will exerciſe our nobleſt powers. The employment is manly in itſelf, and the reſult of it important. It therefore juſtly merits the appellation of *philoſophy*, although its objects are nowiſe different from what occupies the attention of other men.

46 The employment of the philoſopher.

The employment of the philoſopher, like that of the natural hiſtorian, is threefold; DESCRIPTION, ARRANGEMENT, and REFERENCE; while the objects are not *things* but *events*.

The deſcription when employed about events, may be more properly termed *hiſtory*. A philoſophical hiſtory of nature conſiſts in a complete or copious enumeration and narration of facts, properly ſelected, cleared of all unneceſſary or extraneous circumſtances, and accurately narrated. This conſtitutes the materials of philoſophy. We cannot give a better example of this branch of philoſophical occupation than aſtronomy.

From the beginning of the Alexandrian ſchool to this day, aſtronomers have been at immenſe pains in obſerving the heavenly bodies, in order to detect their true motions. This has been a work of prodigious difficulty: for the appearances are ſuch as might have been exhibited although the real motions had been extremely different. Not that our ſenſes give us falſe information; but we form haſty, and frequently falſe judgments, from theſe informations; and call thoſe things deceptions of ſenſe, which are in fact errors of judgment. But the true motions have at laſt been diſcovered, and have been deſcribed with ſuch accuracy, that the hiſtory may be conſidered as nearly complete. This is to be found in the uſual ſyſtems of aſtronomy, where the tables contain a moſt accurate and ſynoptical account of the motion; ſo that we can tell with preciſion in what point of the heavens a planet *has been* ſeen at any inſtant that can be named.

47 Phenomenology.

Sir Iſaac Newton's Optics is ſuch another perfect model of philoſophical hiſtory, as far as it goes. This part of philoſophy may be called PHENOMENOLOGY.

48 Inveſtigation.

Having in this manner obtained the materials of philoſophical deſcription, we muſt put them into a compendious and perſpicuous form, ſo that a general knowledge of the univerſe may be eaſily acquired and firmly retained. This is to be done by claſſification and arrangement, and this claſſification muſt proceed on reſemblances *obſerved* in the events; and the ſubſequent arrangement muſt be regulated by the diſtinctions of which thoſe reſemblances are ſtill ſuſceptible. This aſſemblage of events into groups muſt be expreſſed. They are facts; therefore the expreſſion muſt be propoſitions. Theſe propoſitions muſt be what the logicians call *general* or *abſtract propoſitions*; for they expreſs, not any individual fact of the aſſemblage, but that circumſtance in which they all reſemble. Such propoſitions are the following: Proof is accompanied by belief; kindneſs is accompanied by gratitude; impulſe is accompanied by motion. Theſe are uſually called *general facts*; but there are none ſuch; every fact is individual. This language, however inaccurate, is very ſafe from miſconſtruction, and we may uſe it without ſcruple. Theſe propoſitions are NATURAL OR PHYSICAL LAWS; and then the detecting and marking thoſe reſemblances in event, is the inveſtigation of phyſical laws and we may denominate this employment of the philoſopher INVESTIGATION.

In the proſecution of this taſk, it will be found that the ſimilarities of fact are of various extent; and thus we ſhall form phyſical laws of various extent; and we ſhall alſo find that ſome are ſubordinate to others; for the reſemblance of a number of facts in one circumſtance does not hinder a part of them from alſo reſembling in another circumſtance: and thus we ſhall find ſubordinations of fact in the ſame way as of quieſcent qualities. And it is found here, as in natural hiſtory, that our aſſemblage of reſembling events will be the more extenſive as the number of reſembling circumſtances is ſmaller; and thus we ſhall have kingdoms, claſſes, orders, genera, and ſpecies of phenomena, which are expreſſed by phyſical laws of all thoſe different ranks.

It has been already obſerved, that this obſervation of phyſical laws is always accompanied by a reference of that uniformity of event to a natural bond of union between the concomitant facts which is conceived by us as the *cauſe* of this concomitancy; and therefore this procedure of the philoſopher is conſidered as the diſcovery of thoſe cauſes, that is the diſcovery of thoſe powers of natural ſubſtances which conſtitute their phyſical relations, and may juſtly be called their diſtinguiſhing *qualities* or *properties*. This view of the matter gives riſe to a new nomenclature and language. We give to thoſe powers generic names, ſuch as *ſenſibility*, *intelligence*, *irritability*, *gravity*, *elaſticity*, *fluidity*, *magnetiſm*, &c. Theſe terms without exception, mark reſembling circumſtances of event; and no other definition can be given of them but a deſcription of theſe circumſtances. In a few caſes which have been the ſubjects of more painful or refined diſcuſſion, we have proceeded farther in this abbreviation of language.

49 Aitiology.

We have framed the verb "to gravitate," and the verbal noun "gravitation," which purely expreſſes the fact, the phenomenon; but is conceived to expreſs the *operation* or energy of the cauſe or natural power. It is of importance to keep in mind this metaphyſical remark on theſe terms; for a want of attention to the pure meaning of the words has frequently occaſioned very great miſtakes in philoſophical ſcience.

We may with propriety call this part of the philoſopher's employment AITIOLOGY.

We ſhall give an inſtance of its moſt ſucceſsful application to the claſs of events already adduced as an example of philoſophic hiſtory or phenomenology.

50 Kepler's laws an inſtance.

Kepler, a celebrated Pruſſian aſtronomer, having maturely conſidered the phenomena recorded in the tables and obſervations of his predeceſſors, diſcovered, amidſt all the varieties of the planetary motions, three circumſtances of reſemblance, which are now known by the name of *Kepler's laws*.

1. All the planets deſcribe ellipſes, having the ſun in one focus.

2. The elliptic areas deſcribed by a planet in the different parts of its orbit, are proportional to the times of deſcription.

3. The ſquares of the periodic times are proportional to the cubes of the mean diſtances from the ſun.

By this obſervation or diſcovery, the ſtudy of the planetary motions was greatly promoted, and the calculation of their appearances was now made with a facility and an accuracy which ſurpaſſed all hopes: for the calculation of the place of a planet at any propoſed inſtant was reduced to the geometrical problem of cutting off an area from an ellipſe of known dimenſions, which ſhould bear the ſame proportion to the whole area, as the time for whoſe duration the motion is required, has to the known time of a complete revolution.

51 Comprehended under one more general law.

Long after this diſcovery of Kepler, Sir Iſaac Newton found that theſe laws of Kepler were only particular caſes of a fact or law ſtill more general. He found that the deflections of the planets from uniform rectilineal motion were all directed to the ſun; and that the ſimultaneous deflections were inverſely proportional to the ſquares of the diſtances from him.

Thus was eſtabliſhed a phyſical law of vaſt extent; but further obſervation ſhowed him that the motion of every body of the ſolar ſyſtem was compounded of an original motion of projection, combined with a deflection towards every other body; and that the ſimultaneous deflections were proportional to the quantity of matter in the body towards which they were directed, and to the reciprocal of the ſquare of the diſtance from it. Thus was the law made ſtill more general. He did not ſtop here. He compared the deflection of the moon in her orbit with the ſimultaneous deflection of a ſtone thrown from the hand, and deſcribing a parabola; and he found that they followed the ſame law, that is, that the deflection of the moon in a ſecond, was to that of the ſtone in the ſame time, as the ſquare of the ſtone's diſtance from the centre of the earth, to the ſquare of the moon's diſtance from it. Hence he concluded, that the deflection of a ſtone from a ſtraight line was juſt a particular inſtance of the deflections which took place through the whole ſolar ſyſtem.

52 called gravitation.

The deflection of a ſtone is one of the indications it gives of its being *gravis* or heavy; whence he calls it *gravitation*. He therefore expreſſes the phyſical law which obtains through the whole ſolar ſyſtem, by ſaying that "every body *gravitates* to every other body; and the gravitations are proportional to the quantity of matter in that other body, and inverſely proportional to the ſquare of the diſtance from it."

Thus we ſee how the arrangement of the celeſtial phenomena terminated in the diſcovery of phyſical laws; and that the expreſſion of this arrangement is the law itſelf.

Since the fall of a heavy body is one inſtance of the phyſical law, and ſince this fall is conſidered by all as the effect of its *weight*, and this weight is conſidered as the cauſe of the fall, the ſame cauſe is aſſigned for all the deflections obſerved in the ſolar ſyſtem; and all the matter in it is found to be under the influence of this cauſe, or to be heavy; and thus his doctrine has been denominated the *ſyſtem of univerſal gravitation*.

Philoſophers have gone farther, and have ſuppoſed that gravity is a power, property, or quality, reſiding in all the bodies of the ſolar ſyſtem. Sir Iſaac Newton does not expreſsly ſay ſo, at leaſt in that work where he gives an account of theſe diſcoveries. He contents himſelf with the immediate conſequence of the firſt axiom in natural philoſophy, viz. that every body remains in a ſtate of reſt, or of uniform rectilineal motion, unleſs affected by ſome moving force. Since the bodies of the ſolar ſyſtem are neither in a ſtate of reſt, nor of uniform rectilineal motion, they muſt be conſidered as ſo affected; that is, that there operates on every one of them a moving force, directed towards all the others, and having the proportions obſerved in the deflection.

53 Attempts to include this law under impulſe,

Other philoſophers have endeavoured to ſhow, that this general fact, detected by Sir Iſaac Newton, is included in another ſtill more general, viz. that every body moves which is impelled by another body in motion. They aſſert, that all the bodies of the ſolar ſyſtem are continually impelled by a fluid which they call *ether*, which is moving in all places, and in all directions, or in circular vortices, and hurries along with it the planets and all heavy bodies. It would ſeem that the familiarity of motion produced by impulſe, at leaſt in thoſe inſtances in which our own exertions are moſt employed, has induced philoſophers to adopt ſuch notions; perhaps, too, they are influenced by an obſcure and indiſtinct notion affixed to the term action, as applied to changes in the material world, and which has given riſe to an axiom, "that a body cannot act at a diſtance, or where it is not;" and thus have thought themſelves obliged to look out for an immediate and contiguous agent in all thoſe phenomena.

54 Whilſt impulſe itſelf is never obſerved,

But the philoſophers who profeſs to be moſt ſcrupulous in their adherence to the rules of philoſophic diſcuſſion, deny the legitimacy of this pretended inveſtigation of cauſes, ſaying that this doctrine is in direct oppoſition to the procedure of the mind in acquiring the knowledge of cauſes. Since the *fact* of impulſe is not readily *obſerved* in the celeſtial deflections, nor in the motions of heavy bodies, the law cannot be *inferred*. They ſay that it is not even neceſſary to ſhow that the phenomena of the celeſtial motions are unlike the phenomena of impulſe, although this can be done in the completeſt manner. It is enough that neither the fluid nor the impulſe are obſerved; and therefore they are in the right when they aſſert, there is inherent in, or accompanies all the bodies of the ſyſtem, a power by which they deflect to one another. (See OPTICS, n° 66, 67.

The debate is foreign to our preſent purpoſe, which is only to ſhow how the obſervation and arrangement of phenomena terminates in the diſcovery of their cauſes, or the diſcovery of the powers or properties of natural ſubſtances.

This is a taſk of great difficulty, as it is of great importance. There are two chief cauſes of this difficulty.

55 Cauſes of the difficulty of philoſophical inveſtigation.

1. In moſt of the ſpontaneous phenomena of nature there is a complication of many events, and ſome of them eſcape our obſervation. Attending only to the moſt obvious or remarkable, we conjoin theſe only in our imagination, and are apt to think theſe the concomitant events in nature, the proper indication of the cauſe, and the ſubjects of this philoſophical relation, and to ſuppoſe that they are always conjoined by nature. Thus it was thought that there reſided in a vibrating chord a power by which the ſenſation of ſound was excited, or that a chord had a ſounding quality. But late-obſervations have ſhown clearly that there is an inconceivable number of events interpoſed between the vibration of the chord and the ſenſitive affection of our ear; and therefore, that ſound is not the effect of the vibration of the chord, but of the very laſt event of this ſeries; and this is completely demonſtrated by ſhowing that the vibration and the ſound are *not neceſſarily* connected, becauſe they are not *always* connected, but require the interpoſition of air or of ſome other elaſtic body.

Theſe obſervations ſhow the neceſſity of the moſt accurate and minute obſervation of the phenomena, that none of thoſe intermediate events may eſcape us, and we be thus expoſed to the chance of imaginary connections between events which are really far aſunder in the procedure of nature. As the ſtudy has improved, miſtakes of this kind have been corrected; and philoſophers are careful to make their trains of events under one name as ſhort as poſſible. Thus, in medicine, a drug is no longer conſidered as a *ſpecific* remedy for the diſeaſe which is ſometimes cured when it has been uſed, but is denominated by its moſt immediate operation on the animal frame: it is no longer called a *febrifuge*, but a *ſudorific*.

2. When

56 Means of inſuring ſucceſs.

2. When any natural powers combine their influence in a ſpontaneous phenomenon of nature, it is frequently very difficult to diſcover what part of the complicated effect is the effect of each; and to ſtate thoſe circumſtances of ſimilarity which are the foundation of a phyſical law, or intitle us to infer the agency of any natural power. The moſt likely method for inſuring ſucceſs in ſuch caſes is to get rid of this complication of event, by putting the ſubject into ſuch a ſituation that the operation of all the known powers of nature ſhall be ſuſpended, or ſo modified as we may perfectly underſtand *their* effects. We can thus appreciate the effects of ſuch as we could neither modify nor ſuſpend, or we can diſcover the exiſtence of a new law, the operation of a new power.

This is called *making an experiment;* and is, of all, the moſt effectual way of advancing in the knowledge of nature, and has been called EXPERIMENTAL PHILOSOPHY.

57 A ſeeming anomaly explained.

It ſeems, however, at firſt ſight, in direct oppoſition to the procedure of nature in forming general laws. Theſe are formed by induction from multitudes of individual facts, and muſt be affirmed to no greater extent than the induction on which they are founded. Yet it is a matter of fact, a phyſical law of human thought, that one ſimple, clear, and unequivocal experiment, gives us the moſt complete confidence in the truth of a general concluſion from it to every ſimilar caſe. Whence this anomaly? It is not an anomaly or contradiction of the general maxim of philoſophical inveſtigation, but the moſt refined application of it. There is no law more general than this, that "Nature is conſtant in all her operations." The judicious and ſimple form of our experiment inſures us (we imagine) in the complete knowledge of all the circumſtances of the event. Upon this ſuppoſition, and this alone, we conſider the experiment as the faithful repreſentative of every poſſible caſe of the conjunction. This will be more minutely conſidered afterwards.

58 Theory or explanation of ſubordinate phenomena.

The laſt branch of philoſophic occupation is the explanation of ſubordinate phenomena. This is nothing more than the referring any particular phenomenon to that claſs in which it is included; or, in the language of philoſophy, it is the pointing out the general law, or that general fact of which the phenomenon is a particular inſtance. Thus the feeling of the obligations of virtue is thought to be explained, when it is ſhown to be a particular caſe of that regard which every perſon has for his deareſt intereſts. The riſe of water in pumps is explained, when we ſhow it to be a particular caſe of the preſſure of fluids, or of the air. The general law under which we ſhow it to be properly arranged is called the PRINCIPLE of the explanation, and the explanation itſelf is called the THEORY of the phenomenon. Thus Euler's explanation of the lunar irregularities is called a theory of the lunar motions on the principle of gravitation.

This may be done either in order to advance our own knowledge of nature, or to communicate it to others. If done with the firſt view, we muſt examine the phenomenon minutely, and endeavour to detect every circumſtance in it, and thus diſcover all the known laws of nature which concur in its production; we then appreciate the operation of each according to the circumſtances of its exertion; we then combine all theſe, and compare the reſult with the phenomenon. If they are ſimilar, we have explained the phenomenon. We cannot give a better example than Franklin's explanation of the phenomena of thunder and lightning. See LIGHTNING, and ELECTRICITY *Index*.

If we explain a phenomenon from known principles, we proceed ſyntheticaly from the general law already eſtabliſhed and *known* to exert its influence in the preſent inſtance. We ſtate this influence both in kind and degree according to the circumſtances of the caſe; and having combined them, we compare the reſult with the phenomenon, and ſhow their agreement, and thus it is explained. Thus, becauſe all the bodies of the ſolar ſyſtem mutually gravitate, the moon gravitates to the ſun as well as to the earth, and is continually, and in a certain determinate manner, deflected from that path which ſhe would deſcribe did ſhe gravitate only to the earth. Her motion round the earth will be retarded during the firſt and third quarters of her orbit, and accelerated during the ſecond and fourth. Her orbit and her period will be encreaſed during our winter, and diminiſhed during our ſummer. Her apogee will advance, and her nodes will recede; and the inclination of her orbit will be greateſt when the nodes are in ſyzigee, and leaſt when they are in quadrature. And all theſe variations will be in certain preciſe degrees. Then we ſhow that all theſe things actually obtain in the lunar motions, and they are conſidered as explained.

This ſummary account of the object and employment in all philoſophical diſcuſſion is ſufficient for pointing out its place in the circle of the ſciences, and will ſerve to direct us to the proper methods of proſecuting it with ſucceſs. Events are its object; and they are conſidered as connected with each other by cauſation, which may therefore be called the philoſophical relation of things. The following may be adopted as the fundamental propoſition on which all philoſophical diſcuſſion proceeds, and under which every philoſophical diſcuſſion or diſcovery may be arranged:

59 Fundamental propoſition of philoſophical diſcuſſion.

"*Every change that we obſerve in the ſtate or condition of things* IS CONSIDERED BY US *as an effect, indicating the agency, characterizing the kind, and determining the degree of its* INFERRED *cauſe.*"

As thus enounced, this propoſition is evidently a phyſical law of human thought. It may be enounced as a neceſſary and independent truth, by ſaying, *every change in the ſtate and condition of things* IS AN EFFECT, &c. And accordingly it has been ſo enounced by Dr Reid*; and its title to this denomination has been abundantly ſupported by him. But we have no occaſion to conſider it as poſſeſſing this quality. We are ſpeaking of philoſophy, which is ſomething contingent, depending on the exiſtence and conſtitution of an intellectual being ſuch as man; and, in conformity to the view which we have endeavoured to give of human knowledge in the ſubjects of philoſophical relation, it is quite ſufficient for our purpoſe that we maintain its title to the rank of an univerſal law of human thought. This will make it a firſt principle, even although it may not be a neceſſary truth.

All the proof neceſſary for this purpoſe is univerſality of fact; and we believe this to be without exception. We are not to expect that all mankind have made

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* Eſſays on the intellectual Powers of Man.

or will ever make, a formal declaration of their opinion; but we may venture to ſay that all have made it, and continually do make it, virtually. What have the philoſophers of all ages been employed about but the diſcovery of the cauſes of thoſe changes that are inceſſantly going on? *Nil turpius phyſico* (ſays Cicero) *quam fieri ſine cauſâ quidquam dicere.* Human curioſity has been directed to nothing ſo powerfully and ſo conſtantly as to this. Many abſurd cauſes have been aſſigned for the phenomena of the univerſe; but no ſet of men have ever ſaid that they happened without a cauſe. This is ſo repugnant to all our propenſities and inſtincts, that even the atheiſtical ſect, who, of all others, would have profited moſt by the doctrine, have never thought of advancing it. To avoid ſo ſhocking an abſurdity, they have rather allowed that chance, that the concourſe of atoms, are the cauſes of the beautiful arrangements of nature. The thoughtleſs vulgar are no leſs ſolicitous than the philoſophers to diſcover the cauſe of things; and the poet expreſſes the natural and inſtinctive paſſion of all men, when he ſays,

Felix qui potuit rerum cognoſcere cauſas.

And this anxiety is not to nouriſh, but to get rid of ſuperſtitious fears: for thus

—— *metus omnes, et inexorabile fatum*
Subjecit pedibus, ſtrepitumque Acherontis avari.

Had men never ſpeculated, their conduct alone gives ſufficient evidence of the univerſality of the opinion. The whole conduct of man is regulated by it, nay almoſt wholly proceeds upon it, in the moſt important matters, and where experience ſeems to leave us in doubt; and to act otherwiſe, as if any thing whatever happened without a cauſe, would be a declaration of inſanity. Dr Reid has beautifully illuſtrated this truth, by obſerving, that even a child will laugh at you if you try to perſuade him that the top, which he miſſes from the place where he left it, was taken away by nobody. You may perſuade him that it was taken away by a fairy or a ſpirit; but he believes no more about this nobody, than the maſter of the houſe when *he* is told that nobody was the author of any piece of theft or miſchief. What opinion would be formed, ſays Dr Reid, of the intellects of the juryman, on a trial for murder by perſons unknown, who ſhould ſay that the fractured ſkull, the watch and money gone, and other like circumſtances, might poſſibly have no cauſe? he would be pronounced inſane or corrupted.

60 Controverted by Mr Hume

We believe that Mr Hume is the firſt author who has ventured to call the truth of this opinion in queſtion; and even *he* does it only in the way of mere poſſibility. He acknowledges the *generality* of the opinion; and he only objects to the foundation of this generality: and he objects to it merely becauſe it does not quadrate with his theory of belief; and therefore it *may* happen that ſome men may have no ſuch opinion. But it muſt be obſerved on this occaſion, that the opinion of a philoſopher is of no greater weight in a caſe like this than that of a ploughboy. If it be a firſt principle, directing the opinions and actions of all, it muſt operate on the minds of all. The philoſopher is the only perſon who may chance to be without it; for it requires much labour, and long habits reſolutely maintained, to warp our natural ſentiments; and experience ſhows us that they may be warped if we are at ſufficient pains. It is alſo worthy of remark, that this philoſopher ſeems as much under the influence of this law as ordinary mortals. It is only when he is aware of its not tallying with his other doctrines that his ſcruples appear. Obſerve how he ſpeaks when off his guard: "As to thoſe impreſſions which ariſe from the ſenſes, their ultimate cauſe is, in my opinion, perfectly inexplicable by human reaſon; and it will always be impoſſible to decide with certainty whether they ariſe immediately from the object, are produced by the creative power of the mind, or are derived from the Author of our being."

61 With great inconſiſtency.

Among theſe alternatives he never thought of their not being derived from any cauſe.

62 This propoſition a firſt principle incapable of proof.

But it is not enough to ſhow that this is a phyſical law of the human mind: we have aſſumed it as a firſt principle, the foundation of a whole ſcience; therefore not included in or derived from any thing more general. Mr Hume's endeavours to ſhow that it is not a neceſſary truth, ſhow with ſufficient evidence that moſt attempts to derive it in the way of argument are *petitiones principii*; a thing very commonly met with in all attempts to prove firſt principles. It cannot be proved by induction of facts that every event has a cauſe, becauſe induction always ſuppoſes an *obſerved fact* or event.) Now in by far the greateſt number of events the cauſes are unknown. Perhaps in no event whatever do we know the real cauſe, or that power or energy which, without any intervention, produces the effect. No man can ſay, that in the ſimpleſt event which he ever obſerved, he was fully appriſed of every circumſtance which concurred to its production. We ſuppoſe that no event in nature can be adduced more ſimple than the motion of a ſuſpended glaſs ball when gently ſtruck by another glaſs ball; and we imagine that moſt of our readers will ſay that he perfectly ſees every thing which happens in this phenomenon. We believe, too, that moſt of our readers are of opinion that a body is never put in motion but by the impulſe of another, except in the caſes of animal motion; and that they are diſpoſed to imagine that magnets put iron in motion, and that an electrified body moves another by means of an interpoſed though inviſible fluid ſomehow circulating round them. Now we muſt inform ſuch readers, that unleſs the ſtroke has been very ſmart, ſo ſmart indeed as to ſhatter the glaſs balls, the motion of the ſuſpended ball was produced without impulſe: that is, the two balls were not in contact during the ſtroke; and the diſtance between them was not leſs than the 9000th part of an inch, and probably much greater. We muſt ſay farther, that it is not certain that even the moſt violent ſtroke, ſuch as would ſhatter them to pieces, is enough to bring them into real contact. The proofs of this ſingular poſition are too long for this place; but the evidence will be ſufficiently ſeen by conſulting the article Optics, nº 66, 67.

Unleſs, therefore, our readers are willing to allow that the ſuſpended ball was put in motion by a repulſive force inherent in one or both balls, they muſt acknowledge that they *do not* fully know all the circumſtances of this ſo ſimple phenomenon, or all the train of events which happen in it; and therefore they are reduced to the neceſſity of *ſuppoſing*, although they do not ſee it, an intervening fluid or matter, by the immediate action of whoſe *adjoining* particles the motion is produced.

This being the caſe in the ſimpleſt phenomenon that we can pitch upon, what ſhall we ſay of the numberleſs multitudes which are incomparably more complex? Muſt we not acknowledge that the efficient cauſes, even in the vulgar ſenſe of the word, the immediately preceding events, are unknown, becauſe the conjunctions are not obſerved? and therefore it cannot be ſaid that it is from experimental induction that this truth gains univerſal belief. Experience, ſo far from ſupporting it as a direct proof, ſeems rather the ſtrongeſt argument againſt it; for we have no experiment of unqueſtionable authority but the narrow circle of our own power exerted on our thoughts and actions. And even here there are perhaps caſes of change where we cannot ſay with certainty that we perceive the efficient cauſe.

Nothing ſeems to remain, therefore, but to allow that this phyſical law of human judgment is inſtinctive, a conſtituent of the human ſoul, a firſt principle; and incapable of any other proof than the appeal to the feelings of every man.

63
Cauſes not obſerved but inferred from the phenomena which are the language of nature.

Simply to ſay, that every change is conſidered as an effect, is not giving the whole characters of this phyſical law. The cauſe is not always, perhaps never *obſerved*, but is *inferred* from the phenomena. The inference is therefore in every inſtance dependant on the phenomenon. The phenomenon is to us the language of nature: It is therefore the ſole indication of the cauſe and of its agency: It is therefore the indication of the very cauſe, and of no other. The obſerved change therefore characteriſes the cauſe, and marks its kind. This is confirmed by every word of philoſophical language, where, as has already been obſerved, the names of the inferred powers of nature are nothing but either abbreviated deſcriptions of the phenomena, or terms which are defined ſolely by ſuch deſcriptions. In like manner, the phenomenon determines the cauſe in a *particular degree*, and in no other; and we have no immediate meaſure of the degree of the cauſe but the phenomenon itſelf. We take many meaſures of the cauſe, it is true; but on examination they will be found not to be immediate meaſures of the cauſe, but of the effect. Aſſuming gravitation as the cauſe of the planetary deviations from uniform rectilineal motion, we ſay that the gravitation of the moon is but $\frac{1}{3600}$th part of the gravitation of a ſtone thrown from the hand: but we ſay this only from obſerving that the deflection of the ſtone is 3600 times greater than the ſimultaneous deflection of the moon. In ſhort, our whole knowledge of the cauſe is not only *founded* on our knowledge of the phenomenon, but *it is the ſame*. This will be found a remark of immenſe conſequence in the proſecution of philoſophical reſearches; and a ſtrict attention to it will not only guard us againſt a thouſand miſtakes into which the reaſoning pride of man would continually lead us, but will alſo enable us fully to detect many egregious and fatal blunders made in conſequence of this philoſophical vanity. Nothing can be more evident than that whenever we are puzzled, it would be folly to continue groping among thoſe obſcure beings called *cauſes*, when we have their prototypes, the phenomena themſelves, in our hands.

Such is the account which may be given of philoſophy, the ſtudy of the works of God, as related by cauſation. It is of vaſt extent, reaching from an atom to the glorious Author of the Univerſe, and contemplating the whole connected chain of intelligent, ſenſitive, and inanimate beings. The philoſopher makes uſe of the deſcriptions and arrangements of the natural hiſtorian as of mighty uſe to himſelf in the beginning of his career; confiding in the uniformity of nature, and expecting that ſimilarity in the quieſcent properties of things will be accompanied by ſome reſemblances in thoſe more important properties which conſtitute their mutual dependences, linking them together in a great and endleſsly ramified chain of events.

We have endeavoured to aſcertain with preciſion the pecular province of philoſophy, both by means of its object and its mode of procedure. After this it will not require many words to point out the methods for proſecuting the ſtudy with expedition and with ſucceſs. The rules of philoſophizing, which Newton premiſes to his account of the planetary motions, which he ſo ſcrupulouſly followed, and with a ſucceſs which gives them great authority, are all in ſtrict conformity to the view we have now given of the ſubject.

64
The chief rule of philoſophiſing explained.

The chief rule is, that ſimilar cauſes are to be aſſigned to ſimilar phenomena. This is indeed the ſource of all our knowledge of connected nature; and without it the univerſe would only preſent to us an incomprehenſible chaos. It is by no means, however, neceſſary to enjoin this as a maxim for our procedure: it is an inſtinctive propenſity of the human mind. It is abſolutely neceſſary, on the contrary, to caution us in the application of this propenſity. We muſt be extremely confident in the certainty of the reſemblance before we venture to make any inference. We are prone to reaſon from analogy: the very employment is agreeable; and we are ever diſpoſed to embrace opportunities of engaging in it. For this reaſon we are ſatisfied with very ſlight reſemblances, and eagerly run over the conſequences, as if the reſemblances were complete; and our reſearches frequently terminate in falſehood.

This propenſity to analogical reaſoning is aided by another equally ſtrong, and equally uſeful, when properly directed; we mean the propenſity to form general laws: it is in fact a propenſity to diſcover *cauſes*, which is equivalent to the eſtabliſhing of general laws. It appears in another form, and is called a love of or taſte for ſimplicity; and this is encouraged or juſtified as agreeable to the uniformity and ſimplicity of nature. "Natura ſemper ſibi ſimilis et conſona," ſays Newton; "Fruſtra fit per plura, quod fieri poteſt per pauciora," ſays another. The beautiful, the wiſe economy of nature, are phraſes in every body's mouth; and Newton enjoins us to adopt no more cauſes than are ſufficient to explain the phenomena. All this is very well, and is true in its own degree; but it is too frequently the ſubterfuge of human vanity and ſelf-love. This inordinate admiration of the economy and ſimplicity of nature is generally conjoined with a maniſeſt love of ſyſtem, and with the actual production of ſome new ſyſtem, where from one general principle ſome extenſive theory or explanation is deduced and offered to the world. The author ſees *a ſort* of reſemblance between a certain ſeries of phenomena and the conſequences of ſome principle; and thinks the principle adequate to their explanation. Then, on the authority of the acknowledged ſimplicity of nature, he roundly excludes all other principles of explanation; becauſe, ſays he, this principle is ſufficient "et fruſtra fit per plura," &c. We could point out many inſtances of this kind in the writings of perhaps the firſt mathematician and the pooreſt philoſopher of this century; where extenſive theories are thus cavalierly exhibited, which a few years examination have ſhown to be nothing but analogies, indiſtinctly obſerved, and what is worſe, inaccurately applied.

65
A true cauſe explained.

To regulate theſe hazardous propenſities, and keep philoſophers in the right path, Newton inculcates another rule, or rather gives a modification of this injunction of ſimplicity. He enjoins, that no cauſe ſhall be admitted but what is real. His words are, that *no cauſes ſhall be admitted but ſuch as are true, and ſufficient to account for the phenomena.* We apprehend that the meaning of this rule has been miſtaken by many philoſophers, who imagine that by *true* he means cauſes which really exiſt in nature, and are not mere creatures of the imagination. We have met with ſome who would boggle at the doctrines of Ariſtotle reſpecting the planetary motions, *viz.* that they are carried along by conducting intelligent minds, becauſe we know of *none ſuch* in the univerſe; and who would nevertheleſs think the doctrine of the Carteſian vortices deſerving of at leaſt an examination, becauſe we ſee ſuch vortices exiſt, and produce effects which have ſome reſemblance to the planetary motions, and have juſtly rejected them *ſolely* becauſe this reſemblance has been very imperfect. We apprehend Newton's meaning by theſe words is, that no cauſe of any event ſhall be admitted, or even conſidered, which we *do not know* to be actually concurring or exerting ſome influence *in that very event.* If this be his meaning, he would reject the Carteſian vortices, and the conducting ſpirits of Ariſtotle for one and the ſame reaſon; not becauſe they were not adequate to the explanation, nor becauſe ſuch cauſes did not exiſt in nature, but becauſe we did not *ſee them* anyhow concerned in the phenomenon under conſideration. We neither ſee a ſpirit nor a vortex, and therefore need not trouble ourſelves with enquiring what effects they would produce. Now we know that this was his very conduct, and what has diſtinguiſhed him from all philoſophers who preceded him, though many by following his example, have alſo been rewarded by ſimilar ſucceſs. This has procured to Newton the character of the *modeſt* philoſopher; and modeſt his procedure may, for diſtinction's ſake, be called, becauſe the contrary procedure of others did not originate ſo much from ignorance as from vanity. Newton's conductor in this was not modeſty, but ſagacity, prudence, caution, and to ſay it purely, it was ſound judgment.

For the bonds of nature, the ſuppoſed philoſophical cauſes are not *obſerved*: they are *inferred* from the phenomena. When two ſubſtances are obſerved, and only when they are obſerved, to be connected in any ſeries of events, we *infer* that they are connected by a natural power: but when one of the ſubſtances is not ſeen, but fancied, no law of human thought produces any inference whatever. For this reaſon alone Newton ſtopped ſhort at the laſt FACT which he could diſcover in the ſolar ſyſtem, that all bodies were deflected to all other bodies, according to certain regulations of diſtance and quantity of matter. When told that he had done nothing in philoſophy, that he had diſcovered no cauſe, and that to merit any praiſe he muſt ſhow how this deflection was produced;—he ſaid, that he knew no more than he had told them; that he ſaw nothing cauſing this deflection; and was contented with having deſcribed it ſo exactly, that a good mathematician could now make tables of the planetary motions as accurate as he pleaſed, and with hoping in a few years to have every purpoſe of navigation and of philiſophical curioſity completely anſwered; and he was not diſappointed. And when philoſophers on all ſides were contriving hypothetical fluids and vortices which would produce theſe deflections, he contented himſelf with ſhowing the total inconſiſtency of theſe explanations with the mechanical principles acknowledged by their authors; ſhowing that they had tranſgreſſed both parts of his rule, their cauſes neither being real nor ſufficient for explaining the phenomena. A cauſe is ſufficient for explaining a phenomenon only when its legitimate conſequences are perfectly agreeable to theſe phenomena.

Newton's diſcoveries remain without any diminution or change: no philoſopher has yet advanced a ſtep further.

66
This doctrine founded in reaſon.

But let not the authority, or even the ſucceſs of Newton be our guide. Is his rule founded in reaſon? It ſurely is. For if philoſophy be only the interpretation of nature's language, the inference of cauſes from the phenomena, a fancied or hypothetical phenomenon can produce nothing but a fanciful cauſe, and can make no addition to our knowledge of real nature.

67
Danger of hypotheſis.

All hypotheſes therefore muſt be baniſhed from philoſophical diſcuſſion as frivolous and uſeleſs, adminiſtering to vanity alone. As the explanation of any appearance is nothing but the pointing out the general fact of which this is a particular inſtance, a hypotheſis can give no explanation: knowing nothing of cauſe and effect but the conjunction of two events, we ſee nothing of cauſation where one of the events is hypothetical. Although all the legitimate conſequences of a hypothetical principle ſhould be perfectly ſimilar to the phenomenon, it is extremely dangerous to aſſume this principle as the real cauſe. It is illogical to make uſe of the economy of nature as an argument for the truth of any hypotheſis; for if true, it is a phyſical truth, a matter of fact, and true only to the extent in which it was obſerved, and we are not intitled to ſay that it is ſo one ſtep farther; therefore not in this caſe *till it be obſerved.* But the propoſition that nature is ſo economical is falſe; and it is aſtoniſhing that it has been ſo lazily acquieſced in by the *readers* of hypotheſes; for it is not the *authors* who are deceived by it, they are generally led by their own vanity. Nothing is more obſervable than the prodigious variety of nature. That the ſame phenomena may be produced by different means is well known to the aſtronomers, who muſt all grant, that the appearances of motion will be preciſely the ſame whether the earth moves round the ſun like the other planets, or whether the ſun with his attendant planets moves round the earth: and that

View of Bacon's Philoſophy

the demonſtration of the firſt opinion is had from a fact totally unconnected with all the deflections or even with their cauſes: for it may be aſſerted, that Dr Bradley 's diſcovery of the aberration of the fixed ſtars, in conſequence of the progreſſive motion of light, was the firſt thing which put the Copernican ſyſtem beyond queſtion; and even this is ſtill capable of being explained in another way. The Author of Nature ſeems to delight in variety; and there cannot be named a ſingle purpoſe in which the moſt inconceivable fertility in reſource is not obſerved. It is the moſt delightful occupation of the curious mind and the ſenſible heart to contemplate the various contrivances of nature in accompliſhing ſimilar ends.

As a principle therefore on which to found any maxim of philoſophical procedure, this is not only injudicious, becauſe imprudent and *apt* to miſlead, but as falſe, and almoſt ſure to miſlead. In conformity to this obſervation, it muſt be added, that nothing has done ſo much harm in philoſophy as the introduction of hypotheſes.

Authors have commonly been ſatisfied with very ſlight reſemblances, and readers are eaſily miſled by the appearances of reaſoning which theſe reſemblances have countenanced. The ancients, and above all Ariſtotle, were much given to this mode of explanation, and have filled philoſophy with abſurdities. The ſlighteſt reſemblances were with them ſufficient foundations of theories. It has been by very ſlow degrees that men have learned caution in this reſpect; and we are ſorry to ſay that we are not yet cured of the diſeaſe of hypothetical ſyſtematizing, and to ſee attempts made by ingenious men to bring the frivolous theories of antiquity again into credit. Nay, modern philoſophers even of the greateſt name are by no means exempted from the reproach of hypothetical theories. Their writings abound in ethers, nervous fluids, animal ſpirits, vortices, vibrations, and other inviſible agents. We may affirm that all theſe attempts may be ſhown to be either unintelligible, fruitleſs, or falſe. Either the hypotheſis has been ſuch that no conſequence can be diſtinctly drawn from it, on acccount of its obſcurity and total want of reſemblance to any thing we know; or the juſt and legitimate conſequences of the hypotheſis are inconſiſtent with the phenomena (N). This is remarkably the caſe in the hypotheſes which have been introduced for the explanation of the mechanical phenomena of the univerſe. Theſe can be examined by accurate ſcience, and the conſequences compared without any miſtake; and nothing elſe but a perfect agreement ſhould induce us even to liſten to any hypotheſis whatever.

It may here be aſked, Whether, in the caſe of the moſt perfect agreement, after the moſt extenſive compariſon, the hypotheſis ſhould be admitted? We believe that this muſt be left to the feelings of the mind. When the belief is irreſiſtible, we can reaſon no more. But as there is no impoſſibility of as perfect an agreement with ſome other hypotheſis, it is evident that it does not convey an irrefragable title to our hypotheſis. It is ſaid, that ſuch an agreement authoriſes the reception of the hypothetical theory in the ſame manner as we *muſt* admit that to be the *true* cypher of a letter which will make perfect ſenſe of it. But this is not true: in decyphering a letter we know the ſounds which *muſt* be repreſented by the characters, and that they are really the conſtituents of ſpeech: but in hypothetical explanations the firſt principle is not known to exiſt; nay, it is poſſible to make two cyphers, each of which ſhall give a meaning to the letter. Inſtances of this are to be ſeen in treatiſes on the art of decyphering; and there has been lately diſcovered a national character (the *ogam* diſcovered in Ireland) which has this property.

We conclude our criticiſm on hypothetical explanations with this obſervation, that it is *impoſſible* that they can give any addition of knowledge. In every hypotheſis we thruſt in an intermediate event between the phenomenon and ſome general law; and this event is not ſeen, but ſuppoſed. Therefore, according to the true maxims of philoſophical inveſtigation, we give no explanation; for we are not by this means enabled to aſſign the general law in which this particular phenomenon is included: nay, the hypotheſis makes no addition to our liſt of general laws; for our hypotheſes muſt be *ſelected*, in order to tally with all the phenomena. The hypotheſis therefore is underſtood only *by* and *in* the phenomena; and it muſt not be made more general than the phenomena themſelves. The hypotheſis gives no generaliſation of facts. Its very application is founded on a great coincidence of facts; and the hypothetical fact is thruſt in between two which we really obſerve to be united by nature. The applicability therefore of the hypotheſis is not more extenſive

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(N) It has often been matter of amuſement to us to examine the hypothetical theories of ingenious men, and to obſerve the power of nature even when we are tranſgreſſing her commands, *Naturam expellat furca, tamen uſque revertitur*. The hypotheſis of an ingenious man is framed in perfect conformity to nature's dictate's: for you will find that the hypothetical cauſe is touched and retouched, like the firſt ſetting of a picture, till it is made to reſemble the phenomena, and the cauſe is ſtill inferred, nay explained, in ſpite of all his ingenuity, from the phenomenon; and then, inſtead of deſiring the ſpectators to pay him his due praiſe, by ſaying that the picture is like the man, he inſiſts that they ſhall ſay, what gives him no credit, that the man is like the picture. But, alas! this is ſeldom the caſe: The picture is generally an anamorphoſis, unlike any thing extant in nature, and having parts totally incongruous. We have ſeen ſuch pictures, where a wood is ſtanding on the ſea, and an eye is on the end of an elephant's trunk; and yet when this was viewed through a proper glaſs, the wood became an eyebrow to the eye, and the proboſcis was a very pretty ringlet of hair. We beg indulgence for this piece of levity, becauſe it is a moſt eppoſite illuſtration of a hypothetical theory. The reſemblance between the principle and phenomenon is true only in detached unconnected ſcraps, and the principle itſelf is an incongruous patchwork. But by a perverſion of the rules of logic, all theſe inconſiſtencies are put out of view, and the explanation is ſomething like the phenomenon.

extenſive than the ſimilarity of facts which we obſerve, and the hypothetical law is not more general than the obſerved law. Let us then throw away entirely the hypothetical law, and inſert the obſerved one in our liſt of general laws: it will be in different language from the hypothetical law, but it will expreſs the ſame facts in nature.

68
On what occaſions they may be uſeful

It is in experimental philoſophy alone that hypotheſes can have any juſt claim to admiſſion; and here they are not admitted as explanations, but as conjectures ſerving to direct our line of experiments.

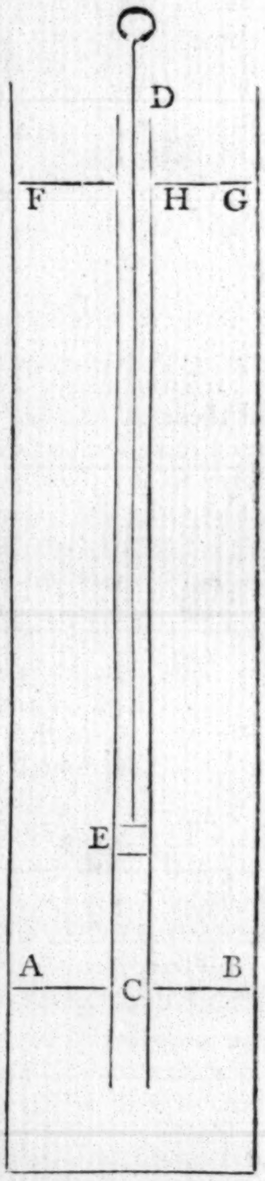
Effects only appear; and by their appearance, and the previous information of experience, cauſes are immediately aſcertained by the perfect ſimilarity of the whole train of events to other trains formerly obſerved: Or they are ſuggeſted by more imperfect reſemblances of the phenomena; and the ſuggeſtions are made with ſtronger or fainter evidence, according as the reſemblance is more or leſs perfect. Theſe ſuggeſtions do not amount to a confidential inference, and only raiſe a conjecture. Wiſhing to verify or overturn this conjecture, we have recourſe to experiment; and we put the ſubject under conſideration in ſuch a ſituation, that we can ſay what will be the effect of the conjectural cauſe if real. If this tallies with the appearance, our conjecture has more probability of truth, and we vary the ſituation, which will produce a new ſet of effects of the conjectured cauſe, and ſo on. It is evident that the probability of our conjecture will increaſe with the increaſe of the conformity of the legitimate effects of the ſuppoſed cauſe with the phenomena, and that it will be entirely deſtroyed by *one* diſagreement. In this way conjectures have their great uſe, and are the ordinary means by which experimental philoſophy is improved. But conjectural ſyſtems are worſe than nonſenſe, filling the mind with falſe notions of nature, and generally leading us into a courſe of improper conduct when they become principles of action. This is acknowledged even by the abettors of hypothetical ſyſtems themſelves, when employed in overturning thoſe of their predeceſſors, and eſtabliſhing their own: witneſs the ſucceſſive maintainers of the many hypothetical ſyſtems in medicine, which have had their ſhort-lived courſe within theſe two laſt centuries.

Let every perſon therefore who calls himſelf a philoſopher reſolutely determine to reject all temptations to this kind of ſyſtem-making, and let him never conſider any compoſition of this kind as any thing better than the amuſement of an idle hour.

69
True mode of philoſophical procedure,

After theſe obſervations, it cannot require much diſcuſſion to mark the mode of procedure which will inſure progreſs in all philoſophical inveſtigations.

The ſphere of our intuitive knowledge is very limited; and we muſt be indebted for the greateſt part of our intellectual attainments to our rational powers, and it muſt be deductive. In the ſpontaneous phenomena of nature, whether of mind or body, it ſeldom happens that the energy of that natural power, which is the principle of explanation, is ſo immediately connected with the phenomenon that we ſee the connection at once. Its exertions are frequently concealed, and in all caſes modified, by the joint exertions of other natural powers: the particular exertion of each muſt be conſidered apart, and their mutual connection traced out. It is only in this way that we can diſcover the perhaps long train of intermediate operations, and alſo ſee in what manner and degree the real principle of explanation concurs in the oſtenſible proceſs of nature.



In all ſuch caſes it is evident that our inveſtigation (and inveſtigation it moſt ſtrictly is) muſt proceed by ſteps, conducted by the ſure hand of logical method. To take an inſtance from the material world, let us liſten to Galileo while he is teaching his friends the cauſe of the riſe of water in a pump. He ſays that it is owing to the preſſure of the air. This is his principle; and he announces it in all its extent. All matter, ſays he, is heavy, and in particular air is heavy. He then points out the connection of this general principle with the phenomenon. Air being heavy, it muſt be ſupported: it muſt lie and preſs on what ſupports it: it muſt preſs on the ſurface AB of the water in the ciſtern ſurrounding the pipe CD of the pump; and alſo on the water C within this pipe. He then takes notice of another general principle which exerts its ſubordinate influence in this proceſs. Water is a fluid; a fluid is a body whoſe parts yield to the ſmalleſt impreſſion; and, by yielding, are eaſily moved among themſelves: and no little parcel of the fluid can remain at reſt unleſs it be equally preſſed in every direction, but will recede from that ſide where it ſuſtains the greateſt preſſure. In conſequence of this fluidity, *known* to be a property of water, if any part of it is preſſed, the preſſure is propagated thro' the whole; and if not reſiſted on every ſide, the water will move to that ſide where the propagated preſſure is not reſiſted. All theſe ſubordinate or collateral propoſitions are ſuppoſed to be previouſly demonſtrated or allowed. Water therefore muſt yield to the preſſure of the air unleſs preſſed by it on every ſide, and muſt move to that ſide where it is not withheld by ſome oppoſite preſſure. He then proceeds to ſhow, from the ſtructure of the pump, that there is no oppoſing preſſure on the water in the inſide of the pump. "For (ſays he) ſuppoſe the piſton thruſt down till it touches the ſurface of the water in the pipe; ſuppoſe the piſton now drawn up by a power ſufficient to lift it, and all the air incumbent on it, and ſuppoſe it drawn up a foot or a fathom—there remains nothing now (ſays he) that I know of, to preſs on the ſurface of the water. In ſhort (ſays he), gentlemen, it appears to me, that the water in the pump is in the ſame ſituation that it would be in were there no air at all, but water poured into the ciſtern to a height AF; ſuch, that the column of water FABG preſſes on the ſurface AB as much as the air does. Now in this caſe we know that the water at C is preſſed upwards with a force equal to the weight of a column of water, having the ſection of the pipe for its baſe and CH for its height. The water below C therefore will be preſſed up into the pipe CD, and will riſe to G, ſo that it is on a level with the external water FG; that is, it will riſe to H. This is a neceſſary conſequence of the weight and preſſure of the incumbent column FABG, and the fluidity of the water in the ciſtern. Conſequences perfectly ſimilar muſt neceſſarily follow from the weight and preſſure of the air; and therefore on drawing up the piſton from the ſurface C of the water, with which it was in contact, the water muſt follow it till it attain that height which will make its own weight a balance for the preſſure of the circumambient air. Accordingly, gentlemen, the Italian plumbers inform me, that a pump will not raiſe water quite fifty palms; and from their information I conclude, that a pillar of water fifty palms high is ſomewhat heavier than a pillar of air of the ſame baſe, and reaching to the top of the atmoſphere."

70
The ſynthetic method.

Thus is the phenomenon explained. The riſe of the water in the pump is ſhown to be a particular caſe of the general fact in hydroſtatics, that fluids in communicating veſſels will ſtand at heights which are inverſely as their denſities, or that columns of equal weights are in equilibrio.

This way of proceeding is called arguing *á priori* the ſynthetic method. It is founded on juſt principles; and the great progreſs which we have made in the mathematical ſciences by this mode of reaſoning ſhows to what length it may be carried with irreſiſtible evidence. It has long been conſidered as the only inlet to true knowledge; and nothing was allowed to be known with certainty which could not be demonſtrated in this way to be true. Accordingly logic or the art of reaſoning, which was alſo called the art of diſcovering truth, was nothing but a ſet of rules for ſucceſsfully conducting this mode of argument.

Under the direction of this infallible guide, it is not ſurely unreaſonable to expect that philoſophy has made ſure progreſs towards perfection; and as we know that the brighteſt geniuſes of Athens and of Rome were for ages ſolely occupied in philoſophical reſearches in every path of human knowledge, it is equally reaſonable to ſuppoſe that the progreſs has not only been ſure but great. We have ſeen that the explanation of an appearance in nature is nothing but the arrangement of it into that general claſs in which it is comprehended. The claſs has its diſtinguiſhing mark, which when it is found in the phenomenon under conſideration, fixes it in its claſs, there to remain for ever an addition to our ſtock of knowledge. Nothing can be loſt any other way but by forgetting it; and the doctrines of philoſophers muſt be ſtable like the laws of nature.

We have ſeen, however, that the very reverſe of all this is the caſe; that philoſophy has but very lately emerged from worſe than total darkneſs and ignorance; that what paſſed under the name of philoſophy was nothing but a ſyſtem of errors (if ſyſtems they could be called), which were termed doctrines, delivered with the moſt impoſing apparatus of logical demonſtration, but belied in almoſt every inſtance by experience, and affording us no aſſiſtance in the application of the powers of nature to the purpoſes of life. Nor will this excite much wonder in the mind of the enlightened reader of the preſent day, who reflects on the uſe that in this dialectic proceſs was made of the *categories*, and the method in which theſe categories were formed. From firſt principles ſo vague in themſelves, and ſo gratuitouſly aſſumed, ingenious men might deduce many different concluſions all equally erroneous: and that this was actually done, no ſurer evidence can be given, than that hardly a lifetime elaſped in which the whole ſyſtem of doctrines which had captivated the minds of the moſt penetrating, have not been oftener than once exploded and overturned by another ſyſtem, which flouriſhed for a while, and then was ſupplanted by a third which ſhared the ſame fate. Here was an infallible proof of their error, for inſtability is incompatible with truth.

It is allowed by all that this has been the caſe in thoſe branches of ſtudy at leaſt which contemplate the philoſophical relations of the material world, in aſtronomy, in mechanical philoſophy, in chemiſtry, in phyſiology, in medicine, in agriculture. It is alſo acknowledged, that in the courſe of leſs than two centuries back we have acquired much knowledge on theſe very ſubjects, call it philoſophy, or by what name you will, ſo much more conformable to the natural courſe of things, that the deductions made from it by the ſame rules of the ſynthetic method are more conformable to fact, and therefore better fitted to direct our conduct and improve our powers. It is alſo certain that theſe bodies of doctrine which go by the name of philoſophical ſyſtems, have much more ſtability than in ancient times; and though ſometimes in part ſuperſeded, are ſeldom or never wholly exploded.

This cannot perhaps be affirmed with equal confidence with reſpect to thoſe ſpeculations which have our intellect or propenſities for their object: and we have not perhaps attained ſuch a repreſentation of human nature as will bear compariſon with the original: nor will the legitimate deductions from ſuch doctrines be of much more ſervice to us for directing our conduct than thoſe of ancient times; and while we obſerve this difference between theſe two general claſſes of ſpeculations, we may remark, that it is conjoined with a difference in the manner of conducting the ſtudy. We have proceeded in the old Ariſtotelian method when inveſtigating the nature of mind; but we ſee the material philoſophers running about, paſſing much of their time away from books, in the ſhop of the artiſan, or in the open fields engaged in obſervation, labouring with their hands, and buſy with experiments. But the ſpeculatiſt on the intellect and the active powers of the the human ſoul ſeems unwilling to be indebted to any thing but his own ingenuity, and his labours are confined to the cloſet. In the firſt claſs, we have met with ſomething like ſucceſs, and we have improved many arts: in the other, it is to be feared that we are not much wiſer, or better, or happier, for all our philoſophic attainments.

71
No inlet to truth,

Here, therefore, muſt ſurely have been ſome great, ſome fatal miſtake. There has indeed been a material defect in our mode of procedure, in the employment of this method of reaſoning as an inlet to truth. The fact is, that philoſophers have totally miſtaken the road of diſcovery, and have pretended to ſet out in their inveſtigation in the very point where this journey ſhould have terminated.

The Ariſtotelian logic, the ſyllogiſtic art, that art ſo much boaſted of as the only inlet to true knowledge, the only means of diſcovery, is in direct oppoſition to the ordinary procedure of nature, by which we every day, and in every action of our lives, acquire knowledge and diſcover truth. It is not the art of diſcovering truth, it is the art of communicating knowledge, and of detecting error: it is nothing more than the application of this maxim, "whatever is true of a whole claſs of objects, is true of each individual of that claſs." This is not a juſt account of the art of diſcovering truth, nor is it a complete account of the art of reaſoning. Reaſoning is the producing belief; and whatever mode of argumentation invariably and irreſiſtibly produces belief, is reaſoning. The ancient logic ſuppoſes that all the firſt principles are already known, and that nothing is wanted but the application of them to particular facts. But were this true, the application of them, as we have already obſerved, can hardly be called a diſcovery: but it is not true; and the fact is, that the firſt principles are generally the chief objects of our reſearch, and that they have come into view only now and then as it were by accident, and never by the labour of the logician. He indeed can tell us whether we have been miſtaken; for if our general principle be true, it muſt influence *every* particular caſe. If, therefore, it be falſe in any one of theſe, it is not a true principle. And it is here that we diſcover the ſource of that fluctuation which is ſo much complained of in philoſophy. The authors of ſyſtems give a ſet of conſecutive propoſitions logically deduced from a firſt principle, which has been haſtily adopted, and has no foundation in nature. This does not hinder the amuſement of framing a ſyſtem from it, nor this ſyſtem from pleaſing by its ſymmetry; and it takes a run: but when ſome officious follower thinks of making ſome uſe of it, which requires the compariſon with experience and obſervation, they are found totally unlike, and the whole fabric muſt be abandoned as unſound: and thus the ſucceſſive ſyſtems were continually puſhing out their predeceſſors, and preſently met with the ſame treatment.

72
But the art of communicating knowledge.

How was this to be remedied? The ratiocination was ſeldom egregiouſly wrong; the ſyllogiſtic art had ere now attained a degree of perfection which left little room for improvement, and was ſo familiarly underſtood by the philoſophical practitioners, that they ſeldom committed any great blunders. Muſt we examine the firſt principles? This was a taſk quite new in ſcience; and there were hardly any rules in the received ſyſtems of logic to direct us to the ſucceſsful performance of it. Ariſtotle, the ſagacious inventor of thoſe rules, had not totally omitted it; but in the fervor of philoſophic ſpeculation he had made little uſe of them. His fertile genius never was at a loſs for firſt principles, which anſwered the purpoſe of verbal diſquiſition without much riſk of being belied on account of its diſſimilitude to nature; for there was frequently no prototype with which his ſyſtematic doctrine could be compared. His enthuſiaſtic followers found abundant amuſement in following his example; and philoſophy, no longer in the hands of men acquainted with the world, converſant in the great book of nature, was now confined almoſt entirely to recluſe monks equally ignorant of men and of things. But curioſity was awakened, and the men of genius were fretted as well as diſguſted with the diſquiſitions of the ſchools, which one moment raiſed expectations by the ſymmetry of compoſition, and the next moment blaſted them by their inconſiſtency with experience.

They ſaw that the beſt way was to begin *de novo*, to throw away the firſt principles altogether, without exception or examination, and endeavour to find out new ones which ſhould ſtand the teſt of logic; that is, ſhould in every caſe be agreeable to fact.

73
The method of induction pointed out by nature.

Philoſophers began to reflect, that under the unnoticed tuition of kind nature we have acquired much uſeful knowledge. It is therefore highly probable, that her method is the moſt proper for acquiring knowledge, and that by imitating her manner we ſhall have the like ſucceſs. We are too apt to ſlight the occupations of children, whom we may obſerve continually buſy turning every thing over and over, putting them into every ſituation, and at every diſtance. We excuſe it, ſaying that it is an innocent amuſement; but we ſhould ſay with an ingenious philoſopher (Dr Reid), that they are moſt ſeriouſly and rationally employed: they are acquiring the habits of obſervation; and by merely indulging an undetermined curioſity, they are making themſelves acquainted with ſurrounding objects: they are ſtruck by ſimilitudes, and amuſed with mere claſſification. If ſome new effect occurs from any of their little plays, they are eager to repeat it. When a child has for the firſt time tumbled a ſpoon from the table, and is pleaſed with its jingling noiſe on the floor, if another lies within its reach, it is ſure to ſhare the ſame fate. If the child is indulged in this diverſion, it will repeat it with a greedineſs that deſerves our attention. The very firſt eager repetition ſhows a confidence in the conſtancy of natural operations, which we can hardly aſcribe wholly to experience; and its keenneſs to repeat the experiment, ſhows the intereſt which it takes in the exerciſe of this moſt uſeful propenſity. It is beginning the ſtudy of nature; and its occupation is the ſame with that of a Newton computing the motions of the moon by his ſublime theory, and comparing his calculus with obſervation. The child and the philoſopher are equally employed in the contemplation of a ſimilarity of event, and are anxious that this ſimilarity ſhall return. The child, it is true, thinks not of this abſtract object of contemplation, but throws down the ſpoon again to have the pleaſure of hearing it jingle. The philoſopher ſuſpects that the conjunction of events is the conſequence of a general law of nature, and tries an experiment where this conjunction recurs. The child is happy, and eager to enjoy a pleaſure which to us appears highly frivolous; but it has the ſame foundation with the pleaſure of the philoſopher, who rejoices in the ſucceſs of his experiment: and the fact, formerly a trifle to both, now acquires importance. Both go on repeating the experiment, till the fact ceaſes to be a novelty to either: the child is ſatisfied, and the philoſopher has now eſtabliſhed a new law of nature.

Such (ſays this amiable philoſopher) is the education of kind nature, who from the beginning to the end of our lives makes the play of her ſcholars their moſt inſtructive leſſons, and has implanted in our mind the curioſity and the inductive propenſity by which we are enabled and diſpoſed to learn them. The exerciſe of this inductive principle, by which nature prompts us to infer general laws from the obſervation of particular facts, gives us a ſpecies of logic new in the ſchools, but old as human nature. It is certainly a method of diſcovery; for by theſe means general principles, formerly unknown, have come into view.

74
s a juſt logic

It is a juſt and rational logic; for it is founded on, and indeed is only the habitual application of, this maxim, "That whatever is true with reſpect to every individual of a claſs of events, is true of the whole claſs." This is juſt the inverſe of the maxim on which the Ariſtotelian logic wholly proceeds, and is of equal authority in the court of reaſon. Indeed the expreſſion of the general law is only the abbreviated expreſſion of every particular inſtance.

This new logic, therefore, or the logic of induction, muſt not be conſidered as ſubordinate to the old, or founded on it. See LOGIC, Part III. chap. 5. In fact, the uſe and legitimacy of the Ariſtotelian logic is founded on the inductive,

All animals are mortal;
All men are animals: therefore
All men are mortal.

This is no argument to any perſon who chooſes to deny the mortality of man: even although he acknowledges his animal nature, he will deny the major propoſition.

It is beſide our purpoſe to ſhow, how a point ſo general, ſo congenial to man, and ſo familiar, remained ſo long unnoticed, although the diſquiſition is curious and ſatisfactory. It was not till within theſe two centuries that the increaſing demand for practical knowledge, particularly in the arts, made inquiſitive men ſee how uſeleſs and inſufficient was the learning of the ſchools in any road of inveſtigation which was connected with life and buſineſs; and obſerve, that ſociety had received uſeful information chiefly from perſons actually engaged in the arts which the ſpeculatiſts were endeavouring to illuſtrate; and that this knowledge conſiſted chiefly of experiments and obſervations, the only contributions which their authors could make to ſcience.

The *Novum Organum* of Bacon, which points out the true method of forming a body of real and uſeful knowledge, namely, the ſtudy of nature in the way of deſcription, obſervation, and experiment, is undoubtedly the nobleſt preſent that ſcience ever received. It may be conſidered as the grammar of nature's language, and is a counter-part to the logic of Ariſtotle; not exploding it, but making it effectual.

75
Its chief rule.

As the logic of Ariſtotle had its rules, ſo has the Baconian or inductive; and this work, the *Novum Organum Scientiarum*, contains them all. The chief rule, and indeed the rule from which all the reſt are but derivations, is, that "the induction of particulars muſt be carried as far as the general affirmation which is deduced from them." If this be not attended to, the mind of man, which from his earlieſt years ſhows great eagerneſs in ſearching for firſt principles, will frequently aſcribe to the operation of a general principle events which are merely accidental. Hence the popular belief in omens, palmiſtry, and all kinds of fortune-telling.

76
For diſcovering general principles,

This rule muſt evidently give a new turn to the whole track of philoſophical inveſtigation. In order to diſcover firſt principles, we muſt make extenſive and accurate obſervations, ſo as to have copious inductions of facts, that we may not be deceived as to the extent of the principle inferred from them. We muſt extend our acquaintance with the phenomena, paying a minute attention to what is going on all around us; and we muſt ſtudy nature, not ſhut up in our cloſet drawing the picture from our own fancy, but in the world, copying our lines from her own features.

To delineate human nature, we muſt ſee how men act. To give the philoſophy of the material world, we muſt notice its phenomena.

This method of ſtudying nature has been proſecuted during theſe two laſt centuries with great eagerneſs and ſucceſs. Philoſophers have been buſy in making accurate obſervations of facts and copious collections of them. Men of genius have diſcovered points of reſemblance, from which they have been able to infer many general powers both of mind and body; and reſemblances, among theſe have ſuggeſted powers ſtill more general.

By theſe efforts inveſtigation became familiar; philoſophers ſtudied the rules of the art, and became more expert; hypotheſes were baniſhed, and nothing was admitted as a principle which was not inferred from the moſt copious induction. Concluſions from ſuch principles became every day more conformable to experience. Miſtakes ſometimes happened; but recourſe being had to more accurate obſervation or more copious induction, the miſtakes were corrected. In the preſent ſtudy of nature, our ſteps are more ſlow, and heſitating and painful; our concluſions are more limited and modeſt, but our diſcoveries are more certain and progreſſive, and the reſults are more applicable to the purpoſes of life. This pre-eminence of modern philoſophy over the ancient is ſeen in every path of inquiry. It was firſt remarkable in the ſtudy of the material world; and there it ſtill continues to be moſt conſpicuous. But it is no leſs to be ſeen in the later performances of philoſophers in metaphyſics, pneumatology, and ethics, where the mode of inveſtigation by analyſis and experiment has been greatly adopted; and we may add, that it is this juſter view of the employment which has reſtored philoſophers to the world, to ſociety. They are no longer to be found only in the academies of the ſophiſts and the cloiſters of a convent, but in the diſcharge of public and private duty. A philoſophic genius is a genius for obſervation as well as reflection, and he ſays, *Homo ſum, humani a me nihil alienum puto*.

77
And rectifying miſtakes.

78
Eſtimate of the philoſophic character.

After ſaying ſo much on the nature of the employment, and the mode of procedure, it requires no deep penetration to perceive the value of the philoſophical character. If there is a propenſity in the human mind which diſtinguiſhes us from the inferior orders of ſentient beings, without the leaſt circumſtance of interference, a propenſity which alone may be taken for the characteriſtic of the ſpecies, and of which no trace is to be found in any other, it is diſintereſted intellectual curioſity, a love of diſcovery for its own ſake, independent of all its advantages.

79
We ſhould think modeſtly of our rational powers.

We think highly (and with great juſtice do we think ſo) of our rational powers; but we may carry this too far, as we do every ground of ſelf-eſtimation. To every man who enjoys the chearing thought of living under the care of a wiſe Creator, this boaſted prerogative will be viewed with more modeſty and diffidence; and he has given us evident marks of the rank in which He eſteems the rational powers of man. In no caſe that is of eſſential importance, of indiſpenſable neceſſity, not only to our well-being but to our very exiſtence, has He left man to the care of his reaſon alone; for in the firſt inſtance. He has given us reaſon

To guide the helm, while paſſion blows the gale.

80
Importance of our inſtinctive principles.

God has not truſted either the preſervation of the individual or the continuance of the race to man's notions of the importance of the taſk, but has committed them to the ſurer guards of hunger and of ſexual deſire. In like manner, He has not left the improvement of his nobleſt work, the intellectual powers of the ſoul of man, to his own notions how important it is to his comfort that he be thoroughly acquainted with the objects around him. No: He has committed this alſo to the ſure hand of curioſity: and he has made this ſo ſtrong in a few ſuperior ſouls, whom He has appointed to give light and knowledge to the whole ſpecies, as to abſtract them from all other purſuits, and to engage them in intellectual reſearch with an ardour which no attainment can ever quench, but, on the contrary, inflames it the more by every draught of knowledge.

———————— But what need words
To paint its power? For this the daring youth
Breaks from his weeping mother's fondling arms
In foreign climes to rove. The penſive ſage,
Heedleſs of ſleep, or midnight's hurtful vapour,
Hangs o'er the ſickly taper.—Hence the ſcorn
Of all familiar proſpects, though beheld
With tranſport once. Hence th' attentive gaze
Of young aſtoniſhment.
Such is the bounteous providence of Heaven,
In every breaſt implanting the deſire
Of objects new and ſtrange, to urge us on
With unremitting labour to attain
The ſacred ſtores that wait the rip'ning ſoul
In Truth's exhauſtleſs boſom *Aikenſide.*

81
Our diſpoſition to refinement

But human life is not a ſituation of continual neceſſity; this would ill ſuit the plans of its Beneficent Author: and it is from induction of phenomena totally oppoſite to this, and from ſuch induction alone, that we have ever thought of a wiſe Creator. His wiſdom appears only in his beneficence. Human life is a ſcene filled with enjoyment; and the ſoul of man is ſtored with propenſities and powers which have *pleaſure in direct terms*, for their object. Another ſtriking diſtinction of our nature is a continual diſpoſition to refinement, of which few traces are to be found in the actions of other animals. There is hardly a gift of nature ſo grateful in itſelf as to pleaſe the freakiſh mind of man till he has moulded it to his fancy. Not contented with food, with raiment, and with ſhelter, he muſt have nice cookery, ornamental dreſs, and elegant houſes. He hunts when he is not hungry, and he refines ſexual appetite into a moſt elegant paſſion. In like manner he has improved this anxious deſire of the knowledge of the objects around him, ſo as to derive from them the means of ſubſiſtence and comfort, into the moſt elegant and pleaſing of all gratifications, the accumulation of intellectual knowledge, independent of all conſideration of its advantages. And as every man has a title to the enjoyment of ſuch pleaſures as he can attain without injuring his neighbour; ſo it is allowable to ſuch as have got the means of intellectual improvement, without relinquiſhing the indiſpenſable ſocial duties, to puſh this advantage as far as it will go: and, in all ages and countries, it has been conſidered as forming the greateſt diſtinction between men of eaſy fortune and the poor, who muſt earn their ſubſiſtence by the ſweat of their brow. The plebeian muſt learn to work, the gentleman muſt learn to think; and nothing can be a ſurer mark of a groveling ſoul than for a man of fortune to have an uncultivated mind.

82
Ought to be cheriſhed as far as it is ſubſervient to the duties of life.

Let us then cheriſh to the utmoſt this diſtinguiſhing propenſity of the human ſoul: but let us do even this like philoſophers. Let us cultivate it as it is; as the handmaid to the arts and duties of life; as the guide to ſomething yet more excellent. A character is not to be eſtimated from what the perſon knows, but from what he can perform. The accumulation of intellectual knowledge is too apt to create an inordinate appetite for it; and the man habituated to ſpeculation is, like the miſer, too apt to place that pleaſure in the mere *poſſeſſion*, which he ought to look for only or chiefly in the *judicious uſe* of his favourite object. Like the miſer, too, his habits of hoarding up generally unfit him for the very enjoyment which at ſetting out he propoſed to himſelf. Seldom do we find the man, who has devoted his life to ſcientific purſuits for their own ſake, poſſeſſed of that ſuperiority of mind which the active employ to good purpoſe in times of perplexity; and much ſeldomer do we find him poſſeſſed of that promptitude of apprehenſion, and that deciſion of purpoſe, which are neceſſary for paſſing through the difficult ſcenes of human life.

83
Limits of our knowledge.

But we may uſe the good things of this life without abuſing them; and by moderation here, as in all other purſuits, derive thoſe ſolid advantages which philoſophy is able to beſtow. And theſe advantages are great. To enumerate and deſcribe them would be to write a great volume. We may juſt take notice of one, which is an obvious conſequence of that ſtrict and ſimple view which we have given of the ſubject; and this is, a modeſt opinion of our attainments. Appearances are all that we know; cauſes are for ever hid from our view; the powers of our nature do not lead us ſo far. Let us therefore, without heſitation, relinquiſh all purſuits which have ſuch things as ultimate principles for *objects of examination*. Let us attend to the ſubordinations of things which it is our great buſineſs to explore.

explore Among theſe there is ſuch a ſubordination as that of means to ends, and of inſtruments to an operation. All will acknowledge the abſurdity of the project of viewing light with a microſcope. It is equally abſurd for us to examine the nature of knowledge, of truth, of infinite wiſdom, by our intellectual powers. We have a wide field of acceſſible knowledge in the works of God; and one of the greateſt advantages, and of the moſt ſublime pleaſures, which we can derive from the contemplation, is the view which a judicious philoſophical reſearch will moſt infallibly give us of a world, not conſiſting of a number of detached objects, connected only by the fleeting tie of coexiſtence, but an *univerſe*, a *ſyſtem* of beings, all connected together by cauſation, with innumerable degrees of ſubordination and ſubſerviency, and all cooperating in the production of one great and glorious purpoſe. The heart which has but a ſpark of ſenſibility muſt be warmed by ſuch a proſpect, muſt be pleaſed to find itſelf an important part of this ſtupendous machine; and cannot but adore the incomprehenſible artiſt who contrived, created, and directs the whole. Let us not liſten, then, to the timid admonitions of theological ignorance, which ſhrinks with ſuperſtitious horror from the thoughts of accounting for every thing by the powers of nature, and conſiders theſe attempts as an approach to atheiſm. Philoſophical diſquiſition will, on the contrary, exhibit theſe general laws of the univerſe, that wonderful concatenation and adjuſtment of every thing both material and intellectual, as the moſt ſtriking inſtance of incomprehenſible wiſdom; which, by means ſo few and ſo ſimple, can produce effects, which by their grandeur dazzle our imagination, and by their multiplicity elude all poſſibility of enumeration. Of all the obſtacles which the weakneſs, the folly, or the ſinful vanity of men, have thrown in the way of the theologian, there is none ſo fatal, ſo hoſtile to all his endeavours, as a cold and comfortleſs ſyſtem of materialiſm, which the reaſoning pride of man firſt engendered, which made a figure among a few ſpeculatiſts in the laſt century, but was ſoon forgotten by the philoſophers really buſy with the obſervation of nature and of nature's God. It has of late reared up its head, being now cheriſhed by all who wiſh to get rid of the ſtings of remorſe, as the only opinion compatible with the peace of the licentious and the ſenſual: for we may ſay to them as Henry IV. ſaid to the prince of Wales, "Thy wiſh was, father Harry, to that thought." In vain will the divine attempt to lay this devil with the metaphyſical exorciſms of the ſchools, it is philoſophy alone that can detect the cheat. Philoſophy ſingles out the characteriſtic phenomena which diſtinguiſh every ſubſtance; and philoſophy never will heſitate in ſaying that there is a ſet of phenomena which characteriſe mind and another which characteriſe body, and that theſe are *toto cœlo* different. Continually appealing to fact, to the phenomena, for our knowledge of every cauſe, we ſhall have no difficulty in deciding that thought, memory, volition, joy, hope, are not compatible attributes with bulk, weight, elaſticity, fluidity. *Tuta ſub ægide Pallas;* philoſophy will maintain the dignity of human nature, will detect the ſophiſms of the materialiſts, confute their arguments; and ſhe alone will reſtore to the countenance of nature that ineffable beauty of which thoſe would deprive her, who would take away the ſupreme Mind which ſhines from within and gives life and expreſſion to every feature.

84
Philoſophical diſquiſition gives juſt notions of God and of our own ſouls.

Natural PHILOSOPHY. See *NATURAL Philoſophy*, PHILOSOPHY, and PHYSICS.

Experimental PHILOSOPHY. See *EXPERIMENTAL Philoſophy*.

Moral PHILOSOPHY. See *MORAL Philoſophy*.

PHILOSTORGIUS, an eccleſiaſtical hiſtorian of the 4th century, was born in Cappadocia, and wrote an abridgment of eccleſiaſtical hiſtory, in which he treats Athanaſius with ſome ſeverity. This work contains many curious and intereſting particulars. The beſt edition is that of Henry de Valois in Greek and Latin. There is alſo attributed to him a book againſt Porphyry.

PHILOSTRATUS (Flavius), was an ancient Greek author. He wrote the Life of Apollonius Tyanenſis, and ſome other things which have come down to our time. Euſebius againſt Hierocles calls him an Athenian, becauſe he taught at Athens; but Eunapius and Suidas always ſpeak of him as a Lemnian: and he hints, in his life of Apollonius, that he uſed to be at Lemnos when he was young. He frequented the ſchools of the ſophiſts; and he mentions his having heard Damianus of Epheſus, Proclus Naucratitas, and Hippodromus of Lariſſa. This ſeems to prove that he lived in the reign of the emperor Severus, from 193 to 212, when thoſe ſophiſts flouriſhed. He became known afterwards to Severus's wife Julia Auguſta, and was one of thoſe learned men whom this philoſophic empreſs had continually about her. It was by her command that he wrote the Life of Apollonius Tyanenſis, as he relates himſelf in the ſame place where he informs us of his connections with that learned lady. Suidas and Heſychius ſay that he was a teacher of rhetoric, firſt at Athens and then at Rome, from the reign of Severus to that of Philippus, who obtained the empire in 244.

Philoſtratus's celebrated work is the Life of Apollonius: which has erroneouſly been attributed to Lucian, becauſe it has been printed with ſome of that author's pieces. Philoſtratus endeavours, as Cyril obſerves, to repreſent Apollonius as a wonderful and extraordinary perſon; rather to be admired and adored as a god than to be conſidered as a mere man. Hence Eunapius, in the preface to his Lives of the Sophiſts, ſays that the proper title of that work would have been, *The Coming of a God to Men*; and Hierocles, in his book againſt the Chriſtians which was called *Philalethes*, and which was refuted by Euſebius in a work ſtill extant, among other things drew a compariſon between Apollonius and Jeſus Chriſt. It has always been ſuppoſed that Philoſtratus compoſed his work with a view to diſcredit the miracles and doctrines of our Lord, by ſetting up other miracles and other doctrines againſt them, and this ſuppoſition may be true; but that Apollonius was really an impoſtor and magician may not be ſo certain. He may, for what we know, have been a wiſe and excellent perſon; and it is remarkable, that Euſebius, though he had the worſt opinion of Philoſtratus's hiſtory, ſays nothing ill of Apollonius. He concluded that that hiſtory was written to oppoſe the hiſtory of Jeſus; and the uſe which the ancient infidels made of it juſtifies his opinion; but he draws no information from it with regard to Apollonius. It would have been improper to have done ſo; ſince the ſophiſtical and affected ſtyle of Philoſtratus, the ſources from whence he owns his materials to have been drawn, and, above all, the abſurdities and contradictions with which he abounds, plainly ſhow his hiſtory to be nothing but a collection of fables, either invented or at leaſt embelliſhed by himſelf.

The works of Philoſtratus, however, have engaged the attention of critics of the firſt claſs. Grævius had intended to have given a correct edition of them, as appears from the preface of Meric Caſaubon to a diſſertation upon an intended edition of Homer, printed at London in 1658, 8vo. So had Bently, who deſigned to add a new Latin verſion of his notes; and Fabricius ſays that he ſaw the firſt ſheet of Bentley's edition printed at Leipſic in 1691. Both theſe deſigns were dropped. A very exact and beautiful edition was publiſhed at length at Leipſic, 1709, in folio, by Olearius, profeſſor of the Greek and Latin tongues in that univerſity; who has proved himſelf perfectly qualified for the work he undertook, and ſhown all the judgment, learning, and induſtry, that are required in an excellent editor.

See Apollonius, p. 127, col. I. and Blount (Charles).

At the end of Apollonius's Life there are 95 Letters which go under his name. They are not, however, believed to be his; the ſtyle of them being very affected, and like that of a ſophiſt, while they bear in other reſpects all the marks of a forgery. Philoſtratus ſays that he ſaw a collection of Apollonius's Letters in Hadrian's library at Antium, but had not inſerted them all among theſe. They are ſhort, and have in them little elſe than moral ſentences. The Lives of the Sophiſts contain many things which are to be met with nowhere elſe. The Heroics of Philoſtratus are only a dialogue between a vintner of Thracian Cherſoneſus and a Phœnician, in which the former draws characters of Homer's heroes, and repreſents ſeveral things differently from that poet; and this upon the faith of Proteſilaus's ghoſt, who had lately viſited his farm, which was not far from the tomb of this hero. Olearius conjectures, with much probability, that Philoſtratus's deſign in this dialogue was ſecretly to criticiſe ſome things in Homer, which he durſt not do openly on account of the great veneration then paid to him, and for fear of the odium which Zoilus and others had incurred by cenſuring him too freely. The images are elegant deſcriptions and illuſtrations of ſome ancient paintings and other particulars relating to the fine arts: to which Olearius has ſubjoined the deſcription of ſome ſtatues by Calliſtratus; for the ſame reaſon that he ſubjoined Euſebius's book againſt Hierocles to the Life and Letters of Apollonius, namely, becauſe the ſubjects of theſe reſpective works are related to each other. The laſt piece is a collection of Philoſtratus's Letters; but ſome of theſe, though it is not eaſy to determine which, were written by a nephew to our Philoſtratus, of the ſame name, as were alſo the laſt eighteen in the book of images. This is the reaſon why the title runs not *Philoſtrati*, but *Philoſtratorum quæ ſuperſunt omnia*.

There were many perſons of the name of Philoſtratus among the ancients; and there were many other works of the Philoſtratus here recorded, but no others are extant beſides thoſe we have mentioned.

PHILOTIS, a ſervant maid at Rome, ſaved her countrymen from deſtruction. After the ſiege of Rome by the Gauls, the Fidenates aſſembled an army, and marched againſt the capital, demanding all the wives and daughters in the city as the only conditions of peace. This demand aſtoniſhed the ſenators; and when they refuſed to comply, Philotis adviſed them to ſend all their female ſlaves diſguiſed in matron's clothes, and ſhe offered to march herſelf at the head. Her advice was followed; and when the Fidenates had feaſted late in the evening, and were quite intoxicated and fallen aſleep, Philotis lighted a torch as a ſignal for her countrymen to attack the enemy. The whole was ſucceſsful; the Fidenates were conquered; and the ſenate, to reward the fidelity of the female ſlaves, permitted them to appear in the dreſs of the Roman matrons.

PHILOXENUS, an officer of Alexander, who received Cilicia at the general diviſion of the provinces.——A ſon of Ptolemy, who was given to Pelopidas as an hoſtage.——A dythyrambic poet of Cythera. He enjoyed the favour of Dionyſius tyrant of Sicily for ſome time, till he offended him by ſeducing one of his female ſingers. During his confinement Philoxenus compoſed an allegorical poem called *Cyclops*; in which he had delineated the character of the tyrant under the name of Polyphemus, and repreſented his miſtreſs under the name of Galatæa, and himſelf under that of Ulyſſes. The tyrant, who was fond of writing poetry, and of being applauded, removed Philoxenus from his dungeon; but the poet refuſed to purchaſe his liberty by ſaying things unworthy of himſelf, and applauding the wretched verſes of Dionyſius. and therefore he was ſent to the quarries. Being ſet at liberty, he ſome time after was aſked his opinion at a feaſt about ſome verſes which Dionyſius had juſt repeated, and which the courtiers had received with the greateſt applauſe. Philoxenus gave no anſwer, but he ordered the guards that ſurrounded the tyrant's table to take him back to the quarries. Dionyſius was pleaſed with his pleaſantry and with his firmneſs, and immediately forgave him. Philoxenus died at Epheſus about 380 years before Chriſt.

PHILTER, or Philtre, (*Philtrum*), in pharmacy, &c. a ſtrainer.

Philter, is alſo uſed for a drug or preparation, which it is pretended will excite love.—The word is formed from the Greek φιλεω, "I love," or φιλος, "lover."

Philters are diſtinguiſhed into *true* and *ſpurious*, and were given by the Greeks and Romans to excite love. (See Love in medicine.) The ſpurious are ſpells or charms, ſuppoſed to have an effect beyond the ordinary laws of nature by ſome magic virtue; ſuch are thoſe ſaid to be given by old women, witches, &c.—The true philters

philters are thoſe ſuppoſed to work their effect by ſome natural and magnetical power. There are many grave authors who believe the reality of theſe philters, and allege matter of fact in confirmation of their ſentiments: among the reſt, Van Helmont, who ſays, that upon holding a certain herb in his hand for ſome time, and taking afterwards a little dog by the foot with the ſame hand, the dog followed him wherever he went, and quite deſerted his former maſter; which he pretends to account for thus: The heat communicated to the herb, not coming alone, but animated by the emanations of the natural ſpirits, determines the herb towards the man, and identifies it to him: having then received this ferment, it attracts the ſpirit of the other object magnetically, and gives it an amorous motion.—But this is mere cant; and all philters, whatever facts may be alleged, are mere chimeras.

PHILYCA, in botany. See PHYLICA.

PHILYRA (fab. hiſt.), was one of the Oceanides, whom Saturn met in Thrace. The god, to eſcape from the vigilance of Rhea, changed himſelf into a horſe, to enjoy the company of Philyra, by whom he had a ſon half a man and half a horſe, called *Chiron*. Philyra was ſo aſhamed of giving birth to ſuch a monſter, that ſhe entreated the gods to change her nature. She was accordingly metamorphoſed into a tree, called by her name among the Greeks.

PHIMOSIS, in medicine, a diſorder of the penis, in which the prepuce is ſo ſtrict or tenſe, that it cannot be drawn back over the glans. See SURGERY.

PHINEHAS, or, as the Jews pronounce it PINCHAS, was the ſon of Eleazar, and grandſon of Aaron. He was the third high prieſt of the Jews, and diſcharged this office from the year of the world 2571, till towards the year 2590. He is particularly commended in Scripture for the zeal he ſhowed in vindicating the glory of God, when the Midianites had ſent their daughters into the camp of Iſrael, to tempt the Hebrews to fornication and idolatry. For Zimri having publickly entered into the tent of a Midianitiſh woman named *Cozbi*, Phinehas aroſe up from among the people (Numb. xxv. 7, &c.), took a javelin in his hand, entered after Zimri into that infamous place, and ſtabbed both man and woman at one blow, in thoſe parts that were chiefly concerned in this criminal commerce. Upon which the plague or diſtemper ceaſed with which the Lord had already begun to puniſh the Iſraelites. This happened in the year of the world 2553.

Then the Lord ſaid to Moſes, Phinehas the ſon of Eleazer the high-prieſt has turned away my wrath from the children of Iſrael, becauſe he has been zealous in my cauſe, and has hindered me from deſtroying them: wherefore acquaint him, that I give him my covenant of peace, and the prieſthood ſhall be given to his poſterity by a perpetual covenant, becauſe he has been zealous for his God, and has made atonement for the crime of the children of Iſrael. This promiſe that the Lord made to Phinehas, to give him the prieſthood by a perpetual covenant, interpreters obſerve, evidently included this tacit condition, that his children ſhould continue faithful and obedient; ſince we know that the prieſthood paſſed out of the family of Eleazer and Phinehas to that of Ithamar, and that it returned not to the poſterity of Eleazar till after about 150 years.

This is what we find concerning the tranſlation of the high-prieſthood from one family to the other. This dignity continued in the race of Phinehas, from Aaron down to the high-prieſt Eli, for about 335 years. See AARON.

The manner and cauſes of this change are unknown. It re-entered again into the family of Eleazar under the reign of Saul, when this prince having put to death Abimelech, and the other prieſts of Nob, he gave the high-prieſthood to Zadok, who was of the race of Phinehas. At the ſame time, David had Abiather with him, of the race of Eli, who performed the functions of high-prieſt. So that after the death of Saul, David continued the prieſthood to Zadok and Abiather conjointly. But towards the end of David's reign, Abiathar having eſpouſed the intereſt of Adonijah, to the prejudice of Solomon, he was in diſgrace, and Zadok only was acknowledged as high-prieſt. The prieſthood continued in his family till after the captivity of Babylon, and even to the deſtruction of the temple. But from the beginning of Zadok's prieſthood alone, and the excluſion of Abiathar, to the ruin of the temple, is 1084 years.

We read of another memorable action of Phinehas, in which he ſtill ſhowed his zeal for the Lord. This was when the Iſraelites that were beyond Jordan had raiſed upon the banks of this river a vaſt heap of earth (Joſh. xxii. 30, 31.). Thoſe on the other ſide fearing they were going to forſake the Lord, and ſet up another religion, deputed Phinehas and other chief men among them, to go and inform themſelves of the reaſon of erecting this monument. But when they had found that it was in commemoration of their union and common original, Phinehas took occaſion from thence to praiſe the Lord, ſaying, "We know that the Lord is with us, ſince you are not guilty of that prevarication we ſuſpected you were."

We do not exactly know the time of the death of Phinehas. But as he lived after the death of Joſhua, and before the firſt ſervitude under Chuſhan-riſhathaim, during the time that there were neither kings nor judges in the land, and every one did what was right in his own eyes (Judges xvii. 6. xviii. 1. xxi. 24.); his death is put about the year of the world 2590. It was under his pontificate that the ſtory of Micah happened, as alſo that of the tribe of Dan, when they made a conqueſt of Laiſh; and the enormity that was committed upon the wife of the Levite of the mountain of Ephraim (Judges xx. 28.). Phinehas's ſucceſſor in the high-prieſthood was Abiezer, or Abiſhuah.

The Rabbins allow a very long life to Phinehas. There are ſome who believe he lived to the time of the high-prieſt Eli, or even to the time of Samſon. Others will have it, that he was the ſame as Eli, or rather as the prophet Elias, which would ſtill prolong his life for ſeveral ages.

PHINEUS (fab. hiſt.), was a ſon of Agenor, king of Phœnicia, or according to ſome of Neptune. He became king of Thrace, or, according to the greater part of mythologiſts, of Bithynia. He married Cleopatra the daughter of Boreas, called by ſome *Cleobula*, by whom he had Plexippus and Pandion. After her death, he married Idæa the daughter of Dardanus. Idæa, jealous of his former wife's children, accuſed them of attempts upon their father's life and crown, or, as others aſſert, of attempts upon her virtue; on which they were condemned by

Phinehas to be deprived of their eyes. This cruelty was ſoon after puniſhed by the gods; for Phinehas ſuddenly became blind, and the Harpies were ſent by Jupiter to keep him in continual alarm, and to ſpoil the meats which were placed on his table. He was afterwards delivered from theſe dangerous monſters by his brothers in-law Zetes and Calais, who purſued them as far as the Strophades. He likewiſe recovered his ſight by means of the Argonauts, whom he had received with great hoſpitality, and whom he inſtructed in the eaſieſt and ſpeedieſt way of arriving in Colchis. The cauſes of the blindneſs of Phineus are a matter of diſpute among the ancients; ſome ſuppoſing that this was inflicted by Boreas for his cruelty to his grandſon; while others attribute it to the anger of Neptune, becauſe he had directed the ſons of Phryxus how to eſcape from Colchis to Greece. Many, however, imagine that it proceeded from his having raſhly attempted to develope futurity; while others aſſert that Zetes and Calais put out his eyes on account of his cruelty to their nephews. The ſecond wife of Phineus is called by ſome *Dia*, *Eurytia*, *Danea*, and *Idothea*.—He was killed by Herculus.

PHLEBOTOMY, the opening of a vein with a proper ſharp-edged and pointed inſtrument, in order to let out a certain quantity of blood either for the preſervation or recovery of a perſon's health. See SURGERY.

PHLEGM, in the animal economy, one of the four humours whereof the ancients ſuppoſed the blood to be compoſed. The chemiſts make phlegm or water an elementary body; the characters of which are fluidity, inſipidity, and volatility.

PHLEGMAGOGUES, in medicine, a term anciently made uſe of for ſuch medicines as were ſuppoſed to be endowed with the property of purging off phlegm; ſuch as hermodactyls, agaric, turbith, jalap, &c.

PHLEGMATIC, among phyſicians, an appellation given to that habit or temperament of body wherein phlegm is predominant; which gives riſe to catarrhs, coughs, &c.

PHLEGMON, denotes an external inflammation and tumor, attended with a burning heat.

PHLEGON, who was ſurnamed *Trallianus*, was born in Trallis a city of Lydia. He was the emperor Hadrian's freed man, and lived to the 18th year of Antoninus Pius; as is evident from his mentioning the conſuls of that year. He wrote ſeveral works of great erudition, of which we have nothing left but fragments. Among theſe was a Hiſtory of the Olympiads, A Treatiſe of Long-lived Perſons, and another of Wonderful Things; the ſhort and broken remains of which Xylander tranſlated into Latin, and publiſhed at Baſil in 1568, with the Greek and with notes. Meurſius publiſhed a new edition of them with his notes at Leyden, in 1622. The titles of part of the reſt of Phlegon's writings are preſerved by Suidas. It is ſuppoſed that the Hiſtory of Hadrian, publiſhed under Phlegon's name, was written by Hadrian himſelf, from this paſſage of Spartianus: "Hadrian thirſted ſo much after fame (ſays he), that he gave the books of his own life, drawn up by himſelf, to his freemen, commanding them to publiſh thoſe books under their own names; for we are told that Hadrian wrote Phlegon's books."

Phlegon's name has been more familiar among the moderns, and his fragments have had a greater degree of regard paid to them than perhaps they deſerve, merely becauſe he has been ſuppoſed to ſpeak of the darkneſs which prevailed during our Lord's paſſion. The book in which the words are contained is loſt; but Euſebius has preſerved them in his *Chronicon*. They are theſe: "In the 4th year of the 202d Olympiad, there was a greater and more remarkable eclipſe of the ſun than any that had ever happened before: for at the ſixth hour the day was ſo turned into the darkneſs of night, that the very ſtars in the firmament were viſible; and there was an earthquake in Bithynia which threw down many houſes in the city of Nicæa." Euſebius thinks that theſe words of Phlegon related to the prodigies which accompanied Chriſt's crucifixion; and many other fathers of the church have thought the ſame: but this opinion is liable to many difficulties; for no man had ever a ſtronger deſire than Phlegon to compile marvelous events, and to obſerve the ſupernatural circumſtances in them. How was it then poſſible that a man of this turn of mind ſhould not have taken notice of the moſt ſurpriſing circumſtance in the eclipſe which it is imagined he hints at, viz. its happening on the day when the moon was at the full? But had Phlegon done this, Euſebius would not have omitted it; and Origen would not have ſaid that Phlegon had omitted this particular.

It was a matter of controverſy ſome time ago, whether Phlegon really ſpoke of the darkneſs at the time of our Lord's paſſion; and many diſſertations were written on both ſides of the queſtion. This diſpute was occaſioned by the above paſſage from Phlegon being left out in an edition of Clark's Boyle's Lectures, publiſhed after his death, at the inſtance of Sykes, who had ſuggeſted to Clarke, that an undue ſtreſs had been laid upon it. Whiſton, who informs us of this affair, expreſſes great diſpleaſure againſt Sykes, and calls "the ſuggeſtion groundleſs." Upon this, Sykes publiſhed "A Diſſertation on the Eclipſe mentioned by Phlegon: or, "An Inquiry whether that Eclipſe had any relation to the darkneſs which happened at our Saviour's Paſſion, 1732," 8vo. Sykes concludes it to be moſt probable that Phlegon had in view a natural eclipſe which happened November 24. in the 1ſt year of the 202d Olympiad, and not in the 4th year of the Olympiad in which Chriſt was crucified. Many pieces were written againſt him, and to ſome of them he replied; but perhaps it is a controverſy which concerns the learned world merely, ſince the cauſe of religion is but little affected by it.

Photius blames Phlegon for expatiating too much on trifles, and for collecting too great a number of anſwers pronounced by the oracles. "His ſtyle (he tells us) is not altogether flat and mean, nor does it everywhere imitate the Attic manner of writing. But otherwiſe, the over nice accuracy and care with which he computes the Olympiads, and relates the names of the conteſts, the tranſactions, and even oracles, is not only very tireſome to the reader, whereby a cloud is thrown over all other particulars in that book, but the diction is thereby rendered unpleaſant and ungrateful; and indeed he is every moment bringing in the anſwers pronounced by all kinds of deities."

PHLOGISTON, a term uſed by chemiſts to expreſs a principle which was ſuppoſed to enter the compoſition of various bodies.

The bodies which were thought to contain it in the largeſt quantity are the inflammable ſubſtances; and the property which theſe ſubſtances poſſeſs of being ſuſceptible of inflammation was thought to depend on this principle; and hence it was ſometimes called the *Principle of Inflammability.* Inflammation, according to this doctrine, was the ſeparation of *this principle* or *phlogiſtion* from the other matter which compoſed the combuſtible body. As its ſeparation was always attended with the emiſſion of light and heat, ſome of the chemiſts concluded that it was light and heat combined with other matter in a peculiar manner, or that it was ſome highly elaſtic and very ſubtile matter, on certain modifications of which heat and light depended.

Another claſs of bodies which were ſuppoſed to contain phlogiſtion are the metals; and the chemiſts ſuppoſed that the peculiar luſtre of the metals depended on this principle. Of this they thought themſelves convinced by the evidence of their ſenſes in two ways; viz. firſt, becauſe by expoſing a metal to the action of a long continued heat, it loſt its metallic luſtre, and was converted into an earthy-like ſubſtance called *calx metallicus;* and ſecondly, becauſe by mixing this calx with any inflammable ſubſtance whatever, and ſubjecting the mixture to certain operations, the inflammable matter diſappeared, and the metal was reſtored to its former ſtate and luſtre, without ſuffering much diminution in quantity, eſpecially if the proceſſes had been conducted with care and attention.

This fact relative to the metals was thought to be a full demonſtration of itſelf, independent of other proofs which were brought to ſupport the doctrine. Theſe were, that a combuſtible body, by the act of inflammation (*i. e.* by the diſſipation of its phlogiſton in the form of heat and light), was converted into a body that was no longer combuſtible, but which might have its property of combuſtibility reſtored to it again by mixing the incombuſtible remains with any kind of inflammable matter, and ſubmitting the mixture to certain proceſſes. In this way the body was reſtored to its former ſtate of inflammability.

They were alſo at ſome pains to prove that the *phlogiſton* or the *principle of inflammability* was the ſame in all inflammable bodies and in the metals. This identity of phlogiſtion they thought to be evident from the fact, that the calx of a metal might be reſtored to its metallic ſtate, or that the remains after the combuſtion of a combuſtible body might be again reſtored to its original ſtate of combuſtibility by the addition of any inflammable body whatever, taken either from the animal, vegetable, or mineral kingdoms.

Theſe and ſeveral other facts were brought to prove, not only the exiſtence of phlogiſton, but its effects in mixture with other ſubſtances; and the objections which were made againſt the doctrine were removed with wonderful ingenuity. The chief objection againſt it was, that if the inflammation of a combuſtible body, or the converſion of a metal into calx, depends on the diſſipation or extrication of Phlogiſton; then it muſt follow, that the remains of a combuſtible body after inflammation, and the calx of the metal, muſt be leſs than the matter from which they were produced: but this is contrary to fact; for when we collect with care all the vapour into which the pureſt inflammable bodies are converted by combuſtion, theſe incombuſtible remains are much heavier than the inflammable body was from which they were produced, and the calx into which a metal is converted by long expoſure to the action of heat is heavier than the metal from which is was produced. This conſideration made ſeveral people doubt of the truth of the doctrine; but the objection was removed by ſaying, that phlogiſton was ſo ſubtile, as not only to have no weight, but to poſſeſs an abſolute levity; and that when it was taken from an abſolutely heavy body, that body muſt, by loſing ſo much abſolute levity, become heavier, in the ſame manner as the algebraiſts ſay, that a poſitive quantity is augmented by the ſubſtraction of a negative quantity. This ſophiſm ſatisfied the minds of moſt of the chemiſts, eſpecially thoſe who were algebraiſts.

The opinion that phlogiſton was heat and light ſomehow combined with other matter, was proved, not only by the fact, that heat and light were emitted from a combuſtible body during its combuſtion, but from the reduction of certain metallic calces to their original metallic ſtate again, at leaſt in ſome degree, by ſimple expoſure to heat and light. The white calx of ſilver for inſtance, when expoſed in cloſe ſealed glaſs veſſels to the light and heat of the ſun, reſumes a black tinge, and is in part reſtored to its metallic luſtre without any addition whatever; but then this reſtoration, like the others above mentioned, is attended with a loſs of weight.

Beſides conſtituting the principal part of inflammable bodies and metals, phlogiſton was thought to be the cauſe of colour in all vegetable and animal ſubſtances. This was concluded from the fact of plants growing white when defended from the action of the ſun's rays, and in having their green colour reſtored by expoſure to his rays again; and ſo far did the chemiſts ſuffer themſelves to be deceived, that they actually thought the green colouring matter, which they extracted from freſh plants by certain chemical proceſſes, to be an inflammable ſubſtance. A very material objection was made to this argument, viz. if plants owe their colour to phlogiſton imparted by the ſun's rays, why do the ſun's rays deſtroy vegetable colours that are expoſed to them? for we know that the ſun's rays are very effectual in diminiſhing the luſtre of cloth dyed with vegetable colours, and in bleaching or taking out various ſtains from linen and other ſubſtances. All this was removed by ſaying, that the ſun's rays poſſeſſed different powers on living and on dead vegetable matter, and that the living vegetables had the power of abſorbing phlogiſton from the ſun's rays, which dead vegetable matter had not.

Since the exiſtence of phlogiſton, as a chemical principle in the compoſition of certain bodies, is now fully proved to be falſe, we ſhall not trouble our readers with any farther obſervations on it, except adding, that although the chemiſts were ſatisfied with the proofs they gave of its reality, they were never able to exhibit it in a ſeparate ſtate, or ſhow it in a pure form, unmixed with other matter.

Phlogiſton ſeems to have been admitted as a principle in the compoſition of certain bodies, and to have been ſuppoſed the cauſe of certain modifications of matter, merely with a view to explain ſome of thoſe natural phenomena which the authors of it were unable to explain on other principles. Subſequent diſcoveries in natural philoſophy and in chemiſtry have repreſented things in a very different light from that in which the old chemiſts viewed them. The old chemiſts knew nothing but chemiſtry; they ſeldom extended their views to the obſervation of objects beyond their laboratories, and it was not till philoſophers became chemiſts, and chemiſts philoſophers, that chemiſtry began to wear the garb of ſcience. The epoch in which this change began was in the time of Lord Verulam, who firſt removed the dimneſs from the chemiſt's eyes, and to him ſucceeded the Honourable Mr Boyle. Sir Iſaac Newton, with the little aſſiſtance which his predeceſſors in this branch of ſcience afforded him, is in reality the firſt who eſtabliſhed chemiſtry on ſcientific ground. It muſt, however, be acknowledged, that although he made a great progreſs, he left much undone; and ſubſequent chemiſts, who were leſs accurate obſervers of nature, admitted principles unwarrantably. From the time of Sir Iſaac Newton till the middle of the 18th century, no real improvement was made in ſcientific chemiſtry; and the progreſs this ſcience has made ſince that period is owing to the important diſcovery of the exiſtence of heat in a ſtate of compoſition with other matter. Heat thus combined loſes its activity or becomes inſenſible, juſt in the ſame way as any other active ſubſtance loſes its apparent qualities in compoſition. Acids, for example, when combined in a certain proportion with ſubſtances for which they have ſtrong attraction, as alkalis or abſorbent earths, loſe all their obvious acid qualities, and the compound turns out mild, and totally conceals the acid which it contains. In a ſimilar manner, heat, when combined in certain proportions with other matter, loſes its ſenſible qualities, and the compound conceals the heat which it contains. Heat, in this combined ſtate, was called by its ingenious diſcoverer, Dr Black, *latent heat*, and it was found to be very abundant in the atmoſphere, which owes its exiſtence as an elaſtic fluid to the quantity of latent heat that it contains. After this diſcovery was made, Dr Crawford, conſidering that air was abſorbed by a burning body, concluded that the heat which appears in the combuſtion of a combuſtible body, is the heat that had before exiſted in the air which was conſumed by the burning body. Mr Lavoiſier and others, proſecuting this inquiry, found that the combuſtible body, while it is burning, unites with the baſis of the air, and that the heat which the air contained, and which was the cauſe of the air exiſting in the ſtate of air, is expelled. This abſorption of the baſis of the air by the burning body, and the reduction of this baſis to a ſolid form, accounts for the increaſe of weight which a body acquires by burning; or, in other words, gives a reaſon why the matter into which a combuſtible body is converted by combuſtion, is heavier than the body from which it was produced. The ſame abſorption of air is obſervable, when a metal is converted into a calx, and the additional weight of the calx is found to be preciſely equal to the weight of the air abſorbed during the calcination. On theſe principles, therefore, we now explain the phenomena in a much more ſatisfactory manner than by the ſuppoſition of phlogiſton, or a principle of inflammability.

This theory is more fully elucidated in ſeveral articles in the former part of this work; we ſhall not, therefore, in this place, repeat what the reader may find under the words HEAT, INFLAMMATION, FLAME, CHEMISTRY, CALCINATION *of Metals*, OXYGEN, &c.

PHLOGONIÆ, a claſs of compound, inflammable, and metallic foſſils, found in ſmall maſſes of determinately angular figures; comprehending the pyricubia, pyroctogonia, and pyripolygonia.

PHLOMIS, the SAGE-TREE, or *Jeruſalem Sage*; a genus of the gymnoſpermia order, belonging to the didynamia claſs of plants. There are 14 ſpecies, all of which have perennial roots, and of many the ſtalks alſo are perennial. The latter riſe from two to five or ſix feet high; and are adorned with yellow, blue or purple flowers in whorls. They are all ornamental plants; and deſerve a place in gardens, as they are ſufficiently hardy to endure the ordinary winters in this climate: they require, however, a pretty warm ſituation.

Planting and Ornamental Gardening.

There are two ſpecies of this plant, which are peculiarly adapted to the ſhrubbery, viz. the *Phlomis fructicoſa*, a native of Spain and Sicily, and the *Phlomis purpurea*. Of the firſt ſpecies there are three varieties, 1. The *broad-leaved Jeruſalem Sage-tree*, is now very common in our gardens. Its beauty is great, and its culture very eaſy. It grows to be about five feet high, and ſpreads its branches without order all around. The older branches are covered with a dirty, greeniſh, dead, falling, ill-looking bark; and this is the worſt property of this ſhrub: but the younger ſhoots are white and beautiful; they are four-cornered, woolly, and ſoft to the touch. The leaves are roundiſh and oblong, and moderately large; and theſe grow oppoſite at the joints of the ſhrub on long footſtalks. They are hoary to a degree of whiteneſs, and their footſtalks alſo are woolly, white, tough, and ſtrong. The flowers are produced in June, July, and Auguſt, at the top joints of the young ſhoots, in large whorled bunches. They are of the labiated kind, each conſiſting of two lips, the upper end of which is forked, and bends over the other. A finer yellow can hardly be conceived than the colour of which they are poſſeſſed; and being large, they exhibit their golden flowers at a great diſtance, cauſing thereby a handſome ſhow. 2. The *narrow leaved Jeruſalem Sage tree*, is of lower growth than the other, ſeldom riſing higher than a yard or four feet. This ſhrub is in every reſpect like the other; only the ſhoots ſeem to have a more upright tendency of growth. The leaves alſo, which are narrower, are more inclined to a lanceolate form: They are numerous in both the ſorts, and hide the deformity of the bark on the older ſtems, which renders them leſs exceptionable on that account. In ſhort, theſe ſorts are qualified for ſhrubberies of all kinds, or to be ſet in borders of flower-gardens, where they will flower, and be exceeded even in that reſpect by very few ſhrubs. 3. *Cretan Sage-tree*, is ſtill of lower growth than either of the former, ſeldom ariſing to a yard in height. The leaves are of the ſame white hoary nature; they are very broad, and ſtand on long footſtalks. The flowers are alſo of a delightful yellow colour, very large, and grow in large whorls, which give the plant great beauty.

The ſecond ſpecies, which is *Purple Phlomis* or *Portugal Sage*, is four feet high; the ſtalks are woody, and ſend forth ſeveral angular branches, which are covered with a white bark. The leaves are ſpear-ſhaped,

ped, oblong, woolly underneath, crenated, and grow on ſhort footſtalks. The flowers are produced in whorls from the joints of the branches. They are of a deep purple colour, and have narrow involucra. They appear in June and July, but are not ſucceeded by ripe ſeeds in England. There is a variety of this ſpecies with iron-coloured flowers, and another with flowers of a bright purple.

There are ſome other ſhrubby ſorts of phlomis, of great beauty; but theſe not only often loſe their leaves, and even branches, from the firſt froſt, but are frequently wholly deſtroyed, if it happens to be ſevere. They are low ſhrubs, very beautiful, and look well among perennial flowers, where they will not only claſs as to ſize with many of that ſort, but, being rather tender, may with them have ſuch extraordinary care as the owner may think proper to allow them.

The propagation of the above ſorts is, as we have already hinted, very eaſy, and is accompliſhed either by layers or cuttings. 1. If a little earth be thrown upon the branches any time in the winter, they will ſtrike root and be good plants by the autumn following, fit for any place. Thus eaſy is the culture by that method. 2. The cuttings will alſo grow, if planted any time of the year. Thoſe planted in winter ſhould be the woody ſhoots of the former ſummer: Theſe may be ſet cloſe in a ſhady border; and being watered in dry weather, will often grow. This ſhrub may be prapagated by young ſlips alſo, in any of the ſummer months. Theſe ſhould be planted in a ſhady border, like ſage, and well watered. If the border is not naturally ſhady, the beds muſt be hooped, and covered with matting in hot weather. Watering muſt be conſtantly afforded them; and with this care and management many of them will grow.

PHLOX, Lychnidea, or *Baſtard Lychnis*; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are ſeven ſpecies, all of them natives of North America. They have perennial roots, from which ariſe herbaceous ſtalks from nine inches to two feet in height, adorned with tubulated flowers of a purple colour. They are propagated by offſets, and will bear the winters in this country. They require a moiſt rich ſoil, in which they thrive better and grow taller than in any other.

PHLYCTENÆ, in medicine, ſmall eruptions on the ſkin.

PHOCA, in zoology, a genus of quadrupeds of the order of feræ. There are ſix parallel fore-teeth in the upper jaw, the outermoſt being larger; and four blunt, parallel, diſtinct, equal fore-teeth in the under jaw. There is but one dog-tooth, and five or ſix three-pointed grinders; and the hind feet are united ſo as to reſemble a ſheep's tail. There are a variety of ſpecies, the principle of which are,

1. The urſina, ſea-bear, or urſine ſeal, has external ears. The Male is greatly ſuperior in ſize to the female. The bodies of each are of a conic form, very thick before, and taper to the tail. The length of a large one is eight feet; the greateſt circumference, five feet; near the tail, 20 inches; and the weight is about 800 lb. The noſe projects like that of a pug-dog, but the head riſes ſuddenly; the teeth lock into one another when the mouth is ſhut; the tongue is large; the eyes are large and prominent, and may be covered at pleaſure by a fleſhy membrane. The length of the fore-legs is 24 inches; they are like thoſe of other quadrupeds, not immerſed in the body like thoſe of ſeals; the feet are formed with toes like thoſe of other animals, but are covered with a naked ſkin, ſo that externally they ſeem to be a ſhapeleſs maſs; the hind-legs are fixed to the body quite behind, like thoſe of common ſeals; but are capable of being brought forward, ſo that the animal makes uſe of them to ſcratch its head.

Pennant's Arctic Zoology.

Theſe animals are found in the northern ſeas. They are found in amazing quantities between Kamtſchatka and America; but are ſcarcely known to land on the Aſiatic ſhore: nor are they ever taken except in the three Kurilian iſlands, and from thence in the Bobrowoie More, or Beaver Sea, as far as the Kronoſki headland, off the river Kamtſchatka, which comprehends only from 50 to 56 north latitude. It is obſervable that they never double the ſouthern cape of the peninſula, or are found on the weſtern ſide in the Penſchinſka ſea: but their great reſort has been obſerved to be to Bering's iſlands. They are as regularly migratory as birds of paſſage. They firſt appear off the three Kurili iſlands and Kamtſchatka in the earlieſt ſpring. There is not one female which does not come pregnant. Such as are then taken are opened, the young taken out and ſkinned. They are found in Bering's iſland only on the weſtern ſhore, being the part oppoſite to Aſia, where they firſt appear on their migration from the ſouth.

Urſine ſeals are alſo found in the ſouthern hemiſphere, even from under the line, in the iſle of Gallipagos (A), to New Georgia, in ſouth latitude 54. 15. and weſt longitude 37. 15. In the intermediate parts, they are met with in New Zealand, in the iſle of Juan Fernandez, and its neighbour Maſſa Fuera, and probably along the coaſts of Chili to Terra del Fuego and Staten Land. In Juan Fernandez, Staten Land, and New Georgia, they ſwarm; as they do at the northern extremity of this vaſt ocean. Thoſe of the ſouthern hemiſphere have alſo their ſeaſons of migration.—Alexander Selkirk, who paſſed three lonely years on the iſle of Juan Fernandez, remarks that they come aſhore in June, and ſtay till September. Captain Cook found them again in their place of remigration in equal abundance, on Staten Land and new Georgia in the months of December and January; and Don Pernety found them on the Falkland iſlands in the month of February. According to the Greenlanders, this ſpecies inhabits the ſouthern parts of their country. They call it *Auvekæjak*. That it is very fierce, and tears to pieces whatſoever it meets; that it lives on land as well as in water, and is greatly dreaded by the hunters.

During the three months of ſummer they lead a moſt indolent

(A) *Woodes Roger's Voy.* 265. He ſays that they are neither ſo numerous there, nor is their fur ſo fine, as thoſe on Juan Fernandez, which is ſaid to be extremely ſoſt and delicate.

indolent life: they arrive at the iſlands vaſtly fat; but during that time they are ſcarce ever in motion, confine themſelves for whole weeks to one ſpot, ſleep a great part of the time, eat nothing, and, except the employment the females have in ſuckling their young, are totally inactive. They live in families: each male has from 8 to 50 females, whom he guards with the jealouſy of an eaſtern monarch; and though they lie by thouſands on the ſhores, each family keeps itſelf ſeparate from the reſt, and ſometimes, with the young and unmarried ones, amount to 120. The old animals, which are deſtitute of females, or deſerted by them, live apart, and are exceſſively ſplenetick, peeviſh, and quarrelſome: are exceeding fierce, and ſo attached to their old haunts, that they would die ſooner than quit them. They are monſtrouſly fat, and have a moſt hircine ſmell. If another approaches their ſtation, they are rouſed from their indolence, and inſtantly ſnap at it, and a battle enſues; in the conflict, they perhaps intrude on the ſeat of another: this gives new cauſe of offence, ſo in the end the diſcord becomes univerſal, and is ſpread through the whole ſhore.

The other males are alſo very irraſcible: the cauſes of their diſputes are generally theſe. The firſt and moſt terrible is, when an attempt is made by another to ſeduce one of their miſtreſſes or a young female of the family. This inſult produces a combat; and the conqueror is immediately followed by the whole ſeraglio, who are ſure of deſerting the unhappy vanquiſhed. The ſecond reaſon of a quarrel is, when one invades the ſeat of another: the third ariſes from their interfering in the diſputes of others. Theſe battles are very violent; the wounds they receive are very deep, and reſemble the cuts of a ſabre. At the end of a fight they fling themſelves into the ſea, to waſh away the blood.

The males are very fond of their young, but very tyrannical towards the females; if any body attempts to take their cub, the male ſtands on the defenſive, while the female makes off with the young in her mouth; ſhould ſhe drop it, the former inſtantly quits his enemy, falls on her, and beats her againſt the ſtones, till he leaves her for dead. As ſoon as ſhe recovers, ſhe comes in the moſt ſuppliant manner to the male, crawls to his feet, and waſhes them with her tears: he, in the mean time, ſtalks about in the moſt inſulting manner; but in caſe the young one is carried off, he melts into the deepeſt affliction, and ſhows all ſigns of extreme concern. It is probable that he feels his misfortunes the more ſenſibly, as the female generally brings but one at a time, never more than two.

They ſwim very ſwiftly, at the rate of ſeven miles an hour. If wounded, they will ſeize on the boat, and carry it along with vaſt impetuoſity, and oftentimes ſink it. They can continue a long time under water. When they want to climb the rocks, they faſten with the fore-paws, and ſo draw themſelves up. They are very tenacious of life, and will live for a fortnight after receiving ſuch wounds as would immediately deſtroy any other animal.

Pennant, ibid,

The Kamtſchatkans take them by harpooning, for they never land on their ſhore. To the harpoon is faſtened a long line, by which they draw the animal to the boat after it is ſpent with fatigue; but in the chaſe, the hunters are very fearful of too near an approach, leaſt the animal ſhould faſten on, and ſink their veſſel.

The uſes of them are not great. The fleſh of the old males is rank and nauſeous; that of the females is ſaid to reſemble lamb; of the young ones roaſted, a ſucking pig. The ſkins of the young, cut out of the bellies of the dams, are eſteemed for cloathing, and are ſold for about three ſhillings and fourpence each; thoſe of the old for only four ſhillings.

Their remigration is in the month of September, when they depart exceſſively lean, and take their young with them. On their return, they again paſs near the ſame parts of Kamtſchatka which they did in the ſpring. Their winter retreats are quite unknown; it is probable that they are the iſlands between Kurili and Japan, of which we have ſome brief accounts, under the name of *Compagnie Land*, *States Land*, and *Jeſo Gaſima*, which were diſcovered by Martin Uriel in 1642. It is certain, that by his account the natives employed themſelves in the capture of ſeals. Sailors do not give themſelves the trouble of obſerving the nice diſtinction of ſpecific marks; we are thereſore at liberty to conjecture thoſe which he ſaw to be our animals, eſpecially as we can fix on no more convenient place for their winter quarters. They arrive along the ſhores of the Kurili iſlands, and part of thoſe of Kamtſchatka, from the ſouth. They land and inhabit only the weſtern ſide of Bering's iſle which faces Kamtſchatka; and when they return in September, their rout is due ſouth, pointing towards the diſcoveries of Uriel. Had they migrated from the ſouth-eaſt as well as the ſouth-weſt, every iſle, and every ſide of every iſle, would have been filled with them; nor ſhould we have found (as we do) ſuch a conſtant and local reſidence.

2. The leonina, ſea-lion, or bottlenoſe, is found near the ſouth pole. One variety of this ſpecies is deſcribed at ſome length by the publiſher of Anſon's voyage. However, according to others who have written on this ſubject, the name of *ſea-lion* belongs not ſo properly to this as to another, which has a mane like a true lion. Of theſe we have the following account from Pernety's Hiſtorical Journal. "The hair that covers the back part of the head, neck, and ſhoulders, is at leaſt as long a the hair of a goat. It gives this amphibious animal an air of reſemblance to the common lion of the foreſt, excepting the difference of ſize. The ſea-lions of the kind I ſpeak of are 25 feet in length, and from 19 to 20 in their greateſt circumference. In other reſpects they reſemble the common ſea-lions. Thoſe of the ſmall kind have a head reſembling a maſtiff's with cloſe cropt ears.

"The teeth of the ſea-lions which have manes, are much larger and more ſolid than thoſe of the reſt. In theſe, all the teeth which are inſerted into the jawbone are hollow. They have only four large ones, two in the lower and two in the upper jaw. The reſt are not even ſo large as thoſe of a horſe. I brought home one belonging to the true ſea-lion, which is at leaſt three inches in diameter, and ſeven in length, though not one of the largeſt. We counted 22 of the ſame ſort in the jaw-bone of one of theſe lions, where five or ſix were wanting. They were entirely ſolid, and projected ſcarce more than an inch, or an inch and a half beyond their ſockets. They are nearly equal in ſolidity to flint, and are of a dazzling white. Several of our ſeamen took them for white flints when they found them upon the ſhore. I could not even perſuade them that they were not real flints, except by rubbing them againſt each other, or breaking ſome pieces off, to make them ſenſible that they exhaled the ſame ſmell as bones and ivory do when they are rubbed or ſcraped.

"Theſe ſea-lions that have manes are not more miſchievous or formidable than the others. They are equally unwieldy and heavy in their motions; and are rather diſpoſed to avoid than to fall upon thoſe who attack them. Both kinds live upon fiſh and water-fowl, which they catch by ſurpriſe. They bring forth and ſuckle their young ones among the corn-flags, where they retire at night, and continue to give them ſuck till they are large enough to go to ſea. In the evening you ſee them aſſembling in herds upon the ſhore, and calling their dams in cries ſo much like lambs, calves, and goats, that, unleſs apprized of it, you would eaſily be deceived. The tongue of theſe animals is very good eating: we preferred it to that of an ox or calf. For a trial we cut off the tip of the tongue hanging out of the mouth of one of theſe lions which was juſt killed. About 16 or 18 of us eat each a pretty large piece, and we all thought it ſo good, that we regretted we could not cut more of it.

"It is ſaid that their fleſh is not abſolutely diſagreeable. I have not taſted it: but the oil which is extracted from their greaſe is of great uſe. This oil is extracted two ways; either by cutting the fat in pieces, and melting it in large caldrons upon the fire; or by cutting it in the ſame manner upon hurdles, or pieces of board, and expoſing them to the ſun, or only to the air: this greaſe diſſolves of itſelf, and runs into veſſels placed underneath to receive it.—Some of our ſeamen pretended, that this laſt ſort of oil, when it is freſh, is very good for kitchen uſes: this, as well as the other, is commonly uſed for dreſſing leather for veſſels, and for lamps. It is preferred to that of the whale: it is always clear, and leaves no ſediment.

"The ſkins of the ſea lions are uſed chiefly in making portmanteaus, and in covering trunks. When they are tanned, they have a grain almoſt like Morocco. They are not ſo fine, but are leſs liable to tear, and keep freſh a longer time. They make good ſhoes and boots, which, when well ſeaſoned, are water-proof.

"One day Mr Guyot and ſome others brought on board five ſea-lioneſſes. They were about ſeven feet long, and three and a half in circumference, tho' their inteſtines were drawn. Theſe gentlemen had landed on a ſmall iſland, where they found a prodigious number of theſe animals, and killed eight or nine hundred of them with ſticks. No other weapon is neceſſary on theſe occaſions. A ſingle blow with a bludgeon, three feet or three feet and a half long, almoſt full at the noſe of theſe animals, knocks them down, and kills them on the ſpot.

"This is not altogether the caſe with the males: their ſize is prodigious. Our gentlemen encountered two of them for a long time, with the ſame weapons, without being able to overcome them. They lodged three balls in the throat of one while he opened his mouth to defend himſelf, and three muſket-ſhot in his body. The blood guſhed from his wounds like wine from a tap. However, he crawled into the water and diſappeared. A ſailor attacked the other, and engaged him for a long time, ſtriking him on the head with a bludgeon, without being able to knock him down: the ſailor fell down very near his antagoniſt, but had the dexterity to recover himſelf at the inſtant the lion was going to gorge him. Had he once ſeized him, the man would infallibly have been loſt: the animal would have carried him into the water as they uſually do their prey, and there feaſted upon him. In his retreat to the ſea this animal ſeized a pinguin, and devoured him inſtantaneouſly."

Mr Pennant deſcribes three ſeals of different ſpecies which are called *ſea-lions*, viz. the *phoca leonina*, or hooded ſeal; the *phoca leonina*, or bottlenoſe; and the *beſtia marina*, or leonine ſeal. He differs in ſome particulars from the author juſt quoted; and ſuch of our readers as deſire to know theſe differences, we refer to his works.

3. The vitulina, ſea-calf, or common ſeal, inhabits the European ocean. It has a ſmooth head without external ears; and the common length is from five to ſix feet. The fore legs are deeply immerſed in the ſkin of the body; the hind legs are placed in ſuch a manner as to point directly backwards: every foot is divided into five toes; and each of thoſe connected by a ſtrong and broad web, covered on both ſides with ſhort hair. The toes are furniſhed with ſtrong claws, well adapted to aſſiſt the animal in climbing the rocks it baſks on; the claws on the hind feet are ſlender and ſtraight; except at the ends, which are a little incurvated. The head and noſe are broad and flat, like thoſe of the otter; the neck ſhort and thick; the eyes large and black; in lieu of external ears, it has two ſmall orifices: the noſtrils are oblong: on each ſide the noſe are ſeveral long ſtiff hairs; and above each eye are a few of the ſame kind. The form of the tongue is ſo ſingular, that were other notes wanting, that alone would diſtinguiſh it from all other quadrupeds; being forked, or ſlit at the end. The cutting teeth are ſingular in reſpect to their number, being ſix in the upper jaw, and only four in the lower. It has two canine teeth above and below, and on each ſide of the jaw five grinders; the total 34. The whole animal is covered with ſhort hair, very cloſely ſet together: the colour of that on the body is generally duſky, ſpotted irregularly with white; on the belly white; but ſeals vary greatly in their marks and colours, and ſome have been found entirely white.

The ſeal is common on moſt of the rocky ſhores of Great Britain and Ireland, eſpecially on the northern coaſts: in Wales, it frequents the coaſts of Caernarvonſhire and Angleſey. They inhabit all the European ſeas, even to the extreme north; are found far within the arctic circle, in the ſeas both of Europe and Aſia, and are even continued to thoſe of Kamtſchatka*. It preys entirely on fiſh, and never moleſts the ſea-fowl: for numbers of each are often ſeen floating on the waves, as if in company. Seals eat their prey beneath the water; and in caſe they are devouring any very oily fiſh, the place is known by a certain ſmoothneſs of the waves immediately above. The power of oil in ſtilling the waves excited by a ſtorm is mentioned by Pliny: the moderns have made the experiment with ſucceſs; and thereby made one advance towards eradicating the vulgar prejudices againſt that great and elegant writer.

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* Steller. in Nov. Com. Petrop ii. 290.

Seals are excellent ſwimmers, and ready divers; and are very bold when in the ſea, ſwimming careleſsly enough about boats; their dens or lodgments are in hollow rocks or caverns near the ſea, but out of the reach of the tide: in the ſummer they will come out of the water, to baſk or ſleep in the ſun on the top of large ſtones or ſhivers of rocks; and that is the opportunity our countrymen take of ſhooting them: if they chance to eſcape, they haſten towards their proper element, flinging ſtones and dirt behind them as they ſcramble along; at the ſame time expreſſing their fears by piteous moans; but if they happen to be overtaken, they will make a vigorous defence with their feet and teeth till they are killed. They are taken for the ſake of their ſkins, and for the oil their fat yields: the former ſell for 4 s. or 4 s. 6 d. a piece; which, when dreſſed, are very uſeful in covering trunks, making waiſtcoats, ſhot-pouches, and ſeveral other conveniences. We remember ſome years ago to have ſeen a young ſeal in ſome degree domeſticated. It was taken at a little diſtance from the ſea, and was generally kept in a veſſel full of ſalt water; but ſometimes it was allowed to crawl about the houſe, and even to approach the fire. Its natural food was regularly procured for it, and it was taken to the ſea every day and thrown in from a boat. It uſed to ſwim after the boat, and always allowed itſelf to be taken back. It lived thus for ſeveral weeks; and we doubt not would have lived much longer had it not been ſometimes too roughly uſed by the boys who took it to and from the ſea.

The fleſh of theſe animals, and even of porpoiſes, formerly found a place at the tables of the great; as appears from the bill of fare of that vaſt feaſt that Archbiſhop Nevill gave in the reign of Edward IV. in which is ſeen that ſeveral were provided on the occaſion. They couple about April, on large rocks or ſmall iſlands not remote from the ſhore; and bring forth in thoſe vaſt caverns that are frequent on the coaſts: they commonly bring two at a time, which in their infant ſtate are covered with a whitiſh down or woolly ſubſtance. The ſeal hunters in Caithneſs ſay, that their growth is ſo ſudden, that in nine tides from their birth (108 hours) they will become as active as their parents. On the coaſt of that country are immenſe caverns opening into the ſea, and running ſome hundreds of yards beneath the land. Theſe are the reſort of ſeals in the breeding time, where they continue till their young are old enough to go to ſea, which is in about ſix or ſeven weeks. The firſt of theſe caves is near the Ord, the laſt near Thrumſter; their entrance is ſo narrow as only to admit a boat; their inſide very ſpacious and lofty. In the month of October, or the beginning of November, the ſeal hunters enter the mouth of the caverns about midnight, and rowing up as far as they can, they land; each of them being provided with a bludgeon, and properly ſtationed, they light their torches, and make a great noiſe, which brings down the ſeals from the farther end in a confuſed body with fearful ſhrieks and cries: at firſt the men are obliged to give way for fear of being overborne; but when the firſt crowd is paſt, they kill as many as ſtraggle behind, chiefly the young, by ſtriking them on the noſe; a very ſlight blow on that part diſpatches them. When the work is over, they drag the ſeals to the boat, which two men are left to guard. This is a moſt hazardous employment; for ſhould their torches go out, or the wind blow hard from ſea during their continuance in the cave, their lives are loſt. The young ſeals of ſix weeks age yield more oil than their emaciated dams: above eight gallons have been got from a ſingle whelp, which ſells from 6 d. to 9 d. per gallon; the ſkins from 6 d. to 1 s. each.

Pennant's Britiſh Zoology.

The natural hiſtory of this animal may be further elucidated by the following extracts from a letter of the reverend Dr William Borlaſe, dated October the 24th 1763. "The ſeals are ſeen in the greateſt plenty on the ſhores of Cornwall in the months of May, June, and July. They are of different ſizes; ſome as large as a cow, and from that downwards to a ſmall calf. They feed on moſt ſorts of fiſh which they can maſter; and are ſeen ſearching for their prey near ſhore, where the whiſtling fiſh, wraws, and polacks, reſort. They are very ſwift in their proper depth of water, dive like a ſhot, and in a trice riſe at 50 yards diſtance; ſo that weaker fiſhes cannot avoid their tyranny except in ſhallow water. A perſon of the pariſh of Sennan ſaw not long ſince a ſeal in purſuit of a mullet (that ſtrong and ſwift fiſh); the ſeal turned it to and fro in deep water, as a gre-hound does a hare; the mullet at laſt found it had no way to eſcape, but by running into ſhoal water: the ſeal purſued; and the former, to get more ſurely out of danger, threw itſelf on its ſide, by which means it darted into ſhoaler water than it could have ſwam in with the depth of its paunch and fins, and ſo eſcaped. The ſeal brings her young about the beginning of autumn: our fiſhermen have ſeen two ſucking their dam at the ſame time, as ſhe ſtood in the ſea in a perpendicular poſition. Their head in ſwimming is always above water, more ſo than that of a dog. They ſleep on rocks ſurrounded by the ſea, or on the leſs acceſſible parts of the cliffs left dry by the ebb of the tide; and if diſturbed by any thing, take care to tumble over the rocks into the ſea. They are extremely watchful, and never ſleep long without moving; ſeldom longer than a minute; then raiſe their heads, and if they hear or ſee nothing more than ordinary, lie down again, and ſo on, raiſing their heads a little and reclining them alternately in about a minute's time. Nature ſeems to have given them this precaution, as being unprovided with auricles or external ears; and conſequently not hearing very quick, nor from any great diſtance."

Theſe animals are ſo very uſeful to the inhabitants of Greenland and other arctic people, that they may be called their flocks. We cannot give a better account of theſe uſes than in the words of Mr Crantz, who was long reſident in thoſe northern regions.

"Seals (ſays he) are more needful to them than ſheep are to us, though they furniſh us with food and raiment; or than the cocoa-tree is to the Indians, although that preſents them not only with meat to eat, and covering for their bodies, but alſo houſes to dwell in, and boats to ſail in, ſo that in caſe of neceſſity they could live ſolely from it. The ſeals fleſh (together with the rein-deer, which has already grown pretty ſcarce) ſupplies the natives with their moſt palatable and ſubſtantial food. Their fat furniſhes them with oil for lamp-light, chamber and kitchen fire; and whoever ſees their habitations, preſently finds, that if they even had a ſuperfluity of wood, it would not do, they can uſe nothing but train in them. They alſo mollify their dry food, moſtly fiſh, in the train; and finally, they barter it for all kinds of neceſſaries with the factor. They can ſew better with fibres of the ſeals ſinews than with thread or ſilk. Of the ſkins of the entrails they make their windows, curtains for their tents, ſhirts, and part of the bladders they uſe at their harpoons; and they make train bottles of the maw. Formerly, for want of iron, they made all manner of inſtruments and working tools of their bones. Neither is the blood waſted, but boiled with other ingredients, and eaten as ſoup. Of the ſkin of the ſeal they ſtand in the greateſt need; for, ſuppoſing the ſkins of rein-deer and birds would furniſh them with competent clothing for their bodies, and coverings for their beds; and their fleſh, together with fiſh, with ſufficient food; and provided they could dreſs their meat with wood, and alſo new model their houſe-keeping, ſo as to have light, and keep themſelves warm with it too; yet without the ſeals-ſkins they would not be in a capacity of acquiring theſe ſame rein deer, fowls, fiſhes, and wood; becauſe they muſt cover over with ſeal-ſkin both their large and ſmall boats in which they travel and ſeek their proviſion. They muſt alſo cut their thongs or ſtraps out of them, make the bladders for their harpoons, and cover their tents with them; without which they could not ſubſiſt in ſummer.

"Therefore no man can paſs for a right Greenlander who cannot catch ſeals. This is the ultimate end they aſpire at, in all their device and labour from their childhood up. It is the only art (and in truth a difficult and dangerous one it is) to which they are trained from their infancy; by which they maintain themſelves, make themſelves agreeable to others, and become beneficial members of the community.*

"The Greenlanders have three ways of catching ſeals: either ſingly, with the bladder; or in company, by the clapper-hunt; or in the winter on the ice: whereto may be added the ſhooting them with a gun.

"The principal and moſt common way is the taking them with the bladder. When the Greenlander ſets out equipped, and ſpies a ſeal, he tries to ſurpriſe it unawares, with the wind and ſun in his back, that he may not be heard or ſeen by it. He tries to conceal himſelf behind a wave, and makes haſtily but ſoftly up to it, till he comes within four, five, or ſix fathom of it; meanwhile he takes the utmoſt care that the harpoon, line, and bladder, lie in proper order. Then he takes hold of the oar with his left hand, and the harpoon with his right by the hand-board, and ſo away he throws it at the ſeal, in ſuch a manner that the whole dart flies from the hand-board, and leaves that in his hand. If the harpoon hits the mark, and buries itſelf deeper than the barbs, it will directly diſengage itſelf from the bone-joint, and that from the ſhaft; and alſo unwind the ſtring from its lodge on the kajak. The moment the ſeal is pierced, the Greenlander muſt throw the bladder, tied to the end of the ſtring, into the water, on the ſame ſide as the ſeal runs and dives; for that he does inſtantly like a dart. Then the Greenlander goes and takes up the ſhaft ſwimming on the water, and lays it in its place. The ſeal often drags the bladder with it under water, tho' it is a conſiderable impediment, on account of its great bigneſs; but it ſo wearies itſelf out with it, that it muſt come up again in about a quarter of an hour to take breath. The Greenlander haſtens to the ſpot where he ſees the bladder riſe up, and ſmites the ſeal as ſoon as it appears with a great lance. This lance always comes out of its body again; but he throws it at the creature afreſh every time it comes up till it is quite ſpent. Then he runs the little lance into it, and kills it outright, but ſtops up the wound directly to preſerve the blood; and laſtly, he blows it up, like a bladder, betwixt ſkin and fleſh, to put it into a better capacity of ſwimming after him; for which purpoſe he faſtens it to the left ſide of his kajak or boat.

"In this exerciſe the Greenlander is expoſed to the moſt and greateſt danger of his life; which is probably the reaſon that they call this hunt or fiſhery *kamavock*, i. e. "the extinction," *viz.* of life. For if the line ſhould entangle itſelf, as it eaſily may, in its ſudden and violent motion; or if it ſhould catch hold of the kajak, or ſhould wind itſelf round the oar, or the hand, or even the neck, as it ſometimes does in windy weather; or if the ſeal ſhould turn ſuddenly to the other ſide of the boat, it cannot be otherwiſe than that the kajak muſt be overturned by the ſtring, and drawn down under water. On ſuch deſperate occaſions the poor Greenlander ſtands in need of every poſſible art to diſentangle himſelf from the ſtring, and to raiſe himſelf up from under the water ſeveral times ſucceſſively; for he will continually be overturning till he has quite diſengaged himſelf from the line. Nay, when he imagines himſelf to be out of all danger, and comes too near the dying ſeal, it may ſtill bite him in the face or hand; and a female ſeal that has young, inſtead of flying the field, will ſometimes fly at the Greenlander in the moſt vehement rage, and do him a miſchief, or bite a hole in his kajak that he muſt ſink.

"In this way, ſingly, they can kill none but the careleſs ſtupid ſeal called *attarſoak*. Several in company muſt purſue the cautious kaſſigiak by the clapper-hunt. In the ſame manner they alſo ſurround and kill the attarſoit in great numbers at certain ſeaſons of the year for in autumn they retire into the creeks or inlets in ſtormy weather, as in the Nepiſet ſound in Ball's river, between the main land and the iſland Kangek, which is full two leagues long, but very narrow. There the Greenlanders cut off their retreat, and frighten them under water by ſhouting, clapping, and throwing ſtones; but as they muſt come up again continually to draw breath, then they perſecute them again till they are tired, and at laſt are obliged to ſtay ſo long above water that they ſurround them, and kill them with a kind of dart for the purpoſe. During this hunt we have a fine opportunity to ſee the agility of the Greenlanders, or, if I may call it ſo, their huſſar-like manœuvres. When the ſeal riſes out of the water, they all fly upon it as if they had wings, with a deſperate noiſe; the poor creature is forced to dive again directly; and the moment he does they diſ-

* Hiſt. Greenl. i. 130.

perſe again as faſt as they came, and every one gives heed to his poſt to ſee where it will ſtart up again; which is an uncertain thing, and is commonly three quarters of a mile from the former ſpot. If a ſeal has a good broad water, three or four leagues each way, it can keep the ſportſmen in play for a couple of hours before it is ſo ſpent that they can ſurround and kill it. If the ſeal in its fright betakes itſelf to the land for a retreat, it is welcomed with ſticks and ſtones by the women and children, and preſently pierced by the men in the rear. This is a very lively and a very profitable diverſion for the Greenlanders, for many times one man will have eight or ten ſeals for his ſhare.

"The third method of killing ſeals upon the ice is moſtly practiſed in Diſko, where the bays are frozen over in the winter. There are ſeveral ways of proceeding. The ſeals themſelves make ſometimes holes in the ice; where they come and draw breath; near ſuch a hole a Greenlander ſeats himſelf on a ſtool, putting his feet on a lower one to keep them from the cold. Now when the ſeal comes and puts its noſe to the hole, he pierces it inſtantly with his harpoon; then breaks the hole larger, and draws it out and kills it quite. Or a Greenlander lays himſelf upon his belly on a kind of a ſledge, near other holes, where the ſeals come out upon the ice to baſk themſelves in the ſun. Near this great hole they make a little one, and another Greenlander puts a harpoon into it with a very long ſhaft or pole. He that lies upon the ice looks into the great hole till he ſees a ſeal coming under the harpoon; then he gives the other the ſignal, who runs the ſeal through with all his might.

"If the Greenlander ſees a ſeal lying near its hole upon the ice, he ſlides along upon his belly towards it, wags his head, and grunts like a ſeal; and the poor ſeal, thinking it is one of its innocent companions, lets him come near enough to pierce it with his long dart. When the current wears a great hole in the ice in the ſpring, the Greenlanders plant themſelves all round it, till the ſeals come in droves to the brim to fetch breath, and then they kill them with their harpoons. Many alſo are killed on the ice while they lie ſleeping and ſnoring in the ſun."

To this long quotation, which we think both curious and intereſting, we ſhall ſubjoin the following obſervations of Mr Pennant, which are not leſs worthy of attention.

Arctic Zoology, v. 1.

"Nature (ſays this intelligent writer) has been ſo niggardly in providing variety of proviſion for the Greenlanders, that they are neceſſitated to have recourſe to ſuch which is offered to them with a liberal hand. The Kamtſchatkan nations, which enjoy ſeveral animals, as well as a great and abundant choice of fiſh, are ſo enamoured with the taſte of the fat of ſeals, that they can make no feaſt without making it one of the diſhes. Of that both Ruſſians and Kamtſchatkans make their candles. The latter eat the fleſh boiled, or elſe dried in the ſun. If they have a great quantity, they preſerve it in the following manner:

"They dig a pit of requiſite depth, and pave it with ſtones; then fill it with wood, and ſet it on fire ſo as to heat the pit to the warmth of a ſtove. They then collect all the cinders into a heap. They ſtrew the bottom with the green wood of alder, on which they place ſeparately the fleſh and the fat, and put between every layer branches of the ſame tree; when the pit is filled they cover it with ſods, ſo that the vapour cannot eſcape. After ſome hours they take out both fat and fleſh, and keep it for winter's proviſions, and they may be preſerved a whole year without ſpoiling.

"The Kamtſchatkans have a moſt ſingular ceremony. After they take the fleſh from the heads of the ſeals, they bring a veſſel in form of a canoe, and fling into it all the ſkulls, crowned with certain herbs, and place them on the ground. A certain perſon enters the habitation with a ſack filled with *tonchitche*, ſweet herbs, and a little of the bark of willow. Two of the natives then roll a great ſtone towards the door, and cover it with pebbles; two others take the ſweet herbs and diſpoſe them, tied in little packets. The great ſtone is to ſignify the ſea-ſhore, the pebbles the waves, and the packets ſeals. They then bring three diſhes of a haſh called *tolkoucha*: of this they make little balls, in the middle of which they ſtick the packets of herbs: of the willow-bark they make a little canoe, and fill it with tolkoucha, and cover it with the ſack. After ſome time the two Kamtſchatkans, who had put the mimic ſeals into the tolkoucha, take the balls, and a veſſel reſembling a canoe, and draw it along the ſand as if it was on the ſea, to convince the real ſeals how agreeable it would be to them to come among the Kamtſchatkans, who have a ſea in their very jurts or dwellings. And this they imagine will induce the ſeals to ſuffer themſelves to be taken in great numbers. Various other ceremonies, equally ridiculous, are practiſed; in one of which they invoke the winds, which drive the ſeals on their ſhores, to be propitious.

"Beſides the uſes which are made of the fleſh and fat of ſeals, the ſkins of the largeſt are cut into ſoles for ſhoes. The women make their ſummer boots of the undreſſed ſkins, and wear them with the hair outmoſt. In a country which abounds ſo greatly in furs, very little more uſe is made of the ſkins of ſeals in the article of dreſs than what has been mentioned. But the Koriaks, the Oloutores, and Tehutſchi, form with the ſkins canoes and veſſels of different ſizes, ſome large enough to carry thirty people.

"Seals ſwarm on all the coaſts of Kamtſchatka, and will go up the rivers eighty verſts in purſuit of fiſh. The tunguſi give the milk of theſe animals to their children inſtead of phyſic. The navigators obſerved abundance of ſeals about Bering's iſland, but that they decreaſed in numbers as they advanced towards the ſtraits; for where the walruſes abounded, the ſeals grew more and more ſcarce.

"I did not obſerve any ſeal-ſkin garments among thoſe brought over by the navigators, ſuch as one might have expected among the Eſquimaux of the high latitudes they viſited, and which are ſo much in uſe with thoſe of Hudſon's Bay and Labrador. That ſpecies of dreſs doubtleſsly was worn in the earlieſt times. Theſe people wanted their hiſtorians; but we are aſſured that the Maſſagetæ clothed themſelves in the ſkins of ſeals. They, according to D'Anville, inhabited the country to the eaſt of the Caſpian ſea, and the lake Aral, both of which waters abound with ſeals.

"Seals are now become a great article of commerce. The oil from the vaſt whales is no longer equal to the demand for ſupplying the magnificent profuſion of lamps in and round our capital. The chaſe of theſe animals is redoubled for that purpoſe; and the ſkins, properly tanned, are in conſiderable uſe in the manufactory of boots and ſhoes."

4. The phoca barbata, or great ſeal, has long white whiſkers with curled points. The back is arched; hair black, very deciduous, and very thinly diſperſed over a thick ſkin, which is almoſt naked in ſummer. The teeth of this ſpecies are like thoſe of the common ſeal; the fore-feet are like the human hand, the middle toe being the longeſt and the thumb ſhort. They are upwards of 12 feet long.

The inhabitants of Greenland cut out of the ſkin of this ſpecies thongs and lines, a finger-thick, for the ſeal-fiſhery. Its fleſh is as white as veal, and is eſteemed the moſt delicate of any. They produce plenty of lard, but very little oil. The ſkins of the young are ſometimes uſed to lie on. It inhabits the high ſea about Greenland, is very timid, and commonly reſts on the floating ice. It breeds about the month of March, and brings forth a ſingle young on the ice, generally among the iſlands; for then it approaches a little nearer to the land. The great old ones ſwim very ſlowly.

On the northern coaſt of Scotland is found a ſeal twelve feet long. A young one, ſeven feet and a half long, was ſhown in London ſome years ago, which was ſo far from maturity as to have ſcarcely any teeth *: yet the common ſeals have them complete before they attain the ſize of ſix feet, their utmoſt growth.

A ſpecies larger than an ox was found in the Kamtſchatkan ſeas from 56 to 64 north latitude, called by the natives *lachtak* †. They weighed 800 pounds, and were eaten by Bering's crew; but their fleſh was very loathſome ‡. The cubs are entirely black.

Steller has given accounts of other ſeals found in thoſe wild ſeas; but his deſcriptions are ſo very imperfect as to render it impoſſible to aſcertain the ſpecies. He ſpeaks in his MSS. of a middle ſized kind, wholly and moſt elegantly ſpotted; of another which is black with brown ſpots, having the belly of a yellowiſh white, and as large as a yearling ox. He mentions a third ſpecies, black, and with a particular formation of the hinder legs; and a fourth of a yellowiſh colour, with a great circle on it of the colour of cherries ‖.

5. The phoca fœtida, or rough ſeal, is diſtinguiſhed by a ſhort noſe and ſhort round head; a body almoſt elliptical, covered with lard almoſt to the hind feet. This ſpecies ſeldom if ever exceeds four feet in length. Their hairs are cloſely ſet together, ſoft, long, and ſomewhat erect, intermixed with curled. They are of a duſky colour, mixed with white, which ſometimes varies to white, with a duſky dorſal line.

This ſpecies never frequents the high ſeas, but keeps on the fixed ice in the remote bays near the frozen land; and when old never forſakes its haunts. They couple in June, and bring forth in January on the fixed ice, its proper element. In that cold ſituation they have a hole for the benefit of fiſhing; near which they generally remain ſolitary, being rarely found in pairs. They are very incautious, and often ſleep on the ſurface of the water, by which means they become an eaſy prey to the eagle. They feed on ſmall fiſh, ſhrimps, &c. The ſkin, tendons, and lard, are uſed in the ſame way with thoſe of other ſeals. The fleſh is red and fœtid, eſpecially in males, which is nauſeated even by the inhabitants of Greenland.

The ſeal hunters in Newfoundland have a larger kind, which they call the *ſquare phipper*, and which weighs 500 pounds. Its coat is like that of a water-dog; ſo that it appears by the length of its hair to be allied to this ſpecies; but the vaſt difference in ſize admits not of certainty in this reſpect.

6. The phoca leporina, or leporine ſeal, has hair of a dirty white colour, tinged with yellow, but never ſpotted. The hairs are erect, interwoven, and ſoft like thoſe of a hare eſpecially in the young. The head is long; the upper lip ſwelling and thick; the whiſkers very ſtrong and very thick, ranged in 15 rows, covering the whole front of the lip, ſo that it appears bearded; the eyes are blue, and the pupil of them black; the teeth are ſtrong; the fore-feet are ſhort; the membranes of the hind feet are even and not waved; the tail is ſhort and thick, it being four inches two lines in length; the cubs are of a milk white colour. The length of this ſpecies is about ſix feet ſix inches, and the circumference where greateſt five feet two.

This ſpecies inhabits the White Sea in the ſummer time, and aſcends and deſcends the mouths of rivers with the tide in queſt of prey. It is likewiſe found on the coaſts of Iceland, and within the polar circle from Spitzbergen to Tchutki Noſs, and from thence ſouthward about Kamtſchatka.

There are ſeveral other ſpecies of this genus, and a variety of curious particulars reſpecting them, which our limits permit us not to give. Such of our readers, however, as wiſh for further information on this ſubject, will find themſelves amply gratified by a careful peruſal of what Mr Pennant has written on the ſubject, from whoſe labours we have extracted much of our article. See his *Hiſtory of Quadrupeds.* Vol. II. p. 518——536 his *Arctic Zoology*, Vol. I. p. 151——177. and his *Britiſh Zoology*, as alſo the ſeveral authors whoſe works he quotes.

PHOCÆA, the laſt town of Ionia, (Mela, Pliny); of Æolis, (Ptolemy), becauſe ſituated on the right or north ſide of the river Hermus, which he makes the boundary of Æolis to the ſouth. It ſtood far in the land, on a bay or arm of the ſea; had two very ſafe harbours, the one called *Lampter* the other *Nauſtathmos*, (Livy). It was a colony of Ionians, ſituated in the territory of Æolis, (Herodotus). Maſſilia in Gaul was again a colony from it. *Phœcoenſes*, the people, (Livy); *Phocaicus*, the epithet, (Lucan); applied to *Marſeilles*. It was one of the 12 cities which aſſembled in the panionium or general council of Ionia.

Ancient Univ. Hiſt, vol vi.

Some writers tell us, that while the foundations of this city were laying there appeared near the ſhore a great ſhoal of ſea calves; whence it is called *Phocæa*, the word *phoca* ſignifying in Greek a *ſea-calf*. Ptolemy, who makes the river Hermus the boundary between Æolia and Ionia, places Phocæa in Æolis; but all other geographers reckon it among the cities of Ionia. It ſtood on the ſea-coaſt, between Cuma to the north, and Smyrna to the ſouth, not far from the Hermus; and was, in former times, one of the moſt wealthy and powerful cities of all Aſia; but is now a poor beggarly village, though the ſee of a biſhop. The Phocæans were expert mariners, and the firſt among the Greeks that undertook long voyages; which they performed in galleys of fifty oars. As they applied themſelves to trade and navigation, they became acquainted pretty early with the coaſts and iſlands of Europe, where they are ſaid to have founded ſeveral cities, namely, Velia in Italy; Alalia, or rather Aleria, in Corſica, and Marſeilles in Gaul. Neither were they unacquainted with Spain; for Herodotus tells us, that, in the time of Cyrus the Great, the Phocæans arriving at Sarteſſus, a city in the bay of Cadiz, were treated with extraordinary kindneſs by Arganthonius king of that country; who, hearing that they were under no ſmall apprehenſion of the growing power of Cyrus, invited them to leave Ionia, and ſettle in what part of his kingdom they pleaſed. The Phocæans could not be prevailed upon to forſake their country; but accepted a large ſum of money, which that prince generouſly preſented them with, to defray the expence of building a ſtrong wall round their city. The wall they built on their return; but it was unable to reſiſt the mighty power of Cyrus, whoſe general Harpagus, inveſting the city with a numerous army, ſoon reduced it to the utmoſt extremities. The Phocæans, having no hopes of any ſuccour, offered to capitulate; but the conditions offered by Harpagus ſeeming ſevere, they begged he would allow them three days to deliberate; and, in the mean time, withdraw his forces. Harpagus, tho' not ignorant of their deſign, complied with their requeſt. The Phocæans, taking advantage of this condeſcenſion, put their wives, children, and all their moſt valuable effects, on board ſeveral veſſels which they had ready equipped, and conveyed them ſafe to the iſland of Chios, leaving the Perſians in poſſeſſion of empty houſes. Their deſign was to purchaſe the Œneſſian iſlands, which belonged to the Chians, and ſettle there. But the Chians not caring to have them ſo near, leſt they ſhould engroſs all the trade to themſelves, as they were a ſea-faring people, they put to ſea again; and, having taken Phocæa, their native country, by ſurpriſe, put all the Perſians they found in it to the ſword. They went to Corſica; great part of them however returned very ſoon, as did the reſt alſo in a few years. They then lived in ſubjection either to the Perſians, or tyrants of their own. Among the latter we find mention made of Laodamus, who attended Darius Hyſtaſpis in his expedition againſt the Scythians; and of Dionyſius, who, joining Ariſtagoras, tyrant of Miletus, and chief author of the Ionian rebellion, retired, after the defeat of his countrymen, to Phœnicia, where he made an immenſe booty, ſeizing on all the ſhips he met with trading to that country. From Phœnicia he ſailed to Sicily, where he committed great depredations on the Carthaginians and Tuſcans; but is ſaid never to have moleſted the Greeks.

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* Phil. Tranſ. Abr ix. 74. tab v. xlvii. 120.

† Nov. Com. Petrop. ii. 290.

‡ Muller's Voy.

‖ Dr Pallas, & Deſcr. Kamtſchatka, 420.

In the Roman times the city of Phocæa ſided with Antiochus the Great; whereupon it was beſieged, taken, and plundered, by the Roman general; but allowed to be governed by its own laws. In the war which Ariſtonicus brother to Attalus, king of Pergamus, raiſed againſt the Romans, they aſſiſted the former to the utmoſt of their power; a circumſtance which ſo diſpleaſed the ſenate, that they commanded the town to be demoliſhed, and the whole race of the Phocæans to be utterly rooted out. This ſevere ſentence would have been put in execution, had not the Maſſilienſes, a Phocæan colony, interpoſed, and, with much difficulty, aſſuaged the anger of the ſenate. Pompey declared Phocæa a free city, and reſtored the inhabitants to all the privileges they had ever enjoyed; whence, under the firſt emperors, it was reckoned one of the moſt flouriſhing cities of all Aſia Minor. This is all we have been able to collect from the ancients touching the particular hiſtory of Phocæa.

PHOCAS, a Roman centurion, was raiſed to the dignity of emperor by the army, and was crowned at Conſtantinople about the year 603. The emperor Mauritius, who was thus deſerted both by the army and the people, fled to Chalcedon with his five children whom Phocas cauſed to be inhumanly murdered before his eyes, and then he murdered Mauritius himſelf, his brother, and ſeveral other perſons who were attached to that family.

Ancient Univ. Hiſt. v. 15.

Phocas, thus proclaimed and acknowledged at Conſtantinople, ſent, according to cuſtom, his own image and that of his wife Leontia to Rome, where they were received with loud acclamations, the people there being incenſed againſt Mauritius on account of the cruel exactions of the exarchs, and his other miniſters in Italy. Gregory, ſurnamed the Great, then biſhop of Rome, cauſed the images to be lodged in the oratory of the martyr Cæſarius, and wrote letters to the new emperor, congratulating him upon his advancement to the throne, which he ſaid was effected by a particular providence, to deliver the people from the innumerable calamities and heavy oppreſſions under which they had long groaned. Had we no other character of Phocas and Leontia but that which has been conveyed to us in Gregory's letters, we ſhould rank him amongſt the beſt princes mentioned in hiſtory; but all other writers paint him in quite different colours; and his actions, tranſmitted to us by ſeveral hiſtorians, evidently ſpeak him a moſt cruel and blood-thirſty tyrant. He was of middling ſtature, ſays Cedrenus, deformed, and of a terrible aſpect: his hair was red, his eye-brows met, and one of his cheeks was marked with a ſcar, which, when he was in a paſſion, grew black and frightful: he was greatly addicted to wine and women, blood-thirſty, inexorable, bold in ſpeech, a ſtranger to compaſſion, in his principles a heretic. He endeavoured, in the beginning of his reign, to gain the affections of the people by celebrating the Circenſian games with extraordinary pomp, and diſtributing on that occaſion large ſums amongſt the people; but finding that inſtead of applauding they reviled him as a drunkard, he ordered his guards to fall upon them. Some were killed, many wounded, and great numbers were dragged to priſon: but the populace riſing, ſet them at liberty, and thenceforth conceived an irreconcileable averſion to the tyrant.

As ſoon as the death of Mauritius was known, Narſes, who then commanded the troops quartered on the frontiers of Perſia, revolted. Phocas, however, managed matters ſo as to gain him over to his intereſt, and then treacherouſly and cruelly burnt him alive. He endeavoured to ſtrengthen his cauſe by reſpectable alliances; but his cruelty was ſuch as to render him generally hated, for he ſpared neither ſex nor age, and amongſt others he murdered Conſtantina the widow of

Mauritius, and her daughters. Theſe cruelties were at length the cauſe of his downfall. He became univerſally hateful; and perſons in great authority near his perſon conſpired againſt him. This conſpiracy, however, was diſcovered, and the perſons concerned in it were all put to death. The following year, however, 610, he was overtaken by the fate he had ſo long deſerved.

Heraclius, the ſon of the governor of Africa, who bore the ſame name, taking upon him the title of emperor, and being acknowledged as ſuch by the people of Africa, ſailed from thence with a formidable fleet, and a powerful army on board, for Conſtantinople, while Nicetas marched thither by way of Alexandria and the Pentapolis. Heraclius ſteered his courſe to Abydus, where he was received with great demonſtrations of joy by ſeveral perſons of rank, who had been baniſhed by Phocas. From Abydus he ſailed to Conſtantinople, where he engaged and utterly defeated the tyrant's fleet. Phocas took refuge in the palace; but one Photinus, whoſe wife he had formerly debauched, purſuing him with a party of ſoldiers, forced the gates, dragged the cowardly emperor from the throne, and having ſtripped him of the imperial robes, and clothed him with a black veſt, carried him in chains to Heraclius, who commanded firſt his hands and feet, then his arms, and at laſt his head, to be cut off: the remaining part of his body was delivered up to the ſoldiers, who burnt it in the forum. We are told, that Heraclius having reproached him with his evil adminiſtration, he anſwered, with great calmneſs, "It is incumbent upon you to govern better." Such was the end of this cruel tyrant, after he had reigned ſeven years and ſome months.

PHOCILIDES, a Greek poet and philoſopher of Miletus, flouriſhed about 540 years before the Chriſtian era. The poetical piece now extant, attributed to him, is not of his compoſition, but of another poet who lived in the reign of Adrian.

PHOCION was a diſtinguiſhed Athenian general and orator in the time of Philip II. of Macedon. His character is thus deſcribed in the Ancient Univerſal Hiſtory. "He was too modeſt to ſolicit command, nor did he promote wars that he might raiſe his authority by them; though, taken either as a ſoldier, orator, ſtateſman, or general, he was by far the moſt eminent Athenian of his time. As he was a moſt diſintereſted patriot, he could entertain no great affection for Philip: but as he perfectly well knew the diſpoſition of his countrymen, and how unlikely they were long to ſupport ſuch meaſures as were neceſſary to humble the Macedonian power, he did not expreſs himſelf vehemently, but choſe rather to cultivate the eſteem which on all occaſions Philip ſhowed for the ſtate of Athens, as a mean of preſerving her, when ſhe ſhould be reduced to that ſituation which he conceived they wanted virtue to prevent. From this character the reader will eaſily diſcern that Demoſthenes and he could not well agree. The former was always warm, his language copious, and his deſigns extenſive; and Phocion, on the other hand, was of a mild temper, delivered his opinion in very few words, and propoſed ſchemes at once neceſſary and eaſy to be effected. Yet he ſeldom or never concurred with the people, but ſpoke as poignantly againſt their vices as Demoſthenes himſelf; inſomuch that this orator once told him, 'The Athenians, Phocion, in ſome of their mad fits, will murder thee.' 'The ſame (anſwered he) may fall to thee, Demoſthenes, if ever they come to be ſober.'"

Ancient Univ. Hiſt. v. 5.

He was afterwards appointed to command the army which was ſent to aſſiſt the Byzantines againſt Philip, whom he obliged to return to his own dominions. This truly great man, whom (though extremely poor) no ſum could bribe to betray his country, and who at every riſk on all occaſions gave them ſound advice, was at length accuſed by his ungrateful countrymen. This event happened in the year before Chriſt 318. He was ſent to Athens by Polyperchon head of a faction in Macedonia, together with his friends, chained in carts, with this meſſage, "That though he was convinced they were traitors, yet he left them to be judged by the Athenians as a free people." Phocion demanded whether they intended to proceed againſt him by form of law; and ſome crying out that they would, Phocion demanded how that could be if they were not allowed a fair hearing? but perceiving by the clamour of the people, that no ſuch thing was to be expected, he exclaimed, "As for myſelf, I confeſs the crime objected to me, and ſubmit to the judgment of the law; but conſider, O ye Athenians, what have theſe poor innocent men done that they ſhould be involved in the ſame calamity with me?" The people replied with great vociferation, "They are your accomplices, and that is enough." Then the decree was read, adjudging them all to death, viz. Phocion, Nicocles, Aheudippus, Agamon, and Pythocles; theſe were preſent: Demetrius, Phalereus, Callimedon, Charicles, and others, were condemned in their abſence. Some moved that Phocion might be tortured before he was put to death; nay, they were for bringing the rack into the aſſembly, and torturing him there. The majority, however, thought it enough if he was put to death, for which the decree was carried unanimouſly; ſome putting on garlands of flowers when they gave their votes. As he was going to execution, a perſon who was his intimate friend aſked him if he had any meſſage for his ſon? "Yes," replied Phocion; "tell him it is my laſt command that he forget how ill the Athenians treated his father."

The ſpleen of his enemies was not extinguiſhed with his life: they paſſed a decree whereby his corpſe was baniſhed the Athenian territories; they likewiſe forbad any Athenians to furniſh fire for his funeral pile. One Conopian took up the corpſe, and carried it beyond Eleuſina, where he borrowed ſome fire of a Megarian woman and burned it. A Megarian matron, who attended with her maid, raiſed on the place an honorary monument; and having gathered up the bones, carried them home, and buried them under her own hearth; praying at the ſame time thus to the Penates: "To you, O ye gods, guardians of this place, I commit the precious remains of the moſt excellent Phocion. Protect them, I beſeech you, from all inſults; and deliver them one day to be repoſited in the ſepulchre of his anceſtors, when the Athenians ſhall become wiſer." It was not long before this opportunity occurred. When the Athenians began to cool a little, and remember the many ſervices they had received from Phocion, they decree him a ſtatue of braſs; ordered his bones to be brought back at the public expence; and decreed that his accuſers ſhould be put to death. Agnonides, who was principally concerned in that tragedy, ſuffered; but Epicurus and Demophilus, who were alſo accomplices in it, fled. However, Phocion's ſon met with them, and executed his revenge upon them; which was almoſt the only good action he ever performed, as he had a very ſmall ſhare of his father's abilities, and not any of his virtues. Such is the fickleneſs and ſuch the injuſtice of popular governments; failings which, if we are to judge from univerſal experience, are abſolutely inſeparable from them.

PHOCIS, (Demoſthenes, Strabo, Pauſanias); a country of Greece, contained between Bœotia to the eaſt and Locris to the weſt, but extending formerly from the Sinus Corinthiacus on the ſouth to the ſea of Eubœa on the north, and, according to Dionyſius, as far as Thermopylæ; but reduced afterwards to narrower bounds. *Phocenſes*, the people; *Phocicus* the epithet, (Juſtin); *Bellum Phocicum*, the ſacred war which the Thebans and Philip of Macedon carried on againſt them for plundering the temple at Delphi; and by which Philip paved the way to the ſovereignty of all Greece, (Juſtin.) Its greateſt length was from north to ſouth, that is, from 38° 45′ to 39° 20′, or about 35 miles; but very narrow from eaſt to weſt, not extending to 30 miles, that is, from 23° 10′ to 23° 40′ at the wideſt, but about 23 miles towards the Corinthian bay, and much narrower ſtill towards the north. This country is generally allowed to have taken its name from Phocus the ſon of Ornytion, a native of Corinth; but having been ſoon after invaded by the Eginetæ, under the conduct of another Phocus, who was the ſon of Eacus king of Enopia, the memory of the firſt inſenſibly gave way to that of the ſecond.

Ancient Univ. Hiſt. v. 5.

In Phocis there were many celebrated mountains, ſuch as Cythæron HELICON, and PARNASSUS. The laſt two we have already noticed in the order of the alphabet. Cythæron was conſecrated to the muſes as well as the other two, and was conſequently much celebrated by the poets. Both it and Helicon contend with mount Parnaſſus for height and magnitude. There were no remarkable rivers in Phocis except Cephiſus, which runs from the foot of Parnaſſus northward, and empties itſelf in the Pindus, which was near the boundary of that kingdom. It had ſeveral very conſiderable cities; ſuch as Cyrra, Criſſa, and ANTECYRA, which, according to Ptolemy, were on the ſea coaſts; and Pythia Delphi, Daulis, Elatia, Ergoſthenia, and Baulia, which were inland towns. Elatia was the largeſt and richeſt after Delphi.

Deucalion was king of that part of Phocis which lies about Parnaſſus, at the time that the Cecrops flouriſhed in Attica; but the Phocians afterwards formed themſelves into a commonwealth, to be governed by their general aſſemblies, the members of which were choſen from among themſelves, and were changed as often as occaſion required. Of the hiſtory of the Phocians but little is known till the time of the holy war, of which we have the following account in the Ancient Univerſal Hiſtory.

“The Phocians having preſumed to plough the territories of the city of Cyrra, conſecrated to the Delphic god, were ſummoned by the other Grecian ſtates before the court of the Amphictyons, where a conſiderable fine was impoſed upon them for their ſacrilege. They refuſed to pay it, on pretence that it was too large; and, at the next aſſembly their dominions were adjudged confiſcated to the uſe of the temple. This ſecond ſentence exaſperated the Phocians ſtill more; who, at the inſtigation of one Philomelus, or, as he is called by Plutarch, Philomedes, ſeized upon the temple, plundered it of its treaſure, and held the ſacred depoſitum for a conſiderable time. This ſecond crime occaſioned another aſſembly of the Amphictyons, the reſult of which was a formal declaration of war againſt the Phocians. The quarrel being become more general, the ſeveral ſtates took part in it according to their inclinations or intereſt. Athens, Sparta, and ſome others of the Peloponneſians, declared for the Phocians; and the Thebans, Theſſalians, Locrians, and other neighbouring ſtates, againſt them. A war was commenced with great fury on both ſides, and ſtyled *the holy war*, which laſted ten years; during which the Phocians, having hired a number of foreign troops, made an obſtinate defence, and would in all probability have held out much longer had not Philip of Macedon given the finiſhing ſtroke to their total defeat and puniſhment. The war being ended, the grand council aſſembled again, and impoſed an annual fine of 60 talents upon the Phocians, to be paid to the temple, and continued till they had fully repaired the damage it had ſuſtained from them; and, till this reparation ſhould be made, they were excluded from dwelling in walled towns, and from having any vote in the grand aſſembly. They did not, however, continue long under this heavy ſentence: their known bravery made their aſſiſtance ſo neceſſary to the reſt, that they were glad to remit it; after which remiſſion they continued to behave with their uſual courage and reſolution, and ſoon obliterated their former guilt.”

We cannot finiſh this article without mentioning more particularly Daulis, rendered famous, not ſo much for its extent or richneſs, as for the ſtature and proweſs of its inhabitants; but ſtill more for the inhuman repaſt which was ſerved up to Tereus king of Thrace by the women of this city, by whom he was ſoon after murdered for the double injury he had done to his ſiſter-in-law Philomela, daughter of Pandion king of Athens. See PHILOMELA.

PHŒBUS, one of the names given by ancient mythologiſts to the Sun, Sol, or Apollo. See APOLLO.

PHŒNICIA, or more properly PHOENICE, the ancient name of a country lying between the 34th and 36th degrees of north latitude; bounded by Syria on the north and eaſt, by Judæa on the ſouth, and by the Mediterranean on the weſt. Whence it borrowed its name is not abſolutely certain. Some derive it from one Phœnix; others from the Greek word *phœnix*, ſignifying a *palm* or *date*, as that tree remarkably abounded in this country. Some again ſuppoſe that Phœnice is originally a tranſlation of the Hebrew word *Edom*, from the Edomites who fled thither in the days of David. By the contraction of Canaan it was alſo called

Ancient Univ. Hiſt. v. ii.

called *Chna*, and anciently *Rhabbothin* and *Colpitis* (A). The Jews commonly named it *Canaan;* though ſome part of it, at leaſt, they knew by the name of *Syrophœnice* (B). Bochart tells us that the moſt probable etymology is *Phene Anak*, i. e. "the deſcendents of Anak." Such were the names peculiar to this ſmall country; though Phœnice was ſometimes extended to all the maritime countries of Syria and Judæa, and Canaan to the Philiſtines, and even to the Amalekites. On the contrary, theſe, two names, and the reſt, were moſt generally ſwallowed up by thoſe of Paleſtine and Syria (C).

There is ſome diſagreement among authors with reſpect to the northern limits of this country. Ptolemy makes the river Eleutherus the boundary of Phœnice to the north; but Pliny, Mela, and Stephanus, place it in the iſland of Aradus, lying north of that river. Strabo obſerves, that ſome will have the river Eleutherus to be the boundary of Seleucis, on the ſide of Phœnice and Cœleſyria. On the coaſt of Phœnice, and ſouth of the rive Eleutherus, ſtood the following cities: SIMYRA, Orthoſia, TRIPOLIS, Botrys, Byblus, Palæbyblus, Berytus, SIDON, SAREPTA, TYRUS, Palætyrus.

Phœnice extended, according to Ptolemy, even beyond Mount Carmelus; for that geographer places in Phœnice not only Ecdippa and Ptolemais, but Sycaminum and Dæra, which ſtand ſouth of that mountain. Theſe, however, properly ſpeaking, belonged to Paleſtine. We will not take upon us to mark out the bounds of the midland Phœnice. Ptolemy reckons in it the following towns; Arca, Palæbyblus (Old Byblus), Gabala, and Cæſaria Paniæ. This province was conſiderably extended in the times of Chriſtianity; when, being conſidered as a province of Syria, it included not only Damaſcus but Palmyra alſo.

The ſoil of this country is good, and productive of many neceſſaries for food and clothing. The air is wholeſome, and the climate agreeable. It is plentifully watered by ſmall rivers; which, running down from mount Libanus, ſometimes ſwell to an immoderate degree, either increaſed by the melting of the ſnows on that mountain, or by heavy rains. Upon theſe occaſions they overflow, to the great danger and hinderance of the traveller and damage of the country. Among theſe rivers is that of ADONIS.

It is univerſally allowed that the Phœnicians were Canaanites (D) by deſcent: nothing is plainer or leſs conteſted, and therefore it were time loſt to prove it. We ſhall only add, that their blood muſt have been mixed with that of foreigners in proceſs of time, as it happens in all trading places: and that many ſtrange families muſt have ſettled among them, who could conſequently lay no claim to this remote origin, how much ſoever they may have been called Phœnicians, and reckoned of the ſame deſcent with the ancient proprietors.

The Phœnicians were governed by kings; and their territory, as ſmall a ſlip as it was, included ſeveral kingdoms; namely, thoſe of Sidon, Tyre, Aradus, Berytus, and Byblus. In this particular they imitated and adhered to the primitive government of their forefathers; who, like the other Canaanities, were under many petty princes, to whom they allowed the ſovereign dignity, reſerving to themſelves the natural rights and liberties of mankind. Of their civil laws we have no particular ſyſtem.

With regard to religion, the Phœnicians were the moſt groſs and abominable idolaters. The Baal-berith, Baalzebub, Baalſamen, &c. mentioned in Scripture, were ſome of the Phœnician gods; as were alſo the Moloch, Aſhtaroth, and Thammuz, mentioned in the ſacred writings.—The word *Baal*, in itſelf an appellative, was no doubt applied to the true God, until he rejected it on account of its being ſo much profaned by the idolaters. The name was not appropriated to any particular deity among the idolatrous nations, but was common to many; however, it was generally imagined that one great God preſided over all the reſt. Among the Phœnicians this deity was named *Baal-ſamen;* whom the Hebrews would have called *Baal ſhemim*, or the God of heaven. In all probability this was alſo the principal Carthaginian deity, though his punic name is unknown. We have many religious rites of the Carthaginians handed down to us by the Greek and Roman writers; but they all beſtowed names of their own gods upon thoſe of the Carthaginians, which leads us to a knowledge of the correſpondence between the characters of the Phœnician and European deities. The principal deity of Carthage, according to Diodorus Siculus, was Chronus or Saturn. The ſacrifices offered up to him were children of the beſt families. Our author alſo tells us, that the Carthaginians had a brazen ſtatue or coloſſus of this god, the hands of which were extended in act to receive, and bent downwards in ſuch a manner, that the child laid thereon

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(A) This laſt name is a tranſlation of the firſt. *Rabbotſen* is in Hebrew a *great gulph* or *bay*. From *rabbotſen*, by changing the Hebrew *tſ* into the Greek *t*, comes *rabbotten;* and, with a little variation, *rhabbothin*. Κολπος, *colpos*, is Greek alſo for a *bay* or *gulph:* whence it appears that *colpitis* or *colpites* is a tranſlation of *rabbothin*.

(B) Bochart ſuppoſes that the borderers, both upon the Phœnician and Syrian ſide, were called by the common name of Syrophœnicians, as partaking equally of both nations.

(C) Or rather Phœnice, Paleſtine, and Syria, were promiſcuouſly uſed for each other, and particularly the two former. Phœnice and Paleſtine, ſays Stephanus Byzantinus, were the ſame. As for Syria, we have already obſerved, that in its largeſt extent it ſometimes comprehended Phœnice and Cœleſyria. Herodotus plainly confounds theſe three names; we mean, uſes one for the other indifferently.

(D) Bochart inſinuates that the Canaanites were aſhamed of their name, on account of the curſe denounced on their progenitor, and terrified by the wars ſo vigorouſly and ſucceſsfully waged on them by the Iſraelites, purely becauſe they were Canaanites; and that therefore, to avoid the ignominy of the one and the danger of the other, they abjured their old name, and changed it for Phœnicians, Syrians, Syrophœnicians, and Aſſyrians. Heidegger conjectures alſo that they were aſhamed of their anceſtor Canaan.

thereon immediately fell down into a hollow where there was a fiery furnace. He adds alſo, that this inhuman practice ſeemed to confirm a tradition, handed down to the Greeks from very early antiquity, viz. that Saturn devoured his own children.

The goddeſs Cœleſtis, or Urania, was held in the higheſt veneration by the Carthaginians. She is thought to have been the ſame with the queen of heaven mentioned in Jeremiah, the Juno Olympia of the Greeks. According to Heſychius, the ſame word applied in the Punic language both to Juno and Venus: Nay, the ancient Greeks frequently confound Juno, Venus, and Diana or the moon, all together; which is to be attributed to the Egyptians and Phœnicians, from whom they received their ſyſtem of religion; who ſeem in the moſt ancient times to have had but one name for them all. Beſides theſe there were ſeveral other deities of later date, who were worſhipped among the Phœnicians, particularly thoſe of Tyre, and conſequently among the Carthaginians alſo. Theſe were Jupiter, Apollo, Mars, and Bacchus. Jupiter was worſhipped under the name of *Belus* or *Baal*. To him they addreſſed their oaths; and placed him for the moſt part, as there is reaſon to believe, at the head of their treaties. The ſame name was alſo given to the other two, whence they were frequently miſtaken for one another. Apollo or the ſun went either by this name ſimply, or by others of which this made a part.

The Carthaginian ſuperſtition, however, was not confined to theſe deities alone. They worſhipped alſo the fire, air, and other elements; and had gods of rivers, meads, &c. Nay, they paid divine honours to the ſpirits of their heroes, and even to men and women themſelves while yet in life; and in this adoration Hannibal the Great had for ſome time a ſhare, notwithſtanding the infamous conduct of his countrymen towards him at laſt. In order to worſhip thoſe gods with more conveniency on all occaſions, the Carthaginians had a kind of portable temples. Theſe were only covered chariots, in which were ſome ſmall images repreſenting their favourite deities; and which were drawn by oxen. They were alſo a kind of oracle; and their reſponſes were underſtood by the motion impreſſed upon the vehicle. This was likewiſe an Egyptian or Lybian cuſtom; and Tacitus informs us that the ancient Germans had ſomething of the ſame kind. The tabernacle of Moloch is thought to have been a machine of this kind; and it is not improbable that the whole was derived from the tabernacle of the Jews in the wilderneſs.

Beſides all the deities above-mentioned, we ſtill find another, named the *Dæmon* or *Genius* of Carthage, mentioned in the treaty made by Philip of Macedon and Hannibal. What this deity might be, we know not; however, it may be obſerved, that the pagan world in general believed in the exiſtence of demons, or intelligences who had a kind of middle nature between gods and men, and to whom the adminiſtration of the world was in a great meaſure committed. Hence it is no wonder that they ſhould have received religious honours. For when once mankind were poſſeſſed with the opinion that they were the miniſters of the gods, and truſted with the diſpenſation of their favours, as well as the infliction of their puniſhments, it is natural to ſuppoſe that they would be deſirous of making their addreſſes to them. See ASTARTE and POLYTHEISM.

Herodotus ſuppoſes the Phœnicians to have been circumciſed; but Joſephus aſſerts, that none of the nations included under the vague name of Paleſtine and Syria uſed that rite, the Jews excepted; ſo that if the Phœnicians had anciently that cuſtom, they came in time to neglect it, and at length wholly laid it aſide. They abſtained however from the fleſh of ſwine.

Much is ſaid of their arts, ſciences, and manufactures; but as what we find concerning them is couched in general terms only, we cannot deſcant on particulars. The Sidonians, under which denomination we comprehend the Phœnicians in general, were of a moſt happy genius. They were from the beginning addicted to philoſophical exerciſes of the mind; inſomuch that a Sidonian, by name of Moſchus, taught the doctrine of atoms before the Trojan war: and Abomenus of Tyre puzzled Solomon by the ſubtilty of his queſtions. Phœnice continued to be one of the ſeats of learning, and both Tyre and Sidon produced their philoſophers of later ages; namely, Boethus and Diodatus of Sidon, Antipater of Tyre, and Appollonius of the ſame place; who gave an account of the writings and diſciples of Zeno. For their language, ſee PHILOLOGY, n° 61. As to their manufactures, the glaſs of Sidon, the purple of Tyre, and the exceeding fine linen they wove, were the product of their own country, and their own invention; and for their extraordinary ſkill in working metals, in hewing timber and ſtone; in a word, for their perfect knowledge of what was ſolid, great, and ornamental in architecture—we need only put the reader in mind of the lage ſhare they had in erecting and decorating the temple at Jeruſalem under their king Hiram. Their fame for taſte, deſign, and ingenious invention, was ſuch, that whatever was elegant, great, or pleaſing, whether in apparel, veſſels, or toys, was diſtinguiſhed by way of excellence with the epithet of Sidonian.

The Phœnicians were likewiſe celebrated as merchants, navigators, and planters of colonies in foreign parts. As merchants, they may be ſaid to have engroſſed all the commerce of the weſtern world: as navigators, they were the boldeſt, the moſt experienced, and greateſt diſcoverers, of the ancient times; they had for many ages no rivals. In planting colonies they exerted themſelves ſo much, that, conſidering their habitation was little more than the ſlip of ground between mount Libanus and the ſea, it is ſurpriſing how they could furniſh ſuch ſupplies of people, and not wholly depopulate their native country.

It is generally ſuppoſed that the Phœnicians were induced to deal in foreign commodities by their neighhourhood with the Syrians, who were perhaps the moſt ancient of thoſe who carried on a conſiderable and regular trade with the more eaſtern regions: and this conjecture appears probable at leaſt; for their own territory was but ſmall, and little able to afford any conſiderable exports, if we except manufactures: but that their manufactures were any ways conſiderable till they began to turn all the channels of trade into their own country, it is hard to believe. In Syria, which was a large country, they found ſtore of productions of the natural growth of that ſoil, and many choice and uſeful commodities brought from the eaſt. Thus, having

Phœnicia.

a ſafe coaſt, with convenient harbours, on one ſide, and excellent materials for ſhip-building on the other: perceiving how acceptable many commodities that Syria furniſhed would be in foreign parts, and being at the ſame time, perhaps, ſhown the way by the Syrians themſelves, who may have navigated the Mediterranean—they turned all their thoughts to trade and navigation, and by an uncommon application ſoon eclipſed their maſters in that art.

It were in vain to talk of the Edomites, who fled hither in David's time; or to inquire why Herodotus ſuppoſes the Phœnicians came from the Red Sea: their origin we have already ſeen. That ſome of the Edomites fled into this country in the days of David, and that they were a trading people, is very evident: what improvements they brought with them into Phœnice, it is hard to ſay; and by the way, it is as difficult to aſcertain their numbers. In all probability they brought with them a knowledge of the Red Sea, and of the ſouth parts of Arabia, Egypt, and Ethiopia; and by their information made the Phœnicians acquainted with thoſe coaſts; by which means they were enabled to undertake voyages to thoſe parts, for Solomon, and Pharoah Necho, king of Egypt.

Their whole thoughts were employed on ſchemes to advance their commerce. They affected no empire but that of the ſea; and ſeemed to aim at nothing but the peaceable enjoyment of their trade. This they extended to all the known parts they could reach; to the Britiſh iſles, commonly underſtood by the Caſſiterides; to Spain, and other places in the ocean, both within and without the Straits of Gibraltar; and, in general, to all the ports of the Mediterranean, the Black Sea, and the Lake Mæotis. In all theſe parts they had ſettlements and correſpondents, from which they drew what was uſeful to themſelves, or might be ſo to others; and thus they exerciſed the three great branches of trade, as it is commonly divided into importation, exportation, and tranſportation, in full latitude. Such was their ſea-trade; and for that which they carried on by land in Syria, Meſopotamia, Aſſyria, Babylonia, Perſia, Arabia, and even in India, it was of no leſs extent, and may give us an idea of what this people once was, how rich and how deſervedly their merchants are mentioned in Scripture as equal to princes. Their country was, at that time, the great warehouſe, where every thing that might either adminiſter to the neceſſities or luxury of mankind was to be found; which they diſtributed as they judged would be beſt for their own intereſt. The purple of Tyre, the glaſs of Sidon, and the exceeding fine linen made in this country, together with other curious pieces of art in metals and wood, already mentioned, appear to have been the chief and almoſt only commodities of Phœnice itſelf. Indeed their territory was ſo ſmall, that it is not to be imagined they could afford to export any of their own growth; it is more likely that they rather wanted than abounded with the fruits of the earth.

Having thus ſpoken in general terms of their trade, we ſhall now touch upon their ſhipping and ſome things remarkable in their navigation. Their larger embarkations were of two ſorts; they divided them into round ſhips or gauli; and long ſhips, galleys, or triremes. When they drew up in line of battle, the gauli were diſpoſed at a ſmall diſtance from each other in the wings, or in the van and the rear: their triremes were contracted together in the centre. If, at any time, they obſerved that a ſtranger kept them company in their voyage, or followed in their track, they were ſure to get rid of him if they could, or deceive him if poſſible; in which policy they went ſo far, as to venture the loſs of their ſhips, and even their lives; ſo jealous were they of foreigners, and ſo tenaciouſly bent on keeping the whole trade to themſelves. In order to diſcourage other nations from engaging in commerce, they practiſed piracy, or pretended to be at war with ſuch as they met when they thought themſelves ſtrongeſt. This was but a natural ſtroke of policy in people who graſped at the whole commerce of the then known world. We muſt not forget here the famous fiſhery of Tyre, which ſo remarkably enriched that city in particular. See ASTRONOMY, n° 7. OPHIR, and TYRE.

Phœnicopterus.

PHOENICOPTERUS, or FLAMINGO, in ornithology, a genus of birds belonging to the order of grallæ. The beak is naked, teethed, and bent as if it was broken; the noſtrils are linear; the feet are palmated, and four-toed. There is but one ſpecies; viz. the Bahamenſis of Cateſby, a native of Africa and America.

Plate CCCXCII.

This bird reſembles the heron in ſhape, excepting the bill, which is of a very ſingular form. It is two years old before it arrives at its perfect colour; and then it is entirely red, excepting the quill-feathers, which are black. A full-grown one is of equal weight with a wild duck; and when it ſtands erect, it is five feet high. The feet are webbed. The fleſh is delicate; and moſt reſembles that of a patridge in taſte. The tongue, above any other part, was in the higheſt eſteem with the luxurious Romans. Theſe birds make their neſts on hillocks in ſhallow water; on which they ſit with their legs extended down, like a man ſitting on a ſtool. They breed on the coaſts of Cuba and the Bahama iſlands in the Weſt Indies; and frequent ſalt-water only. By reaſon of the particular ſhape of its bill, this bird, in eating, twiſts its neck from ſide to ſide, and makes the upper mandible touch the ground. They are very ſtupid, and will not riſe at the report of a gun: nor is it any warning to thoſe who ſurvive, that they ſee others killed by their ſide; ſo that, by keeping himſelf out of ſight, a fowler may kill as many as he pleaſes.

Latham's Synopſis.

Theſe birds prefer a warm climate. In the old continent they are not often met with beyond 40 degrees north or ſouth. They are met with everywhere on the African coaſt and adjacent iſles, to the Cape of Good Hope; and ſometimes on the coaſts of Spain, Italy, and thoſe of France lying in the Mediterranean Sea; being at times found at Marſeilles, and for ſome way up the Rhone. In ſome ſeaſons they frequent Aleppo and the parts adjacent. They are ſeen alſo on the Perſian ſide of the Caſpian Sea, and from thence along the weſtern coaſt as far as the Wolga; tho' this is at uncertain times, and chiefly in conſiderable flocks coming from the north-eaſt, moſtly in October and November; but ſo ſoon as the wind changes they totally diſappear. They breed in the Cape Verd iſles, particularly in that of Sal. They go for the moſt part together in flocks, except in breeding time. Dampier ſays, that, with two more in company, he killed 14 at once, which was effected by ſecreting themſelves;

for they are ſo very ſhy, that they will by no means ſuffer any one to approach openly near enough to ſhoot them. Kolben tells us, that they are very numerous at the Cape; keeping in the day on the borders of the lakes and rivers, and lodging themſelves at night in the long graſs on the hills. They are alſo common to various places in the warmer parts of America, frequenting the ſame latitudes as in other quarters of the world; being found at Peru, Chili, Cayenne, and the coaſt of Braſil, as well as the various iſlands of the Weſt Indies. Sloane found them in Jamaica; but particularly at the Bahama Iſlands and at Cuba, where they breed. When ſeen at a diſtance, they appear as a regiment of ſoldiers, being ranged along-ſide one another, on the borders of the rivers, ſearching for food; which chiefly conſiſts of ſmall fiſh or the eggs of them; and of water-inſects, which they ſearch after by plunging in the bill and part of the head, from time to time trampling with their feet to muddy the water, that their prey may be raiſed from the bottom. Whilſt they are feeding, one of them is ſaid to ſtand centinel, and the moment he ſounds the alarm the whole flock takes wing. This bird, when at reſt, ſtands on one leg, the other being drawn up cloſe to the body, with the head placed under the wing on that ſide of the body it ſtands on.

They are ſometimes caught young, and are brought up tame; but are always impatient of cold: and in this ſtate will ſeldom live a great while, gradually loſing their colour, fleſh, and appetite, and dying for want of that food which in a ſtate of nature at large they were abundantly ſupplied with.

PHOENIX, in aſtronomy. See there, n° 406.

Phoenix, the *Great Palm*, or *Date-tree*; a genus of plants belonging to the order of palmæ. There is only one ſpecies, viz. the dactylifera, or common date-tree, a native of Africa and the eaſtern countries, where it grows to 50, 60, and 100 feet high. The trunk is round, upright, and ſtudded with protuberances, which are the veſtiges of the decayed leaves. From the top iſſues forth a cluſter of leaves or branches eight or nine feet long, extending all round like an umbrella, and bending a little towards the earth. The bottom part produces a number of ſtalks like thoſe of the middle, but ſeldom ſhooting ſo high as four or five feet. Theſe ſtalks, ſays Adanſon, diffuſe the tree very conſiderably; ſo that, wherever it naturally grows in foreſts, it is extremely difficult to open a paſſage through its prickly leaves. The-date tree was introduced into Jamaica ſoon after the conqueſt of the iſland by the Spaniards. There are, however, but few of them in Jamaica at this time. The fruit is ſomewhat in the ſhape of an acorn. It is compoſed of a thin, light, and gloſſy membrane, ſomewhat pellucid and yellowiſh; which contains a fine, ſoft, and pulpy fruit, which is firm, ſweet, and ſomewhat vinous to the taſte, eſculent, and wholeſome; and within this is incloſed a ſolid, tough, and hard kernel, of a pale grey colour on the outſide, and finely marbled within like the nutmeg. For medicinal uſe dates are to be choſen large, full, freſh, yellow on the ſurface, ſoft and tender, not too much wrinkled; ſuch as have a vinous taſte, and do not rattle when ſhaken. They are produced in many parts of Europe, but never ripen perfectly there. The beſt are brought from Tunis; they are alſo very fine and good in Egypt and in many parts of the eaſt. Thoſe of Spain and France look well; but are never perfectly ripe, and very ſubject to decay. They are preſerved three different ways; ſome preſſed and dry; others preſſed more moderately, and again moiſtened with their own juice; and others not preſſed at all, but moiſtened with the juice of other dates, as they are packed up, which is done in baſkets or ſkins. Thoſe preſerved in this laſt way are much the beſt. Dates have always been eſteemed moderately ſtrengthening and aſtringent.

Though the date-tree grows every where indiſcriminately on the northern coaſts of Africa, it is not cultivated with care, except beyond Mount Atlas; becauſe the heat is not ſufficiently powerful along the coaſts to bring the fruits to proper maturity. We ſhall here extract ſome obſervations from Mr Des Fontaines reſpecting the manner of cultivating it in Barbary, and on the different uſes to which it is applied. All that part of the Zaara which is near Mount Atlas, and the only part of this vaſt deſert which is inhabited, produces very little corn; the ſoil being ſandy, and burnt up by the ſun, is almoſt entirely unfit for the cultivation of grain, its only productions of that kind being a little barley, maize, and ſorgo. The date-tree, however, ſupplies the deficiency of corn to the inhabitants of theſe countries, and furniſhes them with almoſt the whole of their ſubſiſtence. They have flocks of ſheep; but as they are not numerous, they preſerve them for the ſake of their wool; beſides, the fleſh of theſe animals is very unwholeſome food in countries that are exceſſively warm; and theſe people, though ignorant, have probably been enabled by experience to know that it was ſalutary for them to abſtain from it. The date-trees are planted without any order, at the diſtance of 12 feet one from the other, in the neighbourhood of rivulets and ſtreams which iſſue from the ſand. Foreſts of them may be ſeen here and there, ſome of which are ſeveral leagues in circumference. The extent of theſe plantations depends upon the quantity of water which can be procured to water them; for they require much moiſture. All theſe foreſts are intermixed with orange, almond, and pomegranate trees, and with vines which twiſt round the trunks of the date trees; and the heat is ſtrong enough to ripen the fruit, though they are never expoſed to the ſun.

Along the rivulets and ſtreams, dykes are erected to ſtop the courſe of their waters, in order that they may be diſtributed amongſt the date trees by means of ſmall canals. The number of canals is fixed for each individual; and in ſeveral cantons, to have a right to them, the proprietors are obliged to pay an annual ſum proportionable to the number and extent of their plantations. Care is taken to till the earth well, and to raiſe a circular border around the root of each tree, that the water may remain longer and in larger quantity. The date trees are watered in every ſeaſon, but more particularly during the great heats of ſummer.

It is generally in winter that new plantations of this tree are formed. For this purpoſe thoſe who cultivate them take ſhoots of thoſe which produce the beſt dates, and plant them at a ſmall diſtance one from the other. At the end of three or four years theſe ſhoots, if they have been properly taken care of, begin to bear fruit; but this fruit is as yet dry, without ſweetneſs, and even without kernels; they never reach the higheſt degree of perfection of which they are ſuſceptible till they are about 15 or 20 years old.

Theſe plants are however produced from the ſeeds taken out of the fruit, provided they are freſh. They ſhould be ſown in pots filled with light rich earth, and plunged into a moderate hot-bed of tanners bark, which ſhould be kept in a moderate temperature of heat, and the earth frequently refreſhed with water. When the plants are come up to a proper ſize, they ſhould be each planted in a ſeparate ſmall pot, filled with the ſame light earth, and plunged into a hot bed again, obſerving to refreſh them with water, as alſo to let them have air in proportion to the warmth of the ſeaſon and the bed in which they are placed. During the ſummer-time they ſhould remain in the ſame hot-bed; but in the beginning of Auguſt, they ſhould have a great ſhare of air to harden them againſt the approach of winter; for if they are too much forced, they will be ſo tender as not to be preſerved through the winter without much difficulty, eſpecially if you have not the conveniency of a bark-ſtove to keep them in. The ſoil in which theſe plants ſhould be placed, muſt be compoſed in the following manner, viz. half of light freſh earth taken from a paſture-ground, the other half ſea-ſand and rotten dung or tanners bark in equal proportion; theſe ſhould be carefully mixed, and laid in a heap three or four months at leaſt before it is uſed, but ſhould be often turned over to prevent the growth of weeds, and to ſweeten the earth.

The trees, however, which ſpring from ſeed never produce ſo good dates as thoſe that are raiſed from ſhoots; they being always poor and ill taſted. It is undoubtedly by force of cultivation, and after ſeveral generations, that they acquire a good quality.

The date trees which have been originally ſown, grow rapidly, and we have been aſſured that they bear fruit in the fourth or fifth year. Care is taken to cut the inferior branches of the date tree in proportion as they riſe; and a piece of the root is always left of ſome inches in length, which affords the eaſy means of climbing to the ſummit. Theſe trees live a long time, according to the account of the Arabs; and in order to prove it, they ſay that when they have attained to their full growth, no change is obſerved in them for the ſpace of three generations.

The number of females which are cultivated is much ſuperior to that of the males, becauſe they are much more profitable. The ſexual organs of the date tree grow, as is well known, upon different ſtalks, and theſe trees flower in the months of April and May, at which time the Arabs cut the male branches to impregnate the female. For this purpoſe, they make an inciſion in the trunk of each branch which they wiſh to produce fruit, and place in it a ſtalk of male flowers; without this precaution the date tree would produce only abortive fruit (A). In ſome cantons the male branches are only ſhaken over the female. The practice of impregnating the date tree in this manner is very ancient. Pliny deſcribes it very accurately in that part of his work where he treats of the palm-tree.

There is ſcarcely any part of the date tree which is not uſeful. The wood, though of a ſpongy texture, laſts ſuch a number of years, that the inhabitants of the country ſay it is incorruptible. They employ it for making beams and inſtruments of huſbandry; it burns ſlowly, but the coals which reſult from its combuſtion are very ſtrong and produce a great heat.

The Arabs ſtrip the bark and fibrous parts from the young date trees, and eat the ſubſtance, which is in the centre; it is very nouriſhing, and has a ſweet taſte: it is known by the name of the marrow of the date tree. They eat alſo the leaves, when they are young and tender, with lemon juice; the old ones are laid out to dry, and are employed for making mats and other works of the ſame kind, which are much uſed and with which they carry on a conſiderable trade in the interior parts of the country. From the ſides of the ſtumps of the branches which have been left ariſe a great number of delicate filaments, of which they make ropes, and which might ſerve to fabricate cloth.

Of the freſh dates and ſugar, ſays Haſſelquiſt, the Egyptians make a conſerve, which has a very pleaſant taſte. In Egypt they uſe the leaves as fly-flaps, for driving away the numerous inſects which prove ſo troubleſome in hot-countries. The hard boughs are uſed for fences and other purpoſes of huſbandry; the principal ſtem for building. The fruit, before it is ripe, is ſomewhat aſtringent; but when thoroughly mature, is of the nature of the fig. The Senegal dates are ſhorter than thoſe of Egypt, but much thicker in the pulp, which is ſaid to have a ſugary agreeable taſte, ſuperior to that of the beſt dates of the Levant.

A white liquor, known by the name of *milk*, is drawn alſo from the date-tree. To obtain it, all the branches are cut from the ſummit of one of theſe trees, and after ſeveral inciſions have been made in it, they are covered with leaves, in order that the heat of the ſun may not dry it.

The ſap drops down into a veſſel placed to receive it, at the bottom of a circular groove, made below the

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(A) The celebrated Linnæus, in his Diſſertation on the Sexes of Plants, ſpeaking of the date tree, ſays, "A female date-bearing palm flowered many years at Berlin without producing any ſeeds; but the Berlin people taking care to have ſome of the bloſſoms of the male tree, which was then flowering at Leipſic, ſent to them by the poſt, they obtained fruit by theſe means; and ſome dates, the offspring of this impregnation, being planted in my garden, ſprung up, and to this day continue to grow vigorouſly. Kœmpfer formerly told us, how neceſſary it was found by the oriental people, who live upon the produce of palm trees, and are the true *Lotophagi*, to plant ſome male trees among the females, if they hoped for any fruit: hence it is the practice of thoſe who make war in that part of the world to cut down all the male palms, that a famine may afflict their proprietors; ſometimes even the inhabitants themſelves deſtroy the male trees when they dread an invaſion, that their enemies may find no ſuſtenance in the country."

the inciſions. The milk of the date tree has a ſweet and agreeable taſte when it is new; it is very refreſhing, and it is even given to ſick people to drink, but it generally turns ſour at the end of 24 hours. Old trees are choſen for this operation, becauſe the cutting of the branches, and the large quantity of ſap which flows from them, greatly exhauſt them, and often cauſe them to decay.

The male flowers of the date tree are alſo uſeful. They are eaten when ſtill tender, mixed up with a little lemon juice. They are reckoned to be very provocative: the odour which they exhale is probably the cauſe of this property being aſcribed to them.

Theſe date trees are very lucrative to the inhabitants of the deſert. Some of them produce twenty bunches of dates; but care is always taken to lop off a part of them, that thoſe which remain may become larger; ten or twelve bunches only are left on the moſt vigorous trees.

It is reckoned that a good tree produces, one year with another, about the value of 10 or 12 ſhillings to the proprietor. A pretty conſiderable trade is carried on with dates in the interior part of the country, and large quantities of them are exported to France and Italy. The crop is gathered towards the end of November. When the bunches are taken from the tree, they are hung up in ſome very dry place where they may be ſheltered and ſecure from inſects.

Dates afford wholeſome nouriſhment, and have a very agreeable taſte when they are freſh. The Arabs eat them without ſeaſoning. They dry and harden them in the ſun, to reduce them to a kind of meal, which they lay up in ſtore to ſupply themſelves with food during the long journeys which they often undertake acroſs their deſerts. This ſimple food is ſufficient to nouriſh them for a long time.—The inhabitants of the Zaara procure alſo from their dates a kind of honey which is exceedingly ſweet. for this purpoſe they chooſe thoſe which have the ſofteſt pulp; and having put them into a large jar with a hole in the bottom, they ſqueeze them by placing over them a weight of eight or ten pounds.—The moſt fluid part of the ſubſtance ,which drops through the hole, is what they call the *honey* of the date.

Even the ſtones, though very hard, are not thrown away. They give them to their camels and ſheep as food, after they have bruiſed them or laid them to ſoften in water.

The date, as well as other trees which are cultivated, exhibits great variety in its fruit, with reſpect to ſhape, ſize, quality, and even colour. There are reckoned to be at leaſt twenty different kinds. Dates are very liable to be pierced by worms, and they ſoon corrupt in moiſt or rainy weather.

From what has been ſaid, it may eaſily be perceived, that there is, perhaps, no tree whatever uſed for ſo many and ſo valuable purpoſes as the date tree.

Phoenix, in ornithology, a bird famous in antiquity, but generally looked upon by the moderns as fabulous. The ancients ſpeak of this bird as ſingle, or the only one of its kind; they deſcribe it as of the ſize of an eagle; its head finely creſted with a beautiful plumage, its neck covered with feathers of a gold colour, and the reſt of its body purple, only the tail white, and the eyes ſparkling like ſtars: they hold, that it lives 500 or 600 years in the wilderneſs; that when thus advanced in age, it builds itſelf a pile of ſweet wood and aromatic gums, and fires it with the waſting of its wings, and thus burns itſelf; and that from its aſhes ariſes a worm, which in time grows up to be a phœnix. Hence the Phœnicians gave the name of *phœnix* to the palm-tree; becauſe when burnt down to the root it riſes again fairer than ever.

In the ſixth book of the annals of Tacitus, ſect. 28. it is obſerved that, in the year of Rome 787, the phœnix reviſited Egypt; which occaſioned among the learned much ſpeculation. This being is ſacred to the ſun. Of its longevity the accounts are various. The common perſuaſion is, as we have mentioned above, that it lives 500 years; though by ſome the date is extended to 1461. The ſeveral eras when the phœnix has been ſeen are fixed by tradition. The firſt, we are told, was in the reign of Seſoſtris; the ſecond in that of Amaſis; and, in the period when Ptolemy the third of the Macedonian race was ſeated on the throne of Egypt, another phœnix directed its flight towards Heliopolis. When to theſe circumſtances are added the brilliant appearance of the phœnix, and the tale that it makes frequent excurſions with a load on its back, and that when, by having made the experiment through a long tract of air, it gains ſufficient confidence in its own vigour, it takes up the body of its father and flies with it to the altar of the ſun to be there conſumed; it cannot but appear probable, that the learned of Egypt had enveloped under this allegory the philoſophy of comets.

Phoenix, ſon of Amyntor king of Argos by Cleobule of Hippodamia, was preceptor to young Achilles. His father having proved faithleſs to his wife, through fondneſs for a concubine called *Clytia*, Cleobule, who was jealous of him, perſuaded her ſon Phœnix to ingratiate himſelf with his father's miſtreſs. Phœnix eaſily ſucceeded; but Amyntor diſcovering his intrigues, he drew a curſe upon him, and the ſon was ſoon after deprived of his ſight by divine vengeance. Some ſay that Amyntor himſelf put out his ſon's eyes, which ſo cruelly provoked him that he meditated the death of his father. Reaſon and piety, however, prevailed over paſſion; and that he might not become a parricide, Phœnix fled from Argos to the court of Peleus king of Phthia. Here he was treated with tenderneſs; Peleus carried him to Chiron, who reſtored him to his eye-ſight; ſoon after which he was made preceptor to Achilles, his benefactor's ſon. He was alſo preſented with the government of many cities, and made king of the Dolopes. He went with his pupil to the Trojan war; and Achilles was ever grateful for the inſtructions and precepts which he had received from him. After the death of Achilles, Phœnix, with others, was commiſſioned by the Greeks to return into Greece, to bring to the war young Pyrrhus. This commiſſion he ſucceſsfully performed; and after the fall of Troy, he returned with Pyrrhus, and died in Thrace. He was buried, according to Strabo, near Trachinia, where a ſmall river in the neighbourhood received the name of *Phœnix*. There was another Phœnix, ſon of Agenor, by a nymph who was called *Telephaſſa*, according to Apollodorus and Moſchus, or, according to others, *Epimeduſa*, *Perimeda*, or *Agriope*. He was, like his brother Cadmus, and Cilix, ſent by his father in purſuit of his ſiſter Europa, whom Jupiter had carried away under the form of a bull; and when his inquiries proved unſucceſsful, he ſettled in a country, which, according to ſome, was from him called *Phœnicia*. From him, as ſome ſuppoſe, the Carthaginians were called *Pœni*.

Plate CCCXCII.

PHOLAS, a genus of inſects, belonging to the order of vermes teſtacea. The ſhell is double-valved and divaricated; the cardo is turned backwards, and connected by a cartilage. There are ſix ſpecies, diſtinguiſhed by the figure of their ſhells.

The word *pholas* is derived from the Greek, and ſignifies ſomething which lies hid. This name they derive from their property of making themſelves holes in the earth, ſand, wood, or ſtone, and living in them. The means of their getting there, however, are as yet entirely unknown. All that we can know with certainty is, that they muſt have penetrated theſe ſubſtances when very ſmall; becauſe the entrance of the hole in which the pholas lodges is always much leſs than the inner part of it, and indeed than the ſhell of the pholas itſelf. Hence ſome have ſuppoſed that they were hatched in holes accidentally formed in ſtones, and that they naturally grew of ſuch a ſhape as was neceſſary to fill the cavity.

The holes in which the pholades lodge are uſually twice as deep, at leaſt, as the ſhells themſelves are long; the figure of the holes is that of a truncated cone, excepting that they are terminated at the bottom by a rounded cavity, and their poſition is uſually ſomewhat oblique to the horizon. The openings of theſe holes are what betray the pholas being in the ſtone; but they are always very ſmall in proportion to the ſize of the fiſh. There ſeems to be no progreſſive motion of any animal in nature ſo ſlow as that of the pholas; it is immerſed in the hole, and has no movement except a ſmall one towards the centre of the earth; and this is only proportioned to the growth of the animal. Its work is very difficult in its motion; but it has great time to perform it in, as it only moves downward, ſinking itſelf deeper in the ſtone as it increaſes itſelf in bulk. That part by means of which it performs this, is a fleſhy ſubſtance placed near the lower extremity of the ſhell; it is of the ſhape of a lozenge, and is conſiderably large in proportion to the ſize of the animal; and though it be of a ſoft ſubſtance, it is not to be wondered at that in ſo long a time it is able, by conſtant work, to burrow into a hard ſtone. The manner of their performing this may be ſeen by taking one of them out of the ſtone, and placing it upon ſome ſoft clay; for they will immediately get to work in bending and extending that part allotted to dig for them, and in a few hours they will bury themſelves in the mud in as large a hole as they had taken many years to make in the ſtone. They find little reſiſtance in ſo ſoft a ſubſtance; and the neceſſity of their hiding themſelves evidently makes them haſten their work. The animal is lodged in the lower half of the hole in the ſtone, and the upper half is filled up by a pipe of a fleſhy ſubſtance and conic figure, truncated at the end: this they uſually extend to the orifice of the hole, and place on a level with the ſurface of the ſtone; but they ſeldom extend it any farther than this. The pipe, though it appears ſingle, is in reality compoſed of two pipes, or at leaſt it is compoſed of two parts ſeparated by a membrane. The uſe of this pipe or proboſcis is the ſame with that of the proboſcis of other ſhell-fiſh, to take in ſea-water into their bodies, and afterwards to throw it out again. In the middle of their bodies they have a ſmall green veſſel, the uſe of which has not yet been diſcovered. This, when plunged in ſpirit of wine, becomes of a purple colour: but its colour on linen will not become purple in the ſun like that of the murex; and even if it would, its quantity is too ſmall to make it worth preſerving.

The pholas is remarkable for its luminous quality. That this fiſh was luminous is noticed by Pliny, who obſerves that it ſhines in the mouth of the perſon who eats it; and if it touch his hands or clothes, it makes them luminous. He alſo ſays, that the light depends upon its moiſture. The light of this fiſh has furniſhed matter for various obſervations and experiments to M. Reaumur and the Bolognian academicians, eſpecially Beccarius, who took ſo much pains with the ſubject of phoſphoreal light.

M. Reaumur obſerves, that whereas other fiſhes give light when they tend to putreſcence, this is more luminous in proportion to its being freſh; that when they are dried, their light will revive if they be moiſtened either with freſh or ſalt water, but that brandy immediately extinguiſhes it. He endeavoured to make this light permanent, but none of his ſchemes ſucceeded.

The attention of the Bolognian academicians was engaged to this ſubject by M. F. Marſilius in 1724, who brought a number of theſe fiſhes, and the ſtones in which they were incloſed, to Bologna, on purpoſe for their examination.

Beccarius obſerved, that though this fiſh ceaſed to ſhine when it became putrid, yet that in its moſt putrid ſtate it would ſhine, and make the water in which it was immerſed luminous when it was agitated. Galeatius and Montius found that wine or vinegar extinguiſhed this light; that in common oil it continued ſome days, but in rectified ſpirit of wine or urine hardly a minute.

In order to obſerve in what manner this light was affected by different degrees of heat, they made uſe of a Reaumur's thermometer, and found that water rendered luminous by theſe fiſhes increaſed in light till the heat arrived to 45°, but that it then became ſuddenly extinct, and could not be revived again.

In the experiment of Beccarius, a ſolution of ſea-ſalt increaſed the light of the luminous water; a ſolution of nitre did not increaſe it quite ſo much. Sal ammoniac diminiſhed it a little, oil of tartar, *per deliquium* nearly extinguiſhed it, and the acids entirely. This water poured upon freſh calcined gypſum, rock cryſtal, ceruſe, or ſugar, became more luminous. He alſo tried the effects of it when poured upon various other ſubſtances, but there was nothing very remarkable in them. Afterwards, uſing luminous milk, he found that oil of vitriol extinguiſhed the light, but that of tartar increaſed it.

This gentleman had the curioſity to try how differently coloured ſubſtances were affected by this kind of light; and having, for this purpoſe, dipped ſeveral ribbons in it, the white came out the brighteſt, next to this was the yellow, and then the green; the other colours could hardly be perceived. It was not, however, any particular colour, but only light, that was perceived in this caſe. He then dipped boards painted with the different colours, and alſo glaſs tubes filled with ſubſtances of different colours, in water rendered luminous by the fiſhes. In both theſe caſes, the red was hardly viſible, the yellow was the brighteſt, and the violet the dulleſt. But on the boards, the blue was nearly equal to the yellow, and the green more languid; whereas in the glaſſes, the blue was inferior to the green.

Of all the liquors to which he put the pholades, milk was rendered the moſt luminous. A ſingle pholas made ſeven ounces of milk ſo luminous, that the faces of perſons might be diſtinguiſhed by it, and it looked as if it was tranſparent.

Air appeared to be neceſſary to this light; for when Beccarius put the luminous milk into glaſs tubes, no agitation would make it ſhine unleſs bubbles of air were mixed with it. Alſo Montius and Galeatius ſound, that, in an exhauſted receiver, the pholas loſt its light, but the water was ſometimes made more luminous; which they aſcribed to the riſing of bubbles of air through it.

Beccarius, as well as Reaumur, had many ſchemes to render the light of theſe pholades permanent. For this purpoſe he kneaded the juice into a kind of paſte with flour, and found that it would give light when it was immerſed in warm water; but it anſwered beſt to preſerve the fiſh in honey. In any other method of preſervation, the property of becoming luminous would not continue longer than ſix months, but in honey it had laſted above a year; and then it would, when plunged in warm water, give as much light as ever it had done. See Barbut's *Genera Verminum*, p. 14. &c.

PHOLEYS, or Foulies, are a people of Africa, of very peculiar manners. Some authors tell us, that the kingdom of Pholey, from whence they derive their name, is divided from that of Jaloff by a lake called in the language of the Mundingoes *Cayor*; and that it ſtretches from eaſt to weſt about 180 miles; but that, though it extends a great way ſouth, its limits in that direction are not exactly aſcertained.

Payne's Geography, Vol. I. p. 442.

Mr Moore, however, gives a very different account, and ſays, that the Pholeys live in clans, build towns, and are in every kingdom and country on each ſide the river; yet are not ſubject to any of the kings of the country, though they live in their territories; for if they are uſed ill in one nation, they break, up their towns, and remove to another. They have chiefs of their own, who rule with ſuch moderation, that every act of government ſeems rather an act of the people than of one man. This form of government is eaſily adminiſtered, becauſe the people are of a good and quiet diſpoſition, and ſo well inſtructed in what is juſt and right, that a man who does ill expoſes himſelf to univerſal contempt.

The natives of all theſe countries, not being avaricious of land, deſire no more than they can uſe; and as they do not plough with horſes or other cattle, they can uſe but very little; and hence the kings willingly allow the Pholeys to live in their dominions, and cultivate the earth.

The Pholeys have in general a tawney complexion, though many of them are of as deep a black as the Mundingoes; and it is ſuppoſed that their alliances with the Moors have given them the mixed colour between the true olive and the black. They are rather of a low ſtature, but have a genteel and eaſy ſhape, with an air peculiary delicate and agreeable.

Though they are ſtrangers in the country, they are the greateſt planters in it. They are extremely induſtrious and frugal, and raiſe much more corn and cotton than they conſume, which they ſell at reaſonable rates; and are ſo remarkable for their hoſpitality, that the natives eſteem it a bleſſing to have a Pholey town in their neighbourhood; and their behaviour has gained them ſuch reputation that it is eſteemed infamous for any one to treat them in an unhoſpitable manner. Their humanity extends to all, but they are doubly kind to people of their race; and if they know of any one of their body being made a ſlave, they will readily redeem him. As they have plenty of food, they never ſuffer any of their own people to want; but ſupport the old, the blind, and the lame, equally with the others.

Theſe people are ſeldom angry; and Mr Moore obſerves that he never heard them abuſe each other; yet this mildneſs is far from proceeding from want of courage, they being as brave as any people of Africa, and very expert in the uſe of their arms, which are javelins, cutlaſſes, bows and arrows, and upon occaſion guns. They uſually ſettle near ſome Mundingo town, there being ſcarce any of note up the river that has not a Pholey town near it. Moſt of them ſpeak Arabic, which is taught in their ſchools; and they are able to read the Koran in that language, though they have a vulgar tongue called *Pholey*. They are ſtrict Mahometans, and ſcarce any of them will drink brandy, or any thing ſtronger than ſugar and water.

They are ſo ſkilful in the management of cattle, that the Mundingoes leave theirs to their care. The whole herd belonging to a town feed all day in the ſavannahs, and after the crop is off, in the rice-grounds. They have a place without each town for their cattle, ſurrounded by a circular hedge, and within this encloſure they raiſe a ſtage about eight feet high, and eight or ten feet wide, covered with a thatched roof; all the ſides are open, and they aſcend to it by a ladder. Round this ſtage they fix a number of ſtakes, and when the cattle are brought up at night, each beaſt is tied to a ſeparate ſtake with a ſtrong rope made of the bark of trees. The cows are then milked, and four or five men ſtay upon the ſtage all night with their arms to guard them from the lions, tygers, and other wild beaſts. Their houſes are built in a very regular manner, they being round ſtructures, placed in rows at a diſtance from each other to avoid fire, and each of them has a thatched roof ſomewhat reſembling a high crowned hat.

They are alſo great huntſmen, and not only kill lions, tygers, and other wild beaſts, but frequently go 20 or 30 in a company to hunt elephants; whoſe teeth they ſell, and whoſe fleſh they ſmoke-dry and eat, keeping it for ſeveral months together. As the elephants here generally go in droves of 100 or 200, they do great miſchief by pulling up the trees by the roots, and trampling down the corn; to prevent which, when the natives have any ſuſpicion of their coming, they make fires round their corn to keep them out.

They are almoſt the only people who make butter, and ſell cattle at ſome diſtance up the river. They are very particular in their dreſs, and never wear any other cloathes but long robes of white cotton, which they make themſelves. They are always very clean, eſpecially the women, who keep their houſes exceedingly neat. They are, however, in ſome particulars very ſuperſtitious; for if they chance to know that any perſon who buys milk of them boils it, they will from thenceforth on no conſideration ſell that perſon any more, from their imagining that boiling the milk makes the cows dry.

PHOLIS, in natural hiſtory, is the name of a genus of foſſils of the claſs of gypſums or plaſter-ſtones. Its diſtinguiſhing characters are, that the bodies of it are tolerably hard, compoſed of particles ſomewhat broad, and of a bright cryſtalline luſtre. The name is derived from φολις, a *ſcale* or *ſmall flake*, becauſe they are compoſed of particles of that form.

The ſpecies of this genus are very valuable, and perhaps the moſt ſo of all the gypſums, becauſe they burn to the beſt and fineſt plaſter, but ſo far as is yet known, there are but two of them: the fine plaſter ſtone of Montmartre in France, called by us *plaſter of Paris ſtone* and *parget;* and the other, the coarſer and ſomewhat reddiſh kind, common in many parts of England, and called *hall plaſter*. See PLASTER *of Paris*.

PHOLIS, in ichthyology, is the name of a ſmall anguilliform fiſh. The back is brown, the belly is white, the whole back and ſides are ſpotted, and the ſkin is ſoft, free of ſcales, but with a tough mucilaginous matter like the eel. This ſpecies moſt of all approaches to the *alauda*; and tho' uſually larger, yet Mr Ray doubts whether it really differs from it in any thing eſſential; the diſtinction is its colour, which though a very obvious is certainly a very precarious one.

PHONICS, the doctrine or ſcience of ſounds, otherwiſe called ACOUSTICS. See that aricle.

PHORMIUM, FLAX-PLANT, (*Phormium tenax*, Forſt.) is a name which we may give to a plant that ſerves the inhabitants of New Zealand inſtead of hemp and flax. Of this plant there are two ſorts; the leaves of both reſemble thoſe of flags, but the flowers are ſmaller, and their cluſters more numerous; in one kind they are yellow, and in the other a deep red. Of the leaves of theſe plants, with very little preparation, they make all their common apparel, and alſo their ſtrings, lines, and cordage, for every purpoſe; which are ſo much ſtronger than any thing we can make with hemp, that they will not bear a compariſon.—From the ſame plant, by another preparation, they draw long ſlender fibres, which ſhine like ſilk, and are as white as ſnow: of theſe, which are very ſtrong, they make their fineſt cloths; and of the leaves, without any other preparation than ſplitting them into proper breadths, and tying the ſtrips together, they make their fiſhing nets, ſome of which are of an enormous ſize.

The ſeeds of this valuable plant have been brought over into England; but, upon trial, appeared to have loſt their vegetating power.

The filamentous parts of different vegetables have been employed in different countries for the ſame mechanic uſes as hemp and flax among us. Putrefaction, and in ſome degree alkaline lixivia, deſtroy the pulpy or fleſhy matter, and leave the tough filaments entire. By curiouſly putrefying the leaf of a plant in water, we obtain the fine flexible fibres which conſtituted the baſis of the ribs and minute veins, and which form as it were a ſkeleton of the leaf. In Madagaſcar, different kinds of cloth are prepared from the filaments of the bark of certain trees boiled in ſtrong ley; and ſome of theſe cloths are very fine, and approach to the ſoftneſs of ſilk, but in durability come ſhort of cotton: others are coarſer and ſtronger, and laſt thrice as long as cotton; and of theſe filaments they make ſails and cordage to their veſſels. The ſtalks of nettles are ſometimes uſed for like purpoſes, even in France; and Sir Hans Sloane relates, in one of his letters to Mr Ray, that he has been informed by ſeveral, that muſlin and callico, and moſt of the Indian linens, are made of nettles. A ſtrong kind of cloth is ſaid to be prepared in ſome of the provinces of Sweden of hop-ſtalks; and in the tranſactions of the Swediſh Academy for 1750, we have an account of an experiment relating to this ſubject: A quantity of the ſtalks was gathered in autumn, which was equal in bulk to a quantity of flax ſufficient to yield a pound after preparation. The ſtalks were put into water, and kept covered with it during the winter. In March they were taken out, dried in a ſtove, and dreſſed as flax. The prepared filaments weighed nearly a pound, and proved fine, ſoft, and white; they were ſpun and wove into ſix ells of fine ſtrong cloth. Unleſs the ſtalks are fully rotted, which will take much longer time than flax, the woody part will not ſeparate, and the cloth will prove neither white nor fine.

PHOSPHAT, is a mineral found in Eſtremadura. It is of a whitiſh colour, and of great ſolidity, though not ſufficiently hard to ſtrike fire with ſteel. If triturated in an iron mortar in the dark, or even if two pieces of it be rubbed together, it becomes luminous; but when it has once loſt this property, it does not, like ſome natural phoſphori, receive it again by being expoſed to the rays of the ſun. If reduced to a very fine powder, and laid on coals, it does not decrepitate, but burns with a beautiful green light; though, if the coals be very hot, and the powder coarſe, decrepitation will take place.

According to the analyſis made by theſe chemiſts, 100 grains of the calcareous phoſphat is reſolvable into the following elements:

Carbonic acid - -	1 grain.
Muriatic acid - - -	½
Iron - - - -	1
Quartzous earth - -	2
Pure calcareous earth - -	59
Phoſphoric acid - -	34
Fluoric acid - -	2½
	100 Grains.

We have the following account of an anaylſis of a native phoſphat of lime (earth bones) by Mr Haſſenfratz in the *Annals of Chemiſtry*. "The phoſphat of lime of eſtremadura, found by Mr Prouſt, determined me to examine on the coals a phoſphoreſcent powder which I collected at Kobala-Polyana near

Sigeth, in the county of Marmaroſch, during the metallurgic tour I made through Hungary by command of government. Though this powder gives abſolutely the ſame appearance when treated on the coals as the fluat of lime (*ſpath-fluor*), yet no fluoric acid is diſengaged from it when heated with ſulphuric acid. It diſſolves in nitric acid (dephlogiſticated nitrous acid); and ſulphuric (vitriolic) acid precipitates from this ſolution a conſiderable quantity of ſulfat of lime (gypſum): the liquor filtered, and concentrated by evaporation, gives a new precipitate ſimilar to the former. The liquor again filtered, and evaporated to dryneſs, left a ſlight reſiduum. This reſiduum, after having been expoſed to a fire ſufficiently ſtrong to make the veſſel containing it red-hot, and diſengage the nitric and ſulphuric acids which might have remained united with it, was ſoluble in diſtilled water, which it acidified. This acid did not precipitate barytic muriat; it cauſed a white precipitate from the ſolutions of ſulfat of iron (green vitriol), and nitrat of mercury (mercurial nitre), and formed a thick and copious one in lime water: hence it is evident, that this acid was the phoſphoric, and the powder was phoſphat of lime."

The phoſphat of ſoda is obtained by combining the phoſphoric acid with the mineral alkali. It has, we are told, been given with ſucceſs as a purge; and M. Pelletier thinks it may be applied to the ſoldering of metals inſtead of borax; and indeed it reſembles this ſubſtance ſo much in many of its properties, that it has been ſuppoſed that phoſphoric acid is one of the conſtituent principles of borax. See CHEMISTRY, n° 904.

1 Phoſphorus defined and diſtinguiſhed.

PHOSPHORUS, a name given to certain ſubſtances which ſhine in the dark without emitting heat. By this circumſtance they are diſtinguiſhed from the *pyrophori*, which though they take fire on being expoſed to the air, are yet entirely deſtitute of light before this expoſure.

2 Divided into various kinds.

Phoſphori are divided into ſeveral kinds, known by the names of ***Bolognian phoſphorus, Mr Canton's phoſphorus, Baldwin's phoſphorus, phoſphorus of urine,*** &c. of which the laſt is by far the moſt remarkable both with reſpect to the quantity of light which it emits, and its property of taking fire and burning very fiercely upon being ſlightly heated or rubbed. For the method of preparing theſe, ſee *CHEMISTRY-Index*.

3 Divided into two claſſes.

Beſides theſe, however, it has been found that almoſt all terreſtrial bodies, upon being expoſed to the light, will appear luminous for a little time in the dark, metals only excepted. This points out a general diviſion of the phoſphori into two claſſes; namely, ſuch as require to be expoſed to the light either of the ſun or of ſome artificial fire, before they become luminous; and ſuch as do not. Of the former kind are the Bolognian phoſphorus, Mr Canton's phoſphorus, the phoſphori from earths, &c. Of the latter kind are rotten-wood, the ſkins of fiſhes, and the phoſphorus of urine. To theſe we may add ſome other ſubſtances which become luminous in another way; *viz.* the maſs which remains after the diſtillation of volatile ſal amoniac with chalk, loaf-ſugar, and the phoſphorus of urine diſſolved in ſpirit of wine. The firſt, which is a compoſition of the marine acid of the ſal ammoniac with the chalks, after being fuſed in a crucible, becomes luminous when ſtruck with any hard body; white ſugar is luminous when grated or ſcraped in the dark; and the ſolution of phoſphorus in ſpirit of wine is luminous only when dropped into water; and even then the light is only perceived where the drops fall into the liquid. One part of phoſphorus communicates this property to 600,000 parts of ſpirit of wine.

4 Remarkable difference between the light of various phoſphoric bodies.

There is a remarkable difference between the light of rotten wood, fiſhes, and that of phoſphorus of urine, even when it is not in an ignited ſtate; for this laſt does not ceaſe to be luminous even when included within an exhauſted receiver; the contrary of which happens to rotten wood and fiſhes. If air is ſtrongly blown upon this phoſphorus from a pair of bellows, it will extinguiſh its light for ſome time, which is not the caſe with the other kinds. When kept in water, and placed in a warm air, the phoſphorus of urine diſcharges ſuch large and bright flaſhes into the air above it, as are apt to ſurpriſe and even frighten thoſe who are unacquainted with it. Theſe coruſcations are contracted in their paſſage through the water, but expand as ſoon as they get above it; however, the experiment can only be tried to advantage in warm weather, and in a cylindrical glaſs not above three quarters filled with water.

5 Phenomena of earthy phoſphori.

The phenomena exhibited by the earthy phoſphori are very curious; both on account of the ſingular circumſtances in which they exhibit their light, and the varieties obſerved in the light itſelf. All theſe, as has been already mentioned, emit no light till they have been firſt expoſed to the light of the ſun, or ſome other luminous body. After that, they are luminous in the dark for a conſiderable time; but by degrees their light dies away, and they emit no more till after another expoſure to the ſun. But if this happens to be too long continued, they are then irrecoverably ſpoiled. The ſame thing will happen from being too much heated without any expoſure to light. Indeed, if a phoſphorus, which has juſt ceaſed to be luminous, be heated, it will again emit light without any expoſure to the ſun; but by this its phoſphoric quality is weakened, and will at laſt be deſtroyed. Indeed theſe phoſphori are ſo tender, and impatient either of light or heat, that the beſt method of rendering them luminous occaſionally is by diſcharging an electric bottle near them. The light of the flaſh immediately kindles the phoſphorus, and it continues luminous for a conſiderable time, after which it may again be revived by another flaſh, and ſo on. However, with all the care that can be taken, theſe phoſphori are very far from being perpetual; nor has any method been yet fallen upon to render them ſo.

The ſingularites in the light of the phoſphori above mentioned are, that they emit light of many different and moſt beautiful colours. This difference of colours ſeems to be natural to them; for ſome will at firſt emit a green, others a red, others a violet, &c. at their formation. However, the beſt kinds agree in this ſtrange property, that if they are expoſed to a red light, they emit a red light in the dark; and the ſame of other colours. But this muſt not be underſtood without limitation; nor is the phoſphoreal light at any time ſo bright as the luminous body, whatever it was, by which it was kindled. Neither are we to imagine, that any particular phoſphorus has a particular kind of light appropriated to it; for the ſame phoſphorus which at one time emits a purple light, will at another perhaps emit a green, or a light of ſome other colour.

6
The nature of phoſphoric phenomena explained.

The explanation of the principal phenomena of phoſphorus is deducible from what has been ſhown concerning the nature of fire, compared with what is mentioned under the article Quicklime. Under this laſt article it is ſhown, that, when calcareous earths are deprived of their fixed air, a proportionable quantity of active fire is abſorbed by them; that is, the etherial fluid which pervades all bodies, has a violent tendency to expand itſelf, or to act all around every particle of the calcined earth, as from a centre. Of conſequence, if this tendency was not counteracted by ſome other power, theſe ſubſtances would emit a perpetual flame. This power, however, is found in our atmoſphere; which has already been ſhown either to be the poſitive principle of cold, or to contain it *. Hence, the latent fire in theſe ſubſtances is checked, and cannot act, excepting within the very ſubſtance itſelf. But if any other body comes in contact with the calcined earth, in which the principle of cold is leſs vigorous than in the atmoſphere, the active fire in the quicklime immediately ſhows itſelf, and the body either becomes hot, or is conſumed as if by fire. Hence it will follow, that if a very inflammable body is touched by quicklime, it ought to be ſet on fire. But of this we have no inſtance, becauſe it is impoſſible for the quicklime to part with any of its fire, unleſs it receives ſomething in exchange. This indeed it might receive from the atmoſphere; which could ſupply it either with more fire, if it was in a ſtate of ignition; or with fixed air, if any ſubſtance was at hand to receive the fire. But the atmoſphere refuſes to part with the fire which it contains, becauſe the effort of the fire in the quicklime is not ſufficiently ſtrong to overcome the oppoſition it meets with in other bodies; and, on the other hand, the effort of the fire in the quicklime is ſufficient to keep the earth from attracting fixed air out of the atmoſphere. But when water, for inſtance, is poured on the quicklime, the dry earth abſorbs it very greedily, and parts with a proportionable quantity of its latent fire, which the water alſo abſorbs much more readily than the atmoſphere. Hence the mixture becomes ſo exceedingly hot as ſometimes to fire combuſtible bodies. Now if, inſtead of water, we ſuppoſe the lime to be mixed with oil, this alſo will abſorb the fire, but not with ſuch force as the water; neither is the heat by any means ſo conſiderable; becauſe oil is capable of detaining a vaſt quantity of heat in a latent ſtate, the only conſequence of which is an increaſe of its fluidity, without any very perceptible change of temperature. At the ſame time, however, we muſt remember, that if the oil is in very ſmall quantity, and intimately combined with the quicklime in that peculiar ſtate which was formerly called *phlogiſton*, it is eaſy to conceive, that it may be ſo much ſaturated with fire, as to be unable to contain any more without being ignited. In this caſe, if more fire is forced into the compound, a quantity of the phlogiſtic matter which it contains will be decompounded; and of conſequence, the fire which it has imbibed will be thrown out, as in the common ignition of vapour; and in proportion to the degree of heat thus communicated, will the degree of ignition and the continuance of it be. If the quantity of heat is very great, the phlogiſton will be diſſipated all at once; but if otherwiſe, the ignition will continue for a much greater length of time, as is the caſe with a common fire.

7
The compoſition of different phoſphori.

To apply this to the accenſion of phoſphori, we muſt conſider that theſe ſubſtances, are all formed by calcining calcareous ſubſtances, and combining them with ſome portion of phlogiſtic matter. Baldwin's phoſphorus is made by diſſolving chalk in the nitrous acid, afterwards evaporating the ſolution, and driving off moſt of the acid. The conſequence of this is, that the earth is left in an exceedingly cauſtic ſtate, as the acid expels the fixed air more completely than could be done almoſt by any calcination whatever; at the ſame time that any phlogiſtic matter which might have been contained in the mixture is moſt accurately diffuſed through it, and combined with it. The Bolognian phoſphorus is compoſed of a gypſeous earth, which contains a quantity of vitriolic acid; and as no mineral is to be found perfectly free from phlogiſtic matter, the vitriolic acid unites with it during the calcination into an exceedingly inflammable ſulphur; for the greater the quantity of acid there is in proportion to the phlogiſton, the more inflammable is the compound †. Thus the Bolognian, as well as Baldwin's phoſphorus, is a compound of quicklime and inflammable matter; and the caſe is ſtill more plain with regard to Mr Canton's, where the quicklime is mixed with ſulphur, and both calcined together.—Neither are the phoſphori made by calcining oyſter-ſhells without addition to be accounted any way different from thoſe already mentioned; ſince the ſhells always contain ſome portion of inflammable matter, which, being reduced to a coal by the action of the fire, furniſhes a quantity of phlogiſtion, and imparts it to the whole of the calcareous matter.

8
State of the phlogiſton.

Having thus ſeen that the phoſphori of which we now ſpeak are all compoſed of pure calcareous earth and phlogiſton, we are next to conſider, that the phlogiſton muſt be in ſuch a ſtate as it is when ſaturated with fire and ready to inflame. It is not indeed in the ſtate of vapour, becauſe this would require a quantity of fire detached from any other ſubſtance, and interpoſed between the particles of the vapour, in order to keep them at a diſtance, or to give it elaſticity. But the fire which ought to do this is confined by the calcareous earth, which alſo detains the phlogſton itſelf. As long therefore as the balance is thus preſerved, the phoſphorus cannot ſhine; but as ſoon as a freſh quantity of light is diſcharged upon it, then more light or fire (for they are the very ſame in this caſe) enters the quicklime than it can contain. The conſequence of this is, that the quantity which cannot be retained by the earth, exerts its force upon the phlogiſtion; which having already as much as it can hold, not only the ſuperfluous quantity is diſcharged, but alſo part of that which the phlogiſton had abſorbed before. The burning indeed is very ſlow and weak, becauſe the phlogiſton is obſtinately retained by the earth, which both impedes the ignition, and prevents the diſſipation of the phlogiſton in vapour. However, as ſoon as the lime has by its action impeded the farther extrication of the phlogiſton, the balance is reſtored, the fire goes out, and the phoſphorus ceaſes to be luminous. Heat

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* See the article Cold.

† See the article Sulphur.

will kindle it again; but thus a larger quantity of phlogiſtic matter is diſſipated, and the phoſphorus is ſoon deſtroyed. Light does the ſame, but in a much more moderate degree; and therefore the phoſphorus may be frequently rekindled by means of light, and will continue its ſplendor for a long time. But if the light is too long continued, or too violent, it will produce the ſame conſequence whether it is attended with perceptible heat or not.

9 Particulars reſpecting phoſphorus of urine.

With regard to the phoſphorus of urine, the caſe is the ſame; only, inſtead of the calcareous earth, we have here an acid joined with phlogiſton. The latter is in exceeding ſmall quantity, and of conſequence ſo loaded with fire that the leaſt additional heat, rubbing, or alteration in the weather, forces more fire upon it than it can bear, and therefore part of it is continually flaſhing off in thoſe coruſcations formerly mentioned. The reaſon why this phoſphorus flaſhes like lightning, and the others give only a ſteady light like coals, is, that the compound is very volatile. It requires indeed a violent fire to diſtil it at firſt; but in the diſtillation ſo much fire is imbibed, that it ſeems ever afterwards ready to evaporate ſpontaneouſly; and therefore phoſphorus, when once made, is eaſily rediſtilled in cloſe veſſels.

10 Why it ſhines under water.

It now remains only to ſhow the reaſon why the phoſphorus of urine and ſome others will ſhine under water, or in an exhauſted receiver, while rotten wood, &c. will not. This ſeems to ariſe from the quantity of fire which they have *internally*, and which requires no ſupply from the external air, as in the caſe of common fire: and hence the phoſphorus of urine ſhines more briſkly *in vacuo* than in the air; becauſe the preſſure of the atmoſphere is then taken off, and the evaporation of the phlogiſtic matter promoted. The light of fiſhes and rotten wood ſeems to be of an electric nature; and therefore ceaſes when the air is exhauſted, as on this fluid all the phenomena of electricity are found to depend.

11 Cauſe of the various colours of phoſphoric light.

With regard to the various colours of phoſphoric light ſome have imagined that the earthy ſubſtance was capable of imbibing a certain quantity of light, and emitting it afterwards in the very ſame ſtate, and having the ſame colour which it had before. But this is now known to be a miſtake, and the light of the phoſphori is found to be owing to a true accenſion, though weak, as in other burning bodies. Hence it is very probable that the colour of the light depends upon the degree of accenſion; for we ſee that even in common fires the colour depends in a great meaſure on the ſtrength of the flame. Thus the flame of a candle, where it is not well kindled at bottom, always appears blue. The flame of a ſmall quantity of ſulphur, or of ſpirit of wine, is blue; but if a large quantity of either of theſe ſubſtances be ſet on fire, the flame will in many places appear white. A ſtrong flame mixed with much ſmoke appears red; a weak one in ſimilar circumſtances appears brown, &c.—Hence if the phoſphoric is weakly kindled it will emit a brown, violet, blue, or green flame; if ſtrongly, a red or white one.

12 Signior Beccaria's experiment

It has already been mentioned, that almoſt all terreſtrial bodies have a phoſphoric quality: however this, in moſt of them, is extremely weak, and continues only for a very ſhort time. Signor Beccaria, who diſcovered this property, in order to find out what ſubſtances were phoſphoric and what were not, had a machine contrived like a dark lanthorn, in which he included himſelf, in order to perceive with the greater facility any ſmall quantity of light which might be emitted by the ſubſtances which he deſigned to examine. In the ſide of the machine was a cylinder capable of being turned about without admitting any light. Upon this were paſted the ſubſtances he deſigned to examine, and by turning the cylinder he immediately brought them from the light of the ſun into intenſe darkneſs; in which ſituation there were but few ſubſtances which did not afford a ſufficient quantity of light to render themſelves viſible. This phenomenon, however, is evidently ſimilar to an optical illuſion by which we are made to ſee what is not preſent before us; for if we look very intenſely upon any thing for ſome time, ſuffering no more light to enter our eyes than what is reflected from that object, we will imagine that we ſtill ſee it, though we remove into the dark or ſhut our eyes. The reaſon of this is, that the nervous fluid being once put in motion after a certain manner, continues that motion for a ſhort ſpace of time after the moving cauſe is removed. In like manner, as the light is partly reflected from bodies, and partly penetrates them, when any body is expoſed to the light, and then is ſuddenly brought into a dark place, the etherial fluid within its ſubſtance being once put into motion does not ceaſe to move immediately, but for a time produces that vibration which we call *light*: for the ſubſtance of light is preſent in the moſt intenſe darkneſs as well as in ſunſhine. Hence almoſt all ſubſtances are capable of emitting light in the dark, after being expoſed to a vigorous ſunſhine; though the reaſon of their doing ſo may be very different from that by which the phoſphori becomes luminous.

13 Other experiments.

Many entertaining experiments may be made with the various kinds of phoſphori, eſpecially with that of urine. This laſt, however, is ſometimes dangerous on account of the violence with which it burns. If diſſolved in oil of cloves, it loſes this property, but continues to be as luminous as before; ſo that this mixture, called *liquid phoſphorus*, may be uſed with ſafety. As on ſome occaſions it may be wiſhed to have it in powder, it is proper to obſerve that this may be done with ſafety by pouring ſome hot water upon the phoſphorus in a glaſs mortar. The compound melts, and while in a ſoft ſtate is eaſily reducible to powder of any degree of fineneſs.

14 On the combination of phoſphorus with metals.

Mr Margraff endeavoured to combine phoſphorus with metals by diſtillation; but zinc and copper were the only two metals that ſhowed any ſigns of combination (See Chemistry, n° 1413.) The great analogy, however, that has been obſerved between the properties of phoſphorus and thoſe of ſulphur and arſenic, induced M. Pelletier long ago to ſuſpect, that phoſphorus would really combine with metals, and that the eſſential point was to retain the phoſphorus in contact with the metal in a ſtate of fuſion. This happy idea led him to a method from which he has obtained all the ſucceſs that could be deſired. Of this we have already given a very contracted account after the word *Phoſ-*

phorus in the *Index* to our article CHEMISTRY, we ſhall now extend that account, by giving that in the firſt volume of *Annals of Chemiſtry*.

15 Phoſphoret of gold. "Each of the combinations which are now to be deſcribed, M. Pelletier has termed *phoſphorated metal*.

"M. Pelletier mixed half an ounce of gold of parting, in powder, with an ounce of phoſphoric glaſs and about a dram of powdered charcoal; he put this mixture into a crucible, covering it with a ſmall quantity of charcoal powder; and then applied a degree of heat ſufficient to melt the gold. During the operation, a conſiderable quantity of vapours of phoſphorus was diſengaged, but all the phoſphorus which was producedwas not diſſipated; a ſmall quantity united with the gold, which was whiter than in its natural ſtate, broke under the hammer, and had alſo a cryſtallized appearance.

"Twenty-four grains of this phoſphoret of gold, placed on a cupel in a heated muffle, loſt only one grain, and the button of gold that remained had the peculiar colour of that metal.

16 Of Platina. "A mixture, conſiſting of an ounce of platina, an ounce of phoſphoric glaſs, and a dram of powdered charcoal, being put into a crucible, and covered with a little charcoal powder, M. Pelletier gave it a degree of heat nearly equal to what would have fuſed gold: this he continued for an hour. Having broken the crucible, he found underneath a blackiſh glaſs a ſmall button of a ſilver white, weighing more than an ounce. On the inferior part of the button were well defined cryſtals of the ſame ſubſtance, the figure of which was a perfect cube. The ſame experiment, frequently repeated, conſtantly afforded the ſame reſult.

"The phoſphoret of platina is very brittle, pretty hard, and ſtrikes fire with ſteel: it is not acted upon by the magnet, and when it is expoſed naked to a fire capable of fuſing it, the phoſphorus is diſengaged, and burns on its ſurface. Expoſed to the fire in a cupelling furnace on porcelain teſts, the phoſphoret of platina leaves a black glaſs, which ſurrounds the metallic ſubſtance. The colour of the glaſs is owing to iron contained in the platina; and if it continue expoſed to the ſame heat in freſh teſts, the portions of glaſs that form latterly have not ſo deep a colour, are more or leſs greeniſh, have ſometimes a bluiſh tinge, and become at laſt of a tranſparent white. This obſervation led M. Pelletier to imagine, that phoſphorus was well adapted for ſeparating iron from platina, and that it was one of the beſt means of ſeparating it entirely from that metal. But the glaſs which reſults from the combuſtion of the phoſphorus and its combination with the *oxyd* (calx) of iron, forms a cruſt which obſtructs the combuſtion of the phoſphorus that ſtill remains combined with the platina. To overcome this obſtacle, M. Pelletier thought of expoſing the phoſphoret of platina to the fire, in cupels made of calcined bones, which, as they eaſily abſorb the glaſs of lead, ought alſo to have the property of abſorbing the phoſphoric glaſs. He repeated the operation, therefore, ſeveral times ſucceſſively, changing the cupel. A button of platina, which had been thus operated on four times, he preſented to the academy: in this ſtate it was capable of being reduced into plates, but was brittle when heated.

"Since the reading of his memoir, M. Pelletier has purſued his proceſs, and has advanced ſo far as to be able totally to free the platina from the phoſphorus, ſo that it may be worked when heated: thus he has procured us a method of purifying this metal more advantageous probably than any hitherto attempted. The phoſphoret of platina detonates ſtrongly when it is thrown on nitre in fuſion. A mixture of phoſphoret of platina, and oxygenated muriat of potaſh (*dephlogiſticated digeſtive ſalt*), thrown into a red hot crucible, produces a briſk detonation, and the platina remains pure in the crucible.

17 Of ſilver, "Half an ounce of ſilver, treated with an ounce of phoſphoric glaſs and two drams of charcoal, acquired an increaſe of weight of one dram. The phoſphoret formed was white: it appeared granulated, and as it were cryſtalized: it broke under the hammer, but was capable of being cut with a knife. Placed in a cupel in a heated muffle, the phoſphorus was diſengaged, and the ſilver remained quite pure.

18 Of copper, "In preparing phoſphorus in the large way, M. Pelletier obſerved, that the phoſphoric acid attacked in ſome degree the copper baſons, which are in other reſpects very convenient for this operation; and in the retorts which he made uſe of for the diſtillation, he found phoſphoret of copper, ſometimes in ſmall diſtinct grains, at others in large maſſes, according as the degree of heat which finiſhed the operation was more or leſs intenſe. This phoſphoret he exhibited to the academy, and thence it was mentioned in the chemical nomenclature. The phoſphoret of copper is alſo obtainable by a proceſs ſimilar to that which we have deſcribed for obtaining that of gold, ſilver, and platina. The proportions which M. Pelletier employed were an ounce of ſhreds of copper, an ounce of phoſphoric glaſs, and a dram of powdered charcoal. This phoſphoret appears whitiſh, is ſometimes variegated with the different colours of the rainbow; changes on expoſure to the air like pyrites, loſes its luſtre, and aſſumes a blackiſh hue.

"Margraff had formed phoſphoret of copper by diſtilling the oxyd of copper, called *crocus veneris*, with phoſphorus; and M. Pelletier alſo obtained it by the ſame proceſs: but he did not obſerve the property attributed to it by Margraff, of running when applied to a candle. Having placed the phoſphoret in a cupel in a heated muffle, it was fuſed, the phoſphorus inflamed on its ſurface; a blackiſh ſubſtance reſembling ſcoriæ remained in the cupel, which was penetrated with a glaſs that gave it a blue colour.

"The phoſphoret of iron produced by the fuſion of an ounce of phoſphoric glaſs, and an ounce of ſhreds of iron, mixed with half a dram of powdered charcoal, was very brittle, and broke white, with a ſtriated and granulated appearance: in one cavity it was cryſtallized in rhomboidal priſms. It is the ſame ſubſtance which Bergman conceived to be a peculiar metal.

"This phoſphoret, placed in a cupel in a heated muffle, ſoon entered into a ſtate of fuſion; in the cupel remained a brittle ſubſtance, which is an oxyd of iron, and the cupel was penetrated with a matter ſimilar to that which M. Pelletier had obſerved on treating in the ſame manner phoſphoret of platina, obtained from platina not purified.

19 Of lead. "The phoſphoret of lead, obtained by the proceſs already deſcribed, appears little different from common lead. It is malleable, and eaſily cut with a knife, but it loſes its luſtre ſooner than lead, and when melted on charcoal by the blow-pipe, the phoſphorus burns, leaving the lead behind.

20 Of tin. "The phoſphoetr of tin, which M. Pelletier obtained by his proceſs, was divided into ſeveral grains, becauſe he had not given a ſufficient degree of fire to unite them. Theſe grains did not appear different from the metal itſelf; but being melted with the blow-pipe, the phoſphorus burnt on the ſurface of the metal, as in the ſimilar experiment with lead.

"In fuſing tin or lead with the charcoal powder and phoſphoric glaſs, care muſt be taken not to urge the fire, as the phoſphorus eaſily flies off from either of thoſe metals.

"From the experiments of M. Pelletier, it appears that phoſphorus may be combined with gold, platina, ſilver, copper, iron, tin, and lead; and that it deprives the five former metals of their ductility. M. Pelletier propoſes to make further experiments, to aſcertain whether it be poſſible or not to combine a greater quantity of phoſphorus with the two latter, and whether they will retain their malleability in that caſe. In another memoir he will examine the action of phoſphorus on ſemimetals: he propoſes alſo to aſcertain the order of its affinity with the metals and ſemimetals.

"It is much to be wiſhed that M. Pelletier may carry to perfection a work which will enrich chemiſtry with a ſpecies of combination hitherto almoſt entirely unknown, and which he has diſcovered means of effecting by a proceſs equally ſimple and ingenious."

In the 10th volume of the ſame Annals we find an account of the action of lime, and of ſome metallic oxyds on phoſphorus, by Dr Raymond.

21 M. Gengembre's diſcovery of a peculiar kind of gas. M. Gengembre diſcovered, that by boiling phoſphorus in a ſolution of potaſh, a peculiar kind of gas was produced, which had the ſingular property of taking fire on coming into contact with the atmoſphere, and to which the French chemiſts have given the appellation of *phoſphorized hydrogen gas*. 22 The proceſs varied. Dr Raymond thought of varying the proceſs, in order to diſcover whether this gas might not be produced in ſome other way. He took two ounces of lime ſlaked in the air, a dram of phoſphorus cut ſmall, with half an ouuce of water, which he mixed up into a ſoft paſte, and put into a ſtone retort; to this retort a tube was fitted, the internal diameter of which, he ſays, ought not to exceed a line and a half, communicating with a receiver full of water. As ſoon as the retort was well heated, the phoſphorized hydrogen gas was generated ſo abundantly, that, from the quantity of ingredients here mentioned, no leſs than three quarts of it were obtained. The reſiduum was found to have all the characters of the native phoſphat of lime. Hence the Doctor ſuppoſes, that the water was decompoſed during the proceſs, and that its oxygen ſerved to acidify the phoſphorus; which, in this ſtate, was combined with the lime, and formed the phoſphat; while its hydrogen, aſſuming a gaſeous ſtate, carried with it a part of the phoſphorus, to which the property of taking fire by contact with the air muſt be aſcribed. The gas ſoon loſes this property, and the phoſphorus is condenſed on the ſides of the receiver: great caution, however, is neceſſary; for though a part of the gas may ſeem to have depoſited its phoſphorus, and to be reduced to pure hydrogen, yet another part, in the ſame receiver, may retain enough to cauſe a formidable exploſion, when in contact with air.

The facility with which water was thus decompoſed led the author to ſuſpect that a ſimilar effect might be produced by the ſame mixture in the mean temperature of the atmoſphere. Accordingly he found that in ten days time a ſmall quantity of hydrogen gas was generated in the vials, in which the ingredients were placed: this, however, was not phoſphorized, the heat not being ſufficient to volatilize the phoſphorus.

23 Another variation. Animated by this ſucceſs, Dr Raymond reſolved to try what could be effected by metallic oxyds. He made two mixtures like the former: but inſtead of lime, he ſubſtituted in the one the white oxyd of zinc, and in the other the black ozyd of iron. After long diſtillation with great heat, he obtained from both phoſphorized hydrogen gas; but it was produced in much leſs time, and in greater quantity, from the oxyd of zinc than from that of iron; which he aſcribed to the cloſe affinity of the former to the phoſphoric acid.

24 Proceſs for making Kunkel's phoſphorus from urine. In the 12th volume of the ſame valuable work, we have an account of a proceſs for making Kunkel's phoſphorus from urine, which is ſhorter and more economical than that by which Meſſrs Scheele and Ghan extract it from the bones of animals, by M. Giobert. This method is founded on the property of the metallic ſalts to ſeparate the phoſphoric acid from urine, which Margraff, we believe, firſt diſcovered: but M. Giobert has greatly improved on the proceſs directed by the German chemiſt, as he avoids the tedious and diſguſting operations of evaporating the urine, and expoſing it to putrefaction. He tells us, that it is indifferent whether the urine be that of healthy or diſeaſed perſons; and that of horſes is nearly as good for this purpoſe as that which is human. He gradually pours into it a ſolution of lead in the nitric acid, till the precipitation ceaſes which this had occaſioned; the whole is then diluted with a conſiderable quantity of water, and afterward filtrated through a linen cloth. The precipitate, which is phoſphat of lead, muſt be made up into a paſte with powder of charcoal, and well dried in an iron or copper pan: it muſt afterward be diſtilled; when it will yield, firſt, an ammoniacal, and then an empyreumatic, oil; theſe oils proceed from the urine, from which it is difficult to purify the phoſphat. As ſoon as the oil ceaſes to come over, a clean receiver muſt be applied, and the fire be greatly increaſed. The phoſphorus generally appears in about half an hour; and, within eight hours, twelve or fourteen ounces of it may thus be obtained. If the proceſs be conducted with care, M. Giobert thinks that a hundred parts of phoſphat of lead will yield between fourteen and eighteen of phoſphorus.

If on the phoſphat of lead thus precipitated from urine, a ſolution of ſulphat of ammoniac be poured, and this, after digeſting during twelve hours, be filtrated and evaporated, phoſphat of ammoniac will be obtained; and if ſulphat of ſoda be uſed, the reſult will be phoſphat of ſoda.

Acid of PHOSPHORUS. This acid, called alſo the *microcoſmic*

Phoſphorus

crocoſmic acid, has already been deſcribed. See Chemistry-*Index* at *Phoſphoric Acid* (a). It has been diſcovered by Mr Scheele, that an acid capable of making phoſphorus is producible from calcined bones or hartſhorn and the vitriolic acid. The proceſs for procuring this acid recommended by that gentleman was to diſſolve the bones in nitrous acid; afterwards to precipitate the earth by means of the vitriolic acid; to filter and evaporate the liquor to dryneſs; and, after driving off the nitrous acid, the phoſphoric acid remains. This proceſs, however, is expenſive on account of the waſte of nitrous acid; and is likewiſe very inconvenient, becauſe a great deal of the earthy matter continues diſſolved even after the vitriolic acid is poured in; and therefore the phoſphoric acid is never to be obtained pure: for which reaſon the following proceſs is preferable.

Take of calcined bones or hartſhorn, one pound; oil of vitriol, 14 ounces. Let the bones be reduced to fine powder; then pour on the acid undiluted, and rub both together till they are as accurately mixed as poſſible. Having let them remain for ſome hours in this ſituation, pour on as much water, ſtirring and diſſolving the lumps, into which the maſs will now be concreted, till it is all equally diſtributed through the liquid, and has the conſiſtence of thick gruel. Let it remain 24 hours, and then pour it into a canvas cloth in order to let the liquor drain from it. This is a very tedious operation, as freſh water muſt continually be pouring on till all the ſaline matter is waſhed off. When this is done, pour into the liquid a quantity of cauſtic volatile alkali, which will occaſion a copious precipitation; for the earth of bones is much leſs ſtrongly attracted by acids than even the cauſtic volatile alkali. The liquid being now filtered a ſecond time, which will be done with ſufficient eaſe, and afterwards evaporated, there remains a maſs compoſed of phoſphoric acid and vitriolic ſal ammoniac. By increaſing the fire, the latter is diſſipated in vapour; and if the proceſs has been ſucceſsful, four ounces or more of pure phoſphoric acid will remain.

With regard to the properties of this acid, it is not yet aſcertained whether they are exactly the ſame with the microcoſmic acid or not. Indeed, as far as yet appears, they ſeem to be different; and there are very ſtrong reaſons for ſuppoſing that the phoſphoric acid thus produced is no other than the vitriolic altered by its combination with the earth of bones. See the article Bones.

Liquor of Phosphorus. See Chemistry, n° 2d 957. 1521.

Photinians, Photius.

PHOTINIANS, in eccleſiaſtical hiſtory, were a ſect of heretics in the fourth century who denied the divinity of our Lord. They derive their name from *Photinus* their founder, who was biſhop of Sirmium, and a diſciple of Marcellus. Photinus publiſhed in the year 343 his notions reſpecting the Deity, which were repugnant both to the orthodox and Arian ſyſtems. He aſſerted, that Jeſus Chriſt was born of the Holy Ghoſt and the Virgin Mary; that a certain divine emanation, which he called the *Word*, deſcended upon Him; and that becauſe of the union of the divine word with his human nature, He was called the ſon of God, and even God himſelf; and that the Holy Ghoſt was not a perſon, but merely a celeſtial virtue proceeding from the Deity. Both parties condemned the biſhop in the councils of Antioch and Milan, held in the years 345 and 347. He was condemned alſo by the council at Sirmium in 351, and was afterwards degraded from the epiſcopal dignity, and at laſt died in exile in the year 372 or 375. His opinions were afterwards revived by Socinus.

PHOTIUS, patriarch of Conſtantinople, was one of the fineſt geniuſes of his time, and his merit raiſed him to the patriarchate; for Bardas having driven Ignatius from the ſee, Photius was conſecrated by Aſbeſtus in 859. He condemned Ignatius in a ſynod, whereupon the pope excommunicated him, and he, to balance the account, anathematized the pope. Baſilius of Macedon, the emperor whom Photius had reproved for the murder of Michael, the late emperor, expelled him, and reſtored Ignatius; but afterwards re-eſtabliſhed Photius, upon Ignatius's death, in 878. At laſt, being wrongfully accuſed of a conſpiracy againſt the perſon of Leo the Philoſopher, the ſon and ſucceſſor to Baſilius, he was expelled by him in 886, and is ſuppoſed to have died ſoon after. He wrote a *Bibliotheca*, which contains an examen of 280 authors: we have alſo 253 epiſtles of his; the *Nomacanon* under 14 titles; an abridgment of the acts of ſeveral councils, &c. This great man was born in Conſtantinople, and was deſcended from a very illuſtrious and noble family. His natural abilities were very great, and he cultivated them with the greateſt aſſiduity. There was no branch of literature, whether ſacred or profane, and ſcarcely any art or ſcience, in which he was not deeply verſed. Indeed he appears to have been by far the greateſt man of the age in which he lived; and was ſo intimately concerned in the chief tranſactions of it, that eccleſiaſtical writers have on that account called it *Sæculum Photianum*. He was firſt raiſed to the chief dignities of the empire, being made principal ſecretary of ſtate, captain of the guards, and a ſenator. In all theſe ſtations he acquitted himſelf with a diſtinction ſuitable to his great abilities; for he was a refined ſtateſman, as well as a profound ſcholar. His riſe to the patriarchate was very quick; for when he was choſen to that office he was only a layman: but that he might be as it were gradually raiſed to that dignity, he was made monk the firſt day, reader the next, and the following days ſub-deacon, deacon, and prieſt. So that in the ſpace of ſix days he attained to the higheſt office in the church. On the whole, however his ardent love of glory and unbounded ambition made him commit exceſſes which rendered him a ſcourge to thoſe about him.

(a) See particularly n° 904. In addition to what has been already ſaid on the acid of phoſphorus, we may juſt obſerve, that M. Pelletier has a memoir on this ſubject in the 14th volume of the Chemical Annals. This philoſopher's method of preparing the phoſphorous acid differs little from that which was ſome years ago propoſed by M. Sage, and which, we believe, is now pretty generally known. The principal alterations made by the author of the preſent memoir conſiſt in his putting each ſtick of phoſphorus into a glaſs pipe, the lower part of which is ſhaped like a funnel terminatinig in a very ſmall opening; and in covering the apparatus with a tubulated receiver, which he can open at pleaſure. By theſe means he can diſſolve a greater quantity of phoſphorus without danger of an exploſion. His method of converting the phoſphorus into the phoſphoric acid, by the nitric or the oxygenated muriatic acid, is the ſame with that diſcovered by M. Lavoiſier, which is deſcribed in his Elements of Chemiſtry.

Fabricius calls this *Bibliotheca* or library, *non liber, ſed inſignis theſaurus*, "not a book, but an illuſtrious treaſure," in which are contained many curious things relating to authors, and many fragments of works which are no where elſe to be found. It was brought to light by Andreas Schottus, and communicated by him to David Hoeſchelius, who cauſed it to be printed in 1601. Schottus, conſidering the great utility of this work, tranſlated it into Latin, and printed his tranſlation alone in 1606. The Greek text, together with the tranſlation, were afterwards printed at Geneva in 1611. The laſt edition of this work, the largeſt, and the faireſt, was printed at Rouen in 1653, folio.

PHRAATES, or Phrahates. There were four kings of this name in Parthia. See Parthia.

PHRASE, in grammar, an elegant turn or manner of ſpeech, peculiarly belonging to this or that occaſion, this or that art, or this or that language. Thus we ſay, an Italian *phraſe*, an eaſtern *phraſe*, a poetical *phraſe*, a rhetorical *phraſe*.

Phrase is ſometimes alſo uſed for a ſhort ſentence or ſmall ſet or circuit of words conſtructed together. In this ſenſe, Father Buffier divides phraſes into complete and incomplete.

Phraſes are *complete* where there is a noun and a verb, each in its proper function; *i. e.* where the noun expreſſes a ſubject, and the verb the thing affirmed of it.

Incomplete phraſes are thoſe where the noun and the verb together only do the office of a noun; conſiſting of ſeveral words without affirming any thing, and which might be expreſſed in a ſingle word. Thus, *that which is true*, is an incomplete phraſe, which might be expreſſed in one word, *truth*; as, *that which is true ſatisfies the mind*, i. e. *truth ſatisfies the mind*.

PHRASEOLOGY, a collection of the phraſes or elegant expreſſions in any language. See Phrase.

PHREATIS, or Phreattium, in Grecian antiquity, was a court belonging to the civil government of Athens, ſituated upon the ſea-ſhore, in the Piræus. The name is derived from απο τȣ φρεατος, becauſe it ſtood in a *pit*; or, as others ſuppoſe, from the hero *Phreatus*. This court heard ſuch cauſes as concerned perſons who had fled out of their own country for murder, or thoſe that fled for involuntary murder, and who had afterwards committed a deliberate and wilful murder. The firſt who was tried in this place was Teucer, on a groundleſs ſuſpicion that he had been acceſſory to the death of Ajax. The accuſed was not allowed to come to land, or ſo much as to caſt anchor, but pleaded his cauſe in his bark; and if found guilty, was committed to the mercy of the winds and waves, or, as ſome ſay, ſuffered their condign puniſhment; if innocent, he was only cleared of the ſecond fact, and, according to cuſtom, underwent a twelvemonth's baniſhment for the former. See Potter's *Gr. Antiq.* vol. i. p. 111.

PHRENETIC, a term uſed to denote thoſe, who, without being abſolutely mad, are ſubject to ſuch ſtrong ſallies of imagination as in ſome meaſure pervert their judgment, and cauſe them to act in a way different from the more rational part of mankind.

PHRENITIS, the ſame with Phrensy; an inflammation of the meninges of the brain, attended with an acute fever and delirium. See Medicine, nº 176; alſo an account of a ſtrange degree of phrenzy which attacked Charles VI. of France in the article France, nº 88, 90.

PHRYGANEA is a genus of inſects, of which Barbut gives the following characters. "The mouth is without teeth, but furniſhed with four palpi: the ſtemmata are three in number: the antennæ are filiform, and longer than the thorax. The wings are incumbent; the under ones are folded."

The ſame author informs us, that the genus is divided into two ſections: the firſt of which is characterized, by having two truncated ſetæ at the extremity of the abdomen, reſembling the beard of an ear of corn; while the ſecond has the abdomen ſimple, or without appendices. The tarſi of the feet of the firſt family conſiſt of three articulations; thoſe of the ſecond are compoſed of five. The wings of this ſection decline from the inner margin towards the ſides, ſo as to reſemble the ridge of a houſe, and are curved, or turn upwards at their extremity. "This inſect (ſays Mr Barbut), before it becomes an inhabitant of the air, has lived under-water, lodged in a kind of tube or ſheath, the inward texture of which is ſilk; outwardly covered with ſand, ſtraws, bits of wood, ſhells, &c. When the hexapod worm is about to change to a chryſalis, he ſtops up the opening of his tube with threads of a looſe texture, through which the water makes its way, but prevents the approach of voracious inſects. The chryſalis is covered with a thin gauze, through which the new form of the inſect is eaſily diſcerned. The phryganea, on the point of changing its element, riſes to the ſurface of the water, leaves its tube, riſes into the air, and enjoys the ſweets of the country, flutters upon flowers and trees, but is ſoon called away to the water ſide to depoſite its eggs; whence proceeds its poſterity. Theſe aquatic larvæ are often found in ſtagnating waters, where they wrap themſelves up in the water-lentil, cut out into regular ſquares, and fitted one to another. Trouts are very greedy of theſe larvæ; which is the reaſon, that in ſome countries, after ſtripping them of their coats, they make uſe of them for fiſhing-baits."

There are a variety of different ſpecies of the phryganea; but except the phryganea bicauda and ſtriata, they do not materialy differ from one another, except in ſize and colour. The bicauda is of a deep dark-brown colour; having a ſingle yellow longitudinal band running a acroſs the head and thorax. The legs are of a brown colour, as are the antennæ; which are alſo long and filiform. Two brown threads, almoſt as long as the antennæ, terminate the abdomen. The wings, which are about a third longer than the body; are veined with brown fibres, are narrow at the top, broad below, and are as it were ſtuck upon the body; which they infold, croſſing one over the other. This inſect, which is met with on the banks of rivers and ſtanding-waters, carries its eggs in a cluſter at its abdomen, like ſome ſpiders.

The ſtriata is a large ſpecies, of a dun colour, except the eyes, which are black, and has a conſiderable reſemblance to the phalena in the carriage of its wings The antennæ are as long as the body, and are borne ſtraight forward. The wings are a third larger than the body, having veins of a colour rather deeper than the reſt. The feet are large, long, and ſomewhat finny. Mr Yeats tells us, that the perlæ of Geoffroy, and phryganeæ of Linnæus, do not differ generically. It appears, however, from Yeats's experiments, that the phryganeæ remain longer in the chryſalis than the perlæ.

The leſſer phryganeæ very much reſemble the tineæ; but, upon examining them with a glaſs, the former will be found to be covered with ſmall hairs inſtead of the ſcales which adorn the wings of the latter.

Ancient Univ. Hiſt. vol. iii. p. 441, &c.

PHRYGIA, a country in Aſia. From whence it derived its name is not certain: ſome ſay it was from the river Phryx (now Sarabat), which divides Phrygia from Caria, and empties itſelf into the Hermus; others from Phrygia, the daughter of Aſopus and Europa. The Greek writers tells us, that the country took its name from the inhabitants, and theſe from the town of Brygium in Macedonia, from whence they firſt paſſed into Aſia, and gave the name of *Phrygia* or *Brygia* to the country where they ſettled. Bochart is of opinion that this tract was called Phrygia from the Greek verb φρυγειν "to burn or parch:" which, according to him, is a tranſlation of its Hebrew name, derived from a verb of the ſame ſignification.

No leſs various are the opinions of authors as to the exact boundaries of this country; an uncertainty which gave riſe to an obſervation made by Strabo, viz. that the Phrygians and Myſians had diſtinct boundaries; but that it was ſcarce poſſible to aſcertain them. The ſame writer adds, that the Trojans, Myſians, and Lydians, are, by the poets, all blended under the common name of Phrygians, which Claudian extends to the Piſidians, Bithynians, and Ionians. Phrygia Proper, according to Ptolemy, whom we chooſe to follow, was bounded on the north by Pontus and Bithynia; on the weſt by Myſia, Troas, the Ægean Sea, Lydia, Mæonia, and Caria; on the ſouth by Lycia; on the eaſt by Pamphylia and Galatia. It lies between the 37th and 41ſt degres of north latitude, extending in longitude from 56 of 62 degrees. The inhabitants of this country, mentioned by Ptolemy, are the Lycaones and Anthemiſenii, towards Lycia; and Moccadelis or Moccadine, the Cyddeſes or Cydiſſes towards Bithynia; and between theſe the Peltini or Speltini, the Moxiani, Phylacenſes, and Hierapolitæ. To theſe we may add the Berecyntes mentioned by Strabo.

Phrygia is commonly divided into the Greater and Leſſer Phrygia, called alſo Troas. But this diviſion did not take place till Troas was ſubdued by the Phrygians; and hence it is more conſidered By ſome Roman writers as a part of Phrygia, than Bithynia, Cappadocia, or any other of the adjacent provinces. In after ages, the Greater Phrygia was divided into two diſtricts or governments; one called Phrygia Pacatiana, from Pacatianus, who, under Conſtantine, bore the great office of the præfectus prætorio of the Eaſt; the other Phrygia Salutaris, from ſome miraculous cures ſuppoſed to have been performed there by the archangel Michael.

This country, and indeed all Aſia Minor, as lying in the fifth and ſixth northern climates, was in ancient times greatly celebrated for its fertility. It abounded in all ſorts of grain; being, for the moſt part, a plain country covered with a deep rich ſoil, and plentifully watered by ſmall rivers. It was in ſome parts productive of bitumen and other combuſtible ſubſtances. It was well ſtocked with cattle, having large plains and paſture grounds. The air was anciently deemed moſt pure and wholeſome, though it is now in ſome parts thought extremely groſs, great part of the country lying uncultivated.

In Phrygia Major were anciently ſeveral cities of great celebrity; ſuch as APAMEA, LAODICEA, HIERAPOLIS, Gordium, &c.—There were alſo ſome famous rivers; ſuch as Marſyas, Mæander, &c. The Mæander is now called *Madre* or *Mindre*, and was much celebrated by the ancients for its windings and turnings; from whence all ſuch windings and turnings have been denominated *meanders*.

The Phrygians accounted themſelves the moſt ancient people in the world. Their origin, however, is extremely dark and uncertain Joſephus and St Jerome ſay, they were deſcended from togarmah; one of Gomer's ſons; and that they were known to the Hebrews under the name of Tigrammanes. The Heathen authors derive them from the Brygians, a people of Macedonia. But this is but mere conjecture; and it is a conjecture totally unſupported, except by the ſimilarity of names. Bochart thinks that the Phrygians were the offspring of Gomer the eldeſt ſon of Japhet; the word Phrygia being the Greek tranſlation of his name. Joſephus makes Gomer the father of the Galatians; but he, by the Galatians muſt neceſſarily mean the Phrygians inhabiting that part of Phrygia which the Galatians had made themſelves maſters of; the deſcendants of Gomer being placed by Ezekiel northward of Judea, near Togarmah (which Bochart takes to be Cappadocia), long before the Gauls paſſed over into Aſia. We are willing to let Gomer enjoy the fine country which Bochart is pleaſed to give him, and allow him the honour of being the progenitor of the Phrygians, ſince we know no other perſon on whom it can be conferred with any degree of probability.

The ancient Phrygians are deſcribed as ſuperſtitious, voluptuous, and effeminate, without any prudence or forecaſt, and of ſuch a ſervile temper, that nothing but ſtripes and ill uſage could make them comply with their duty; which gave riſe to ſeveral trite and well known proverbs (A). They are ſaid to have been the firſt inventors of divination by the ſinging, flying, and feeding

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(A) "Phryges ſero ſapiunt, Phryx verberatus melior, Phryx non minus quam Spyntharus, &c.:" which proverbs feeding of birds. Their muſic, commonly called the *Phrygian mood*, is alleged by ſome as an argument of their effeminancy.

Their government was certainly monarchical; for all Phrygia was during the reigns of ſome kings, ſubject to one prince. Ninnacus, Midas, Manis, Gordius, and his deſcendants, were undoubtedly ſovereigns of all Phrygia. But ſometime before the Trojan war, we find this country divided into ſeveral petty kingdoms, and read of divers princes reigning at the ſame time. Apollodorus mentions a king of Phrygia contemporary with Ilus king of Troy. Cedrenus and others ſpeak of one Teuthrans king of a ſmall country in Phrygia, whoſe territories were ravaged by Ajax, himſelf ſlain in ſingle combat, his royal ſeat laid in aſhes, and his daughter, by name Tecmeſſa, carried away captive by the conqueror. Homer makes mention of Phoreys and Aſcanius, both princes and leaders of the Phrygian auxilaries that came to the relief of Troy. Tantalus was king of Sipylus only, and its diſtrict; a prince no leſs famous for his great wealth, than infamous for his covetouſneſs and other deteſtable vices. That Phrygia was ſubdued either by Ninus, as Diodorus Siculus informs us, or by the Amazons, as we read in Suidas, is not ſufficiently warranted. Moſt authors that ſpeak of Gordius tell us, that the Phrygians having ſent to conſult an oracle in order to know how they might put an end to the inteſtine broils which rent their country into many factions and parties, received for anſwer, that the moſt effectual means to deliver themſelves and their country from the calamities they groaned under, was to commit the government to a king. This advice they followed accordingly, and placed Gordius on the throne.

As to their commerce, all we can ſay is, that Apamea was the chief emporium of all Aſia Minor.—Thither reſorted merchants and traders from all parts of Greece, Italy, and the neighbouring iſlands. Beſides, we know from Syncellus, that the Phrygians were for ſome time maſters of the ſea; and none but trading nations ever prevailed on that element. The country produced many choice and uſeful commodities which afforded conſiderable exports. They had a ſafe coaſt, convenient harbours, and whatever may incline us to think that they carried on a conſiderable trade. But as moſt of the Phrygian records are loſt, we will not dwell on conjectures ſo difficult to be aſcertained.

We have no ſet form of their laws; and as to their learning, ſince we are told that for ſome time they enjoyed the ſovereignty of the ſea, we may at leaſt allow them a competent ſkill in geography, geometry, and aſtronomy; and add to theſe, from what we have ſaid above, a more than ordinary knowledge of muſic.

Some have been of opinion that the Phrygian language bore a great reſemblance to the Greek; but the contrary is manifeſt from the few Phrygian words which have been tranſmitted to us and carefully collected by Bochart and Rudbechius. To theſe we may add the authority of Strabo, who, after attempting to derive the name of a Phrygian city from the Greek, concludes, that it is a difficult matter to diſcover any ſimilitude between the barbarous words of the Phrygian language and the Greek. The Phrygian tongue, after the experiment made by Pſammetichus king of Egypt, was looked upon by the Egyptians as the moſt ancient language of the world. But other nations, particularly the Scythians, refuſed to ſubmit to their opinion, as founded on an argument of no real weight. "As the two children (ſay they) had never heard the voice of any human creature, the word *bec*, or *bekkos*, the firſt they uttered, was only an imitation of the goats that had ſuckled them, and happened to be a Phrygian word ſignifying *bread* (B).

We have already ſaid, that the Phrygians were ſuperſtitious; their idols were conſequently very numerous. The chief of theſe was Cybele, who went by a variety of names. (See CYBELE.) They alſo worſhipped Bacchus under the name of *Sabazios*; and his prieſts they called *Saboi*.

The hiſtory of their kings is dark and uncertain, and the dates of their ſeveral reigns and actions cannot now be fixed; we ſhall refer ſuch of our readers, therefore, as wiſh to know what is certain reſpecting them, to the Ancient Univerſal Hiſtory, already quoted more than once in the preſent article. See alſo GORDIUS, MIDAS, &c. For Phrygia Minor, ſee TROY.

PHRYGIAN STONE, in natural hiſtory, is the name of a ſtone deſcribed by the ancients, and uſed by them in dying; perhaps from ſome vitriolic or aluminous ſalt contained in it, which ſerved to enliven or fix the colours uſed by the dyers. It was light and ſpungy, reſembling a pumice; and the whiteſt and lighteſt were reckoned the beſt. Pliny gives an account of the method of preparing it for the purpoſe of dying, which was by moiſtening it with urine, and then heating it red hot, and ſuffering it to cool.—This calcination was repeated three times, and the ſtone was then fit for uſe. Dioſcorides recommends it in medicine after burning; he ſays it was drying and aſtringent.

PHRYGIANS, a Chriſtian ſect. See CATAPHRYGIANS and MONTANIST.

PHRYNE, was a famous proſtitute who flouriſhed at Athens about 328 years before the Chriſtian era. She was miſtreſs of Praxiteles, who drew her picture,

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proverbs intimate their ſervile temper; and ſhow that they were more fit to bewail miſfortunes in an unmanly manner, than to prevent them by proper meaſures. Their muſic, too, was ſuited to their effeminate temper. The Doric mood was a kind of grave and ſolid muſic; the Lydian a doleful and lamentable harmony; but the Phrygian chiefly calculated to effeminate and enervate the mind. But this character is contradicted by others.

(B) Goropius Becanus makes uſe of the ſame argument, to prove that the High-Dutch is the original or mother-tongue of the world, becauſe the word *beker* in that language ſignifies "a baker."

which was one of his beſt pieces, and was placed in the temple of Apollo at Delphi. We are told that Apelles painted his Venus Anadyomene after he had ſeen Phryne on the ſea-ſhore naked, and with diſhevelled hair. Phryne became ſo very rich by the liberality of her lovers, that ſhe offered to rebuild Thebes at her own expence, which Alexander had deſtroyed, provided this inſcription was placed on the walls: *Alexander, diruit ſed meretrix Phryne refecit;* which was refuſed. See *Plin.* 34. c. 8.——There was another of the ſame name who was accuſed of impiety. When ſhe found that ſhe was going to be condemned, ſhe unveiled her boſom, which ſo influenced her judges that ſhe was immediately acquitted.

PHRYNICUS, a general of Samos, who endeavoured to betray his country, &c.——A flatterer at Athens.——A tragic poet of Athens, diſciple to Theſpis. He was the firſt who introduced a female character on the ſtage.

PHRYNIS was a muſician of Mitylene. He was the firſt who obtained a muſical prize at the Panathenæa at Athens. He added two ſtrings to the lyre, which had always been uſed with ſeven by all his predeceſſors. He flouriſhed about 438 years before the Chriſtian era. We are told that he was originally a cook at the houſe of Hiero king of Sicily.——There was another of the ſame name, a writer in the reign of Commodus, who made a collection, in 36 books, of phraſes and ſentences from the beſt Greek authors, &c.

PHRYXUS (fab. hiſt.), was a ſon of Athamas king of Thebes, by Nephele. When his mother was repudiated, he was perſecuted with the moſt inveterate fury by his ſtep-mother Ino, becauſe he was to ſit on the throne of Athamas, in preference to the children of a ſecond wife. His mother apprized him of Ino's intentions upon his life; or, according to others, his preceptor; and the better to make his eſcape, he ſecured part of his father's treaſures, and privately left Bœotia with his ſiſter Helle, to go to their friend and relation Æetes king of Colchis. They embarked on board a ſhip, or, as we are informed by the fabulous account of the poets and mythologiſts, they mounted on the back of a ram, whoſe fleece was of gold, and proceeded on their journey through the air. The height to which they were carried made Helle giddy, and ſhe fell into the ſea. Phryxus gave his ſiſter a decent burial on the ſea-ſhore, and after he had called the place *Helleſpont* from her name, he continued his flight, and arrived ſafe in the kingdom of Æetes where he offered the Ram on the altars of Mars. The king received him with great tenderneſs, and gave him Chalciope his daughter in marriage. She had by him Phrontis Melas, Argos Cylindrus, whom ſome call *Cytorus.* He was afterwards murdered by his father-in-law, who envied him the poſſeſſion of the golden fleece; and Chalciope, to prevent her children from ſharing their father's fate, ſent them privately from Colchis to Bœotia, as nothing was to be dreaded there from the jealouſy or reſentment of Ino, who was then dead. The fable of the flight of Phryxus to Colchis on a ram has been explained by ſome, who obſerve, that the ſhip on which he embarked was either called by that name, or carried on her prow a figure of that animal. The fleece of gold is accounted for, by obſerving that Phryxus carried away immenſe treaſures from Thebes. Phryxus was placed among the conſtellations of heaven after death. The ram which carried him to Aſia is ſaid to have been the fruit of Neptune's amour with Theophane the daughter of Altis. This ram the gods had given to Athamas in order to reward his piety and religious life; and Nephele procured it for her children, juſt as they were going to be ſacrificed to the jealouſy of Ino. Phryxus's murder was ſome time after amply revenged by the Greeks; it having occaſioned the famous expedition atchieved under Jaſon and many of the princes of Greece, which had for its object the recovery of the golden fleece, and the puniſhment of the king of Colchis for his cruelty to the ſon of Athamas.

PHTHIRIASIS, the LOUSY EVIL from φθειρ, "a louſe." It is a louſy diſtemper; children are frequently its ſubjects, and adults are ſometimes troubled with it. The increaſe of lice, when in a warm moiſt ſituation, is very great; but a cold and dry one ſoon deſtroys them. On the human body four kinds of lice are diſtinguiſhed: 1. The *pediculi,* ſo called becauſe they are more troubleſome with their feet than by their bite. Theſe are in the heads of children, eſpecially if ſore or ſcabby; and often in thoſe of adults, if they are ſlothful and naſty. 2. Crab-lice, ſee CRAB *Lice.* 3. Body lice; theſe infeſt the body, and breed in the clothes of the naſty and ſlothful. 4. A ſort which breed under the cuticle, and are found in the hands and feet: they are of a round form, and ſo minute as often to eſcape the ſight: by creeping under the ſcarf-ſkin they cauſe an intolerable itching; and when the ſkin burſts where they lodge, cluſters of them are found there, See ACARUS.

A good diet and cleanlineſs conduce much to the deſtruction of lice. When they are in the head, comb it every day; and, after each combing, ſprinkle the pulv. ſem. ſtaph. agr. or coccul. Ind. among the hairs every night and confine it with a tight cap.

Codrochius, in his treatiſe on lice, ſays, that the powdered coc. Ind. exceeds all other means; and that it may be mixed in the pulp of apple, or in lard, and applied every night to the hair. Some writers aſſert that if the pulv. cort. rad. ſaſſaffr. is ſprinkled on the head, and confined with a hankerchief, it deſtroys the lice in one night.

The body-lice are deſtroyed by any bitter, ſour, ſalt, or mercurial medicine, if applied to the ſkin.

The black ſoap, and the flowers called *cardamine* or *lady's-ſmock,* are ſaid to be ſpecifics in all caſes of lice on the human body.

PHTHISIS, a ſpecies of conſumption, occaſioned by an ulcer in the lungs. See MEDICINE, n° 237, &c.

Since our article MEDICINE was publiſhed, Dr Beddoes has ſuggeſted * a new theory of phthiſis, founded on the prevailing pneumatic doctrine in chemiſtry. Thinking that much cannot be gained by adhering to eſtabliſhed principles and modes of practice, and being unawed by any pretenſions to ſucceſs from experience, he enters into the province of ſpeculation. He fixes on the effect of pregnancy in ſuſpending the progreſs of phthiſis, as a fact which, by its mode of operation, might

* Obſervations on the Nature and Cure of Calculus, Sea-ſcurvy, &c.

might ſuggeſt a method of diminiſhing the havock occaſioned by this diſtemper. We ſhall give his explanation of this intereſting fact:

“ The fœtus has its blood oxygenated by the blood of the mother through the placenta. During pregnancy there ſeems to be no proviſion for the reception of an unuſual quantity of oxygene. On the contrary, in conſequence of the impeded action of the diaphragm, leſs and leſs ſhould be continually taken in by the lungs. If, therefore, a ſomewhat diminiſhed proportion of oxygene be the effect of pregnancy, may not this be the way in which it arreſts the progreſs of phthiſis? and if ſo, is there not an exceſs of oxygene in the ſyſtem of conſumptive perſons? and may we not, by purſuing this idea, diſcover a cure for this fatal diſorder?”

Dr Beddoes thinks, that this ſuppoſition is countenanced by the deficiency of oxygene in the blood of pregnant women, of aſthmatic patients, and of thoſe who labour under ſea-ſcurvy; and by the ſuperabundance of it in the blood of phthiſical perſons, indicated by its colour, as well as by the aggravation of the ſymptoms of conſumption by breathing oxygene air, and by the relief from inſpiring atmoſpheric air mixed with carbonic acid air; and, laſtly, from the ſmall proportion of deaths among ſea-faring people. Suppoſing acids to act by decompoſition, their alleged effects in producing conſumption are conſiſtent with the author's doctrine, as well as the emaciation preceding and accompanying phthiſis. From theſe facts, Dr Beddoes concludes, that “ 1. The phthiſical inflammation may ſo alter the ſtructure of the lungs, as to cauſe them to tranſmit a more than ordinary portion of oxygene to the blood; or, 2. Some unknown cauſe having enabled them to tranſmit, or the blood itſelf to attract, more oxygene, an inflammation of the lungs might enſue.”

From theſe principles, the Doctor thinks himſelf juſtified in propoſing, in a diſeaſe which is incurable by preſent modes of practice, to diminiſh the ſupply of oxygene by the two channels through which it is introduced; namely, through the lungs, by lowering the atmoſpheric air with azotic or hydrogene air; and through the ſtomach, by giving ſuch nouriſhment as contains a ſmall portion of oxygene.

Such is Dr Beddoes's theory of conſumption; on which the following remark has been made by a critic* who poſſeſſes an equal degree of candour and judgment. It is aſſumed by Dr Beddoes, that the blood of pregnant women has a diminiſhed proportion of oxygene: but pregnant women have the ſame circumſcribed ſpot of florid red in their countenances which is apparent in hectics. If, then, the preſence of this colour be ſufficient to prove an exceſs of oxygene in the one caſe, it muſt have the ſame weight in the other. Another queſtion is, whether leſs oxygene be really taken in by the lungs during pregnancy? For although the diaphragm be impeded in the freedom of its action, the frequency of breathing is proportionally increaſed.—A third circumſtance which demands attention is, in what degree the fœtus has its blood oxygenated by the blood of the mother through the placenta. It appears highly probable, that the fœtal blood receives a very trifling ſupply of oxygene from the blood of the mother; that the fœtal heart contains only a ſmall portion of blood, which has been conveyed to the placenta; and that the blood in the heart and arteries of the fœtus is not florid.—For many ingenious arguments on this ſubject, we may refer to Mr Coleman's Diſſertation on ſuſpended Reſpiration.—Leaving theſe things to Dr Beddoes's conſideration, we will preſent our readers with his concluding remarks on this ſubject:

“ The more you reflect, the more you will be convinced, that nothing would ſo much contribute to reſcue the art of medicine from its preſent helpleſs condition, as the diſcovery of the means of regulating the conſtitution of the atmoſphere. It would be no leſs deſirable to have a convenient method of reducing the oxygene to 18 or 20 in 100, than of increaſing it in any proportion. The influence of the air we breathe is as wide as the diffuſion of the blood. The minuteſt portions of the organs of motion, ſenſe, and thought, muſt be affected by any conſiderable change in this fluid. Whether it be that the brain muſt be waſhed by ſtreams of arterial blood, or that the action of every organ is a ſtimulus to the ſyſtem in general, and conſequently to every other organ in particular; it is certain, that when the acceſs of oxygene is cut off from the lungs, the functions of the brain ceaſe: perhaps there may be a mixture of azotic and oxygene airs, more favourable to the intellectual faculties than that which is found in the atmoſphere; and hence chemiſtry be enabled to exalt the powers of future poets and philoſophers. That diſeaſes of excitement on the one hand, and debility on the other, might be cured almoſt ſolely by a proper air, one can hardly doubt, as well as ſeveral diſorders at preſent highly dangerous or deſperate, which one cannot, upon the faith of any obvious phenomena, refer to either head. The materia medica might, therefore, undergo a ſtill greater reduction than it has lately undergone, in conſequence of the purification of medicine from its groſſer abſurdities; and hence the treatment of diſeaſes be at once rendered infinitely more pleaſant and more efficacious.”

Our author, in a ſubſequent publication† gves an account of his treating with ſucceſs ſeveral caſes of phthiſis according to the principles of this theory. After diſtinguiſhing conſumptions into two kinds, the florid and the pituitous or catarrhal, he obſerves, “ that the ſyſtem may be as variouſly affected by means of the lungs as of the ſtomach: that it is impoſſible to doubt that we are nouriſhed by the lungs as truly as by the ſtomach: and what we take in at the former entrance, becomes, like our food, a part of the ſubſtance of our ſolids as well as of our fluids. By the lungs we can alſo introduce effectual alteratives of the blood, and by conſequence of all the parts nouriſhed by the blood.”

He then acquaints us more particularly with the apparatus requiſite for the practice propoſed. 1ſt, It ſhould be able to furniſh azotic, hydrogene, carbonic, and oxygene airs: our author having, as he ſays, “ no intention to confine himſelf to one incurable diſorder. 2dly, The reſervoirs ſhould be large, that the patients may be ſupplied with any quantity that their ſymptoms may require: and, 3dly, It is neceſſary to be able to mix theſe airs with one another, as well as with atmoſpheric air, in any proportion.” Theſe objects, we are told, have been completely attained by a conſtruction not very unlike to that employed in the gazometers of M. Lavoiſier and Dr Van Marum.

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* Monthly Rev. Nov. 1793, p. 273.

† A Letter to Eraſmus Darwin, M. D.

PHUL, or Pul, king of Aſſyria, is by ſome hiſtorians ſaid to be Ninus under another name, and the firſt founder of that monarchy: A renowned warrior. He invaded Iſrael in the reign of Manahem, who became tributary to him, and paid him 1000 talents of ſilver for a peace. Flouriſhed 771 B. C.

PHUT, or Phuth, the third ſon of Ham (Gen. x. 6.) Calmet is of opinion, that Phut peopled either the canton of Phtemphu, Phtemphuti, or Phtembuti, ſet down in Pliny and Ptolemy, whoſe capital was Thara in Lower Egypt, inclining towards Lybia; or the canton called Phtenotes, of which Buthus was the capital. The prophets often ſpeak of Phut. In the time of Jeremiah, Phut was under the obedience of Necho king of Egypt. Nahum (iii. 9.) reckons up his people in the number of thoſe who ought to have come to the aſſiſtance of No-ammon or Dioſpolis.

PHYLACTERY, in the general, was a name given by the ancients to all kinds of charms, ſpells, or characters, which they wore about them, as amulets, to preſerve them from dangers or diſeaſes.

Phylactery particularly denoted a ſlip of parchment, wherein was written ſome text of Holy Scripture, particularly of the decalogue, which the more devout people among the Jews wore on the forehead, the breaſt, or the neck, as a mark of their religion.

The primitive Chriſtians alſo gave the name *phylacteries* to the caſes wherein they incloſed the relicks of their dead.

Phylacteries are often mentioned in the New Teſtament, and appear to have been very common among the Phariſees in our Lord's time.

PHYLICA, bastard alaternus; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are ſix ſpecies, of which three are kept in the gardens of Britain; but by reaſon of their being natives of warm climates, they require to be kept in pots, and houſed in winter. They are all ſhrubby plants, riſing from three to five or ſix feet high, and adorned with beautiful cluſters of white flowers. They are propagated by cuttings.

PHYLLANTHUS, sea-side laurel; a genus of the triandria order, belonging to the monœcia claſs of plants. There are ſix ſpecies, all of them natives of warm climates; and riſe from 12 or 14 feet to the height of middling trees. They are tender, and cannot be propagated in cold countries without artificial heat.

PHYLLIS (fab. hiſt.), was a daughter of Sithon, or, according to others, of Lycurgus king of Thrace, who received Demophoon the ſon of Theſeus; who, at his return from the Trojan war, had ſtopped on her coaſts. She became enamoured of him, and did not find him inſenſible to her paſſion. After ſome months of mutual tenderneſs and affection, Demophoon ſet ſail for Athens, where his domeſtic affairs recalled him. He promiſed faithfully to return as ſoon as a month was expired; but either his diſlike for Phyllis, or the irreparable ſituation of his affairs, obliged him to violate his engagement: and the queen grown deſperate on account of his abſence, hanged herſelf, or, according to others, threw herſelf down a precipice into the ſea and periſhed. Her friends raiſed a tomb over her body, where there grew up certain trees, whoſe leaves, at a particular ſeaſon of the year, ſuddenly became wet as if ſhedding tears for the death of Phyllis. According to an old tradition mentioned by Servius, Virgil's commentator, Phyllis was changed by the gods into an almond tree, which is called *phylla* by the Greeks. Some days after this metamorphoſis, Demophoon reviſited Thrace; and when he heard of the fate of Phyllis, he ran and claſped the tree, which, though at that time ſtripped of its leaves, ſuddenly ſhot forth, and bloſſomed as if ſtill ſenſible of tenderneſs and love. The abſence of Demophoon from the houſe of Phyllis has given riſe to a beautiful epiſtle of Ovid, ſuppoſed to have been written by the Thracian queen about the fourth month after her lover's departure.—A country woman introduced in Virgil's eclogues.—The nurſe of the emperor Domitian.—A country of Thrace near mount Pangæus.

PHYSALIS, the winter cherry; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are 16 ſpecies; of which the moſt remarkable is the alkekengi, or common winter-cherry. This grows naturally in Spain and Italy. The roots are perennial, and creep in the ground to a great diſtance if they are not confined. Theſe, in the ſpring, ſhoot up many ſtalks, which riſe to the height of a foot or more, garniſhed with leaves of various ſorts; ſome of which are angular and obtuſe, ſome oblong and ſharp pointed, with long foot-ſtalks. The flowers are produced from the wings, ſtanding upon ſlender foot-ſtalks; are of a white colour, and have but one petal. They are ſucceeded by round berries about the ſize of ſmall cherries, incloſed in an inflated bladder, which turns red in autumn, when the top opens and diſcloſes the red berry, which is ſoft, pulpy, and filled with flat kidney-ſhaped ſeeds. Soon after the fruit is ripe, the ſtalks decay to the root. The plant is eaſily propagated, either by ſeeds or parting the roots.

PHYSALUS. See Scolopendra.

PHYSETER, or Spermaceti-fish, in zoology, a genus belonging to the order of cete. There are four ſpecies; the moſt remarkable are,

1. The microps, or black-headed cachalot, with a long fin on the back, and the upper jaw conſiderably longer than the under one. A fiſh of this kind was caſt aſhore on Cramond iſle, near Edinburgh, December 22. 1769; its length was 54 feet; the greateſt circumference, which was juſt beyond the eyes, 30: the upper jaw was five feet longer than the lower, whoſe length was ten feet. The head was of a moſt enormous ſize, very thick, and above one third the ſize of the fiſh: the end of the upper jaw was quite blunt, and near nine feet high: the ſpout-hole was placed near the end of it. The teeth were placed in the lower jaw, 23 on each ſide, all pointing outwards; in the upper jaw, oppoſite to them, were an equal number of cavities, in which the ends of the teeth lodged when the mouth was cloſed. One of the teeth meaſured eight inches long, the greateſt circumference the ſame. It is hollow within-ſide for the depth of three inches, and the mouth of the cavity very wide: it is thickeſt at the bottom, and grows very ſmall at the point, bending very much; but in ſome the flexure is more than in others. Theſe, as well as the teeth of

all other whales we have obſerved, are very hard, and cut like ivory. The eyes are very ſmall, and remote from the noſe. The pectoral fins were placed near the corners of the mouth, and were only three feet long: it had no other fin, only a large protuberance on the middle of the back. The tail was a little forked, and 14 feet from tip to tip. The penis ſeven feet and a half long. Linnæus informs us, that this ſpecies purſues and terrifies the porpoiſes to ſuch a degree as often to drive them on ſhore.

2. The catodon, or round headed cachalot, with a fiſtula in the ſnout, and having no back-fin. Of this ſpecies, 102 of different ſizes were caſt aſhore at one time on one of the Orkney Iſles, the largeſt 24 feet in length. The head is round, the opening of the mouth ſmall. Sibbald ſays it has no ſpout hole, but only noſtrils: But Mr Pennant is of opinon, that the former being placed at the extremity of the noſe, has been miſtaken by him for the latter. Some teeth of this ſpecies are an inch and three quarters long, and in the largeſt part of the thickneſs of one's thumb. The top is quite flat, and marked with concentric lines; the bottom is more ſlender than the top, and pierced with a ſmall orifice: inſtead of a back fin, there was a rough ſpace.

For the method of extracting the ſpermaceti from the brain of theſe creatures, ſee the article SPERMACETI.

PHYSIC, or PHYSICK, the art of healing; properly called MEDICINE. The word is formed from the Greek φυσις, "nature;" in regard medicine conſiſts principally in the obſervation of nature. See PHYSICS and MEDICINE.

PHYSICAL, ſomething belonging to, or really exiſting in, nature. In this ſenſe we ſay a phyſical point, in oppoſition to a mathematical one, which only exiſts in the imagination; a phyſical ſubſtance or body, in oppoſition to ſpirit, or metaphyſical ſubſtance, &c.

PHYSICIAN, a perſon who profeſſes medicine, or the art of healing diſeaſes. See MEDICINE.

PHYSICIANS, College of, in London and Edinburgh. See *COLLEGE of Phyſicians.*

PHYSICO-MATHEMATICS, includes thoſe branches of phyſic which, uniting obſervation and experiment to mathematical calculation, undertake to explain the phenomena of nature.

PHYSICS,

1 General definition of phyſics.

TAKEN in its moſt enlarged ſenſe, comprehends the whole ſtudy of nature; and NATURAL PHILOSOPHY is a term of the ſame extent: but ordinary language, and eſpecially in this country, employs both of theſe terms in a much narrower ſenſe, which it is proper in this place to determine with ſome preciſion.

2 A more particular explanation of the term.

Under the article PHILOSOPHY, we gave a particular account of that view of nature in which the objects of our attention are conſidered as connected by cauſation; and we were at ſome pains to point out the manner in which this ſtudy may be ſucceſsfully cultivated. By a judicious employment of the means pointed out in that article, we diſcover that the objects of our contemplation compoſe an UNIVERSE, which conſiſts, not of a number of independent exiſtences ſolitary and detached from each other, but of a number of ſubſtances connected by a variety of relations and dependencies, ſo as to form a whole which may with great propriety be called the SYSTEM OF NATURE.

This aſſembling of the individual objects which compoſe the univerſe into one ſyſtem is by no means the work of a haſty and warm fancy, but is the reſult of ſober contemplation. The natural hiſtorian attempts in vain to deſcribe objects, by only informing us of their ſhape, colour, and other ſenſible qualities. He finds himſelf obliged, in deſcribing a piece of marble for inſtance, to tell us that it takes a fine poliſh; that it ſtrikes fire with ſteel; that it burns to quicklime; that it diſſolves in aquafortis, and is precipitated by alkalis; that with vitriolic acid it makes gypſum, &c. &c. &c. and thus it appears that even the *deſcription* of any thing, with the view of aſcertaining its ſpecific nature, and with the ſole purpoſe of diſcrimination, cannot be accompliſhed without taking notice of its various relations to other things. But what do we mean by the *nature* of any thing? We are ignorant of its eſſence, or what makes it that thing and no other thing. We muſt content ourſelves with the diſcovery of its *qualities* or *properties*; and it is the aſſemblage of theſe which we call its *nature*. But this is very inaccurate. Theſe do not conſtitute its eſſence, but are the conſequences of it. Yet this is all we ſhall ever know of its nature. Now the term *property* is nothing but a name expreſſing ſome relations which the ſubſtance under conſideration has to other things. This is true of all ſuch terms. Gravity, elaſticity, ſenſibility, gratitude, and the like, expreſs nothing but certain *matters of fact*, which may be obſerved reſpecting the object of our contemplation in different circumſtances of ſituation with regard to other things. Our diſtinct notions of individuals, therefore, imply their relations to other things.

Introduction.

3 All parts of the univerſe evidently connected in their various properties.

The ſlighteſt obſervation of the univerſe ſhows an evident connection between all its parts in their various properties. All things on this earth are connected with each other by the laws of motion and of mind. We are connected with the whole of the ſolar ſyſtem by gravitation. If we extend our obſervations to the fixed ſtars, the connection ſeems to fail; but even here it may be obſerved. Their inconceivable diſtance, it is true, renders it impoſſible for us to obtain any *extenſive* information as to their nature. But theſe bodies are connected with the ſolar ſyſtem by the ſameneſs of the light which they emit with that emitted by our ſun or any ſhining body. It moves with the ſame velocity, it conſiſts (in moſt of them at leaſt) of the ſame colours, and it is reflected, refracted, and inflected, according to the ſame laws.

In this unbounded ſcene of contemplation, our attention will be directed to the different claſſes of objects

4
Our attention naturally directed in the firſt inſtance to our felow-men.

jects nearly in proportion to the intereſt we take in them. There is nothing in which we are ſo much intereſted as our fellow men; and one of the firſt ſteps that we make in our knowledge of nature, is an acquaintance with them. We learn their *diſtinctive* nature by attending to their *characteriſtic* appearances; that is, by obſerving their actions. We obſerve them continually producing, like ourſelves, certain changes in the ſituation or condition of ſurrounding objects; and theſe changes are evidently directed to certain ends *which reſpect themſelves*. Obſerving this ſubſerviency of the effects which they produce to their own accommodation, we conſider this adjuſtment of means to ends as the effect of an INTENTION, as we experience it to be in our own caſe, where we are conſcious of this intention, and of theſe its effects. We therefore interpret thoſe actions of other men, where we obſerve this adjuſtment of means to ends, as marks or ſigns of intention in them ſimilar to our own. And thus a quality, or power, or faculty, is *ſuppoſed* in them *by means of its ſign*, although the quality itſelf is not *immediately* cogniſable by our ſenſes. And as this intention in ourſelves is accompanied by perception of external objects, knowledge of their properties, deſire of good, averſion from evil, volition, and exertion, without all of which we could not or would not perform the actions which we daily perform, we *ſuppoſe* the ſame perception, knowledge, deſire, averſion, volition, and exertion in them.

5
Nature of intention.

Thus, by the conſtitution of our mind, we conſider the employment of means, by which ends terminating in the agent are gained, as the natural ſigns of deſign or intention. ART, therefore or the employment of means, is the natural ſign of intention; and wherever we obſerve this adjuſtment of means to ends, we infer the agency of deſign.

A ſmall acquaintance with the objects around us, obliges us to extend this inference to a great number of beings beſides our fellow men, namely, to the whole animal creation: for in all we obſerve the ſame ſubſerviency to the ends of the agent, in the changes which we find them continually producing in the objects around them. Theſe changes are all adjuſted to their own well being. In all ſuch caſes, therefore, we are forced, by the conſtitution of our own minds, to infer the exiſtence of deſign or intention in theſe beings alſo.

But in numberleſs changes produced by external objects on each other, we obſerve no ſuch fitneſs in the effects, no ſuch ſubſerviency to the well being of the agent. In ſuch caſes, therefore, we make no ſuch inference of thought or deſign.

6
All objects divided into thinking and unthinking beings.

Thus, then, there is preſented to our obſervation an important diſtinction, by which we arrange all external objects into two claſſes. The firſt reſembles ourſelves, in giving external marks of that thought or intention of which we are conſcious; and we *ſuppoſe* in them the other properties which we diſcover in ourſelves, but cannot *immediately* obſerve in them, viz. thought, perception, memory, foreſight, and all that collection of faculties which we feel in ourſelves, and which conſtitute the animal. The other claſs of objects exhibit no ſuch appearances, and we make no ſuch inference. And thus we divide the whole of external nature into the claſſes of THINKING and UNTHINKING beings.

7
How we come to the knowledge of mind.

Our firſt judgments about theſe claſſes will be very inaccurate; and we will naturally aſcribe the differences, which we do not very well underſtand, to the differences in organical ſtructure, which we clearly obſerve. But when we have knocked down or perhaps ſmothered an animal, we find that it no longer gives the former marks of thought and intention, and that it now reſembles the claſs of unthinking beings: And yet it ſtill retains all that fitneſs of organical ſtructure which it had before; it ſeems only to want the intention and the will. This obliges us to conclude that the diſtinction does not ariſe from a difference in organical ſtructure, but from a diſtinct ſubſtance common to all thinking beings, but ſeparable from their organical frame. To this ſubſtance we aſcribe thought, intention, contrivance, and all that collection of faculties which we feel in ourſelves. To this ſubſtance in ourſelves we refer all ſenſations, pleaſures, pains, remembrances, deſires, purpoſes; and to this aggregate, however imperfectly underſtood, we give the name MIND. Our organical frame, which ſeems to be only the inſtrument of information and operation to the mind, we call *our* body.

8
The nature of mind as underſtood by mankind in rude ages.

As the animating principle is not, like our body, the immediate object of the ſenſes, we naturally conceive it to be a ſubſtance eſſentially different from thoſe which are the objects of our ſenſes. The rudeſt people have ſhown a diſpoſition to form this concluſion. Obſerving that animal life was connected with breathing, it was natural to imagine that breathing was living, and that breath was life. It is a remarkable fact, that in moſt languages the term for expreſſing *breath* is at leaſt one of the terms for expreſſing the ſoul: רוח, *πνευμα*, *ſpiritus*, in the Hebrew, Greek, and Latin, expreſs both; *gheiſt* or *ghoſt*, in the Teutonic, comes from *gheiſen*, to "breathe or ſigh;" *dūcha* or *dūha*, "the ſoul," in Sclavonic, comes from *duichat*, "to breathe;" ſo in the Gaelic does *anal* come from *anam*; and the ſame relation is found between the two words in the Malay and other eaſtern languages. We believe that moſt perſons can recollect ſome traces of this notion in their early conceptions of things; and many who do not conſider themſelves as uncultivated, believe that the ſoul quits the body *along with the laſt breath*. Among the Tartar nations hanging is conſidered with particular horror, on account of the ungraceful and filthy exit which the ſoul is obliged to make from the body.

9
Their opinions not juſt.

But the obſervation of the ſame appearances of thought and intention in fiſhes and other animals which do not breathe, would ſoon ſhow that this was but a rude conception. Very little refinement indeed is neceſſary to convince us that air or breath cannot be the ſubſtance which thinks, wiſhes, and deſigns; and that the properties of this ſubſtance, whatever it is, muſt be totally different from, and incompatible with, any thing that we know of the immediate objects of our ſenſes.

10
Of the two kinds of ſubſtances in nature, one is the object of reflection alone, the other of the ſenſes.

Hence we are led to conclude that there are two kinds of ſubſtances in nature: One, which is the principle of ſenſation; and therefore *cannot* be the object of our ſenſes, any more than light can be the object of the microſcope. This ſubſtance alone can feel, think, deſire, and propoſe, and is the object of *reflection alone*. The objects of our ſenſes compoſe the other claſs, and therefore can have none of the other properties which are not cognoſcible by the ſenſes. Theſe have all the properties which our ſenſes can diſcover; and we can have no evidence of their having any other, nor indeed any conception of their having them. This claſs is not confined to the unorganized maſſes of matter; for we ſee that the bodies of animals loſe after death that organical form, and are aſſimilated to all the reſt of unthinking beings. It has ariſen from ſuch views as this, that while all nations have agreed to call this claſs of objects by the name BODY, which originally expreſſes our organical frame, ſome nations, farther advanced in cultivation or refinement, have contrived an abſtract term to expreſs this general ſubſtance of which all inanimate beings are compoſed. Such a term we have in the words *materies*, ὑλη.

11 The diſtinction between material and immaterial ſubſtances is very important,

Matter, then, is that ſubſtance which is immediately cognoſcible by our ſenſes. Whatever, therefore, is not thus immediately cognoſcible by our ſenſes is not material, and is expreſſed by a negative term, and called *immaterial*: hence it is that mind is ſaid to be immaterial. It is of importance to keep in mind this diſtinction, merely grammatical Little more is neceſſary for detecting the ſophiſms of Helvetius, Mirabeau, and other ſages of the Gallic ſchool, who have been anxious to remove the ties of moral and religious obligation by lowering our conceptions of our intellectual nature. It will alſo ſerve to ſhow how haſtily *they* have formed their opinions who have aſcribed to the immediate agency of mind all thoſe relations which are obſerved in the actions of bodies on each other at a diſtance. The connecting principles of ſuch relations *e diſtante* (if there are any ſuch), are not the immediate objects of our ſenſes: they are therefore immaterial. But it does not follow that they are minds. There may be many immaterial ſubſtances which are not minds. We know nothing of any object whatever but by the obſervation of certain appearances, which ſuggeſt to our minds the exiſtence and agency of its qualities or powers. Such phenomena are the natural ſigns of theſe qualities, and it is to thoſe ſigns that we muſt always have recourſe when we wiſh to conceive without ambiguity concerning them. What is the characteriſtic phenomenon of mind, or what is the *diſtinguiſhing* quality which brings it into view? It is INTENTION: and it may be aſſerted with the utmoſt confidence, that we have no other mark by which mind is immediately ſuggeſted to us, or that would ever have made us ſuppoſe that there exiſted another mind beſides our own. The *phenomenon* by which this quality is ſugeſted to us is *art*, or the employment of means to gain ends; and the mark of art is the ſuppoſed conduciveneſs of theſe ends to the well-being of the agent. Where this train is not obſerved, deſign or intention is never thought of; and therefore where intention is not perceived in any immaterial ſubſtance, if any ſuch has ever been obſerved, it is an abuſe of language to call it mind. We do not think that even perception and intelligence intitle us to give the name mind to the ſubſtance in which they are inherent, becauſe it is from marks of intention alone that we infer the exiſtence of mind; and although theſe muſt be accompanied with perception and intelligence, it does not follow that the ſubſtance which can perceive and underſtand muſt alſo deſire and propoſe. However difficult we may find it to ſeparate them, they are evidently ſeparable in imagination. And let not this aſſertion be too haſtily objected to; for the ſeparation *has been made* by perſons moſt eminent for their knowledge and diſcernment. When Leibnitz aſcribed to his MONADES, or what we call the ultimate ATOMS of matter, a perception of their ſituation in the univerſe, and a motion preciſely ſuited to this perception, he was the fartheſt in the world from ſuppoſing them animated or endowed with minds. It is true indeed that others, who think and call themſelves philoſophers, are much more liberal in their application of this term. A modern author of great metaphyſical eminence ſays, "I call that *mind* which moves, and that *body* which is moved." This claſs of philoſophers aſſert that no motion whatever is begun except by the agency of an animating principle, which (after Ariſtotle) they call *Nature*, and which has in theſe days been exalted to the rank of a god. All this jargon (for it is nothing elſe) has ariſen from the puzzle in which naturaliſts think themſelves involved in attempting to explain the production of motion in a body at a diſtance from that body which is conceived as the cauſe of this motion. After having been reluctantly obliged, by the reaſonings of Newton, to abandon their methods of explaining ſuch phenomena by the impulſes of an intervening fluid, nothing ſeemed left but the aſſertion that theſe motions were produced by minds, as in the caſe of our own exertions. Theſe explanations (if they deſerve the name) cannot be objected to in any other way than as an abuſe of language, and as the introduction of an unmeaning jargon. We have, and can have, no notion of mind different from thoſe of our own minds; and we diſcover the exiſtence of other minds as we diſcover the exiſtence of bodies, by means of phenomena which are characteriſtic of minds, that is, which reſemble thoſe phenomena that follow the exertion of our own mental faculties, that is, by the employment of means to attain ſelfiſh ends; and where ſuch apearances are not obſerved, no exiſtence of a mind is inferred. When we ſee a man fall from the top of a houſe, and daſh out his brains on the pavement, we never aſcribe this motion to his mind. Although the fitneſs of many of the celeſtial motions for moſt important purpoſes makes us ſuppoſe deſign and contrivance ſomewhere, and therefore a *Supreme Mind*, we no more think of inferring a mind in the earth from the fitneſs of its motions for purpoſes moſt beneficial to its inhabitants, than of inferring a mind in a bit of bread from its fitneſs for nouriſhing our bodies. It is not from the mere motions of animals that their minds are inferred, but from the conduciveneſs of theſe motions to the well-being of the animal.

12 The mind is not that which produces motion, but that which deſires and wills.

The term mind therefore, in the *ordinary language* of all men, is applied to what deſires and wills at the ſame time that it perceives and underſtands. If we call that mind which *produces motion*, we muſt derive our notions of its qualities or attributes from obſerving their effects. We muſt therefore diſcover the general laws by which they act, that is, the general laws obſerved in thoſe motions which we conſider as their effects. Now theſe are the general laws of motion; and in none of theſe can we find the leaſt coincidence with what we are accuſtomed to call the laws of mind. Nay, it has been the total want of ſimilarity which has given riſe to the diſtinction which all men, in all ages and countries, have made between mind and matter. This diſtinction is found in all languages; and it is an unpardonable liberty which men take with languages when they uſe a *term of diſtinction*, a *ſpecific term*, to expreſs things of a different ſpecies. What theſe authors have been pleaſed to call *mind*, the whole world beſides have called by another name, FORCE; which, though borrowed from our own exertions, is yet ſufficiently diſtinctive, and never leads us to confound things that are different, except in the language of ſome modern philoſophers, who apply it to the laws of the agency of mind; and, when ſpeaking of the force of motives, &c. commit the ſame miſtakes which the followers of Ariſtotle commit in the uſe of the term mind. *Force*, in the language of theſe piloſophers, means what connects the operations of mind; as mind, in the language of Lord Monboddo, is that which connects the operations of body.

13
The principle of motion not diſtinct from matter and mind.

Thoſe are not leſs to blame who conſider this *Nature* of Ariſtotle, this principle of motion, as an exiſtence or ſubſtance different both from matter and from the minds of intelligent creatures. Ariſtotle calls it in ſome places ὡσπερ ψυχη. He might with equal propriety, and equal conſiſtency with his other doctrines, have called mind ὡσπερ τελος, or an ὡσπερ δυναμις. Beſides, we have no evidence for the ſeparability of this ὡσπερ ψυχη from body as we have for the ſeparability of ſuch minds as our own, the genuine ψυχαι. Nay, his whole doctrines, when maturely conſidered, aſſume their abſolute inſeparability.

14
Elemental minds are an abuſe of language.

This doctrine of elemental minds, therefore, as the immediate cauſes of the phenomena of the material world, is an abuſe of language. It is a jargon; and it is a frivolous abuſe, for it offers no explanation whatever. The phenomena are totally unlike the phenomena of ordinary minds, and therefore receive no explanation from them; and ſince our knowledge of theſe *quaſi* minds muſt be derived entirely from the phenomena, it will be preciſely the ſame, although we expreſs it in common language. We ſhall not indeed raiſe the wonder of our hearers, as thoſe do who fill the world with minds which they never ſuſpected to exiſt; but we ſhall not bewilder their imaginations, confound their ideas, and miſlead their judgments.

15
The dreadful conſequences of materialiſm.

We flatter ourſelves that our readers will not think theſe obſervations unſeaſonable or miſplaced, Of all miſtakes that the naturaliſt can fall into, there is none more fatal to his progreſs in knowledge than the confounding things which are eſſentially different; and of all the diſtinctions which can be made among the objects of our contemplation, there is none of equal philoſophical importance with this between mind and matter: And when we conſider the conſequences which naturally follow from this confuſion of ideas and particularly thoſe which follow from ſinking the mental faculties of man to a level with the operations of mechanics or chemiſtry, conſequences which a little ſerious reflection will ſhow to be deſtructive of all that is noble as deſirable in human nature, and of all that is comfortable in this life, and which blaſts every hope of future excellence—we cannot be too anxious to have this capital diſtinction put in the plaineſt point of view, and expreſſed in the moſt familiar characters, "ſo "that he who runneth may read." When we ſee the frenzy which the reaſoning pride of man has raiſed among ſome who call themſelves philoſophers, and hear the dictates of philoſophy inceſſantly appealed to in defence of whatever our hearts ſhudder at as ſhocking and abominable; and when we ſee a man (A), of great reputation as a naturaliſt, and of profeſſed humanity and political moderation, congratulating his countrymen on the rapid improvemrnt and almoſt perfection of philoſophy; and after giving a ſhort ſketch of the conſtitution of the viſible univerſe, ſumming up all with a table of elective attractions, and that particular combination and mode of cryſtallization which conſtitutes GOD *(horreſco referens!)*—is it not full time for us to ſtop ſhort, and to aſk our own hearts "whither are you wandering!"—But ſound philoſophy, reaſoning from effects to their cauſes. will here liſten to the words of our ſacred oracles: "By their fruits ye ſhall know them. Do men gather grapes of thorns, or figs of thiſtles?" The abſurd conſequences of the ſceptical philoſophy of Berkeley and Hume have been thought, by men of undoubted diſcernment, ſufficient reaſons for rejecting it without examination. The no leſs abſurd and the ſhocking conſequences of the mechanical philoſophy now in vogue ſhould give us the ſame abhorrence and ſhould make us abandon its dangerous road, and return to the delightful paths of nature, to ſurvey the works of God, and feaſt our eyes with the diſplays of mind, which offer themſelves on every hand in deſigns of the moſt extenſive influence and the moſt beautiful contrivance. Following the guidance of heavenly wiſdom we ſhall indeed find, that "all her ways are ways of pleaſantneſs, and all her paths are peace."

16
The extent of philoſophical ſtudy.

Such is the ſcene of our obſervation, the ſubject of philoſophical ſtudy. Its extent is almoſt unbounded, reaching from an atom to God himſelf. It is abſolutely neceſſary for the ſucceſsful cultivation of this immenſe field of knowledge that it be commited to the care of different cultivators, and that its various portions be treated in different ways: and, accordingly, the various taſtes of men have given this curioſity different directions; and the ſtudy, like all other taſks, has been promoted by this diviſion of labour.

Some philoſophers have attended only to the appearances of fitneſs which are exhibited in every quarter of the univerſe; and by arranging theſe into different claſſes, and interpreting them as indications of thought and intention, have acquired the knowledge of many claſſes of ſentient and intelligent beings, actuated by propenſities, and directed by reaſon.

17
The nature and uſes of animal inſtincts.

While the contemplation of theſe appearances indicates thought and deſign in any individual of one of theſe claſſes, and brings its propenſities and purpoſes of action, and the ends gained by theſe actions, into view, the contemplation of theſe propenſities, purpoſes, and ends, occaſions an inference of a much more general

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(A) M. de la Metherie, editor of the *Journal de Phyſique*. See his prefaces to the volumes for 1792 and 1793, January and July.

ral kind. All theſe intelligent beings give indications of knowledge and of power; but their knowledge bears, in general, no proportion to their power of producing changes in nature, and of attaining important ends; and their power is neither always, nor in the moſt important caſes, the conſequence of their knowledge. Where the effect of their actions is moſt eminently conducive to their important intereſts, the power of attaining theſe valuable ends is generally independent on any attention to the fitneſs of the means, and the exertion is frequently made without even thinking of the important end. The well-being of the individual is ſecured againſt any danger from its ignorance, indolence, or inattention, by an inſtinctive propenſity, which leads it to the performance of the neceſſary action, which is thus made immediately and ultimately deſirable, without any regard to its ultimate and important end. Thus, in our own nature, the ſupport of animal life, and the improvement of the means of ſubſiſtence by a knowledge of the objects which ſurround us, are not intruſted to our apprehenſions of the importance of theſe ends, but are committed to the ſurer guides of hunger and curioſity.

18 There is a connection between the individuals of a claſs of animals different from that of reſemblance.

The ſame obſervers diſcover a connection between the individuals of a claſs, different from that which ariſes from the mere reſemblance of their external appearance, or even of their propenſities and purſuits; the very circumſtances which produced the claſſification. They obſerve, that theſe propenſities are ſuch, that while each individual ſeeks only its own enjoyment, theſe enjoyments are in general ſuch as contribute to the ſupport of the ſpecies and the enjoyment of other individuals. Thus, in the claſſes of animals, and in human nature, the continuance of the race, and the enjoyment of the whole, are not entruſted to the apprehenſion we entertain of the importance of theſe ends, but are produced by the operation of ſexual love and the love of ſociety.

19 There is alſo a link of connection between ſentient beings of different claſſes.

The ſame obſervers find that even the *different* claſſes of ſentient beings are connected together; and while the whole of each claſs aim only at their own enjoyment, they contribute, in ſome way or other, to the well-being of the other claſſes. Even man, the ſelfiſh lord of this ſublunary world, is not the unconnected inhabitant of it. He cannot, in every inſtance, reap all the fruits of his ſituation, without contributing to the enjoyment of thouſands of the brute creation. Nay, it may be proved to the ſatisfaction of every intelligent man, that while one race of animals, in conſequence of its peculiar propenſities, ſubſiſts by the deſtruction of another, the ſum total of animal life and enjoyment is prodigiouſly increaſed. See a very judicious diſſertation on this curious and puzzling ſubject, intitled *A Philoſophical Survey of the Animal Creation;* where it appears that the increaſe of animal life and enjoyment which is produced by this means, beyond what could poſſibly obtain without it, is beyond all conception. See likewiſe the laſt edition of *King's Origin of Evil*, by Dr Law late biſhop of Carliſle.

20 The end of this connection is the accumulation of happineſs.

Thus the whole aſſemblage ſeems connected, and jointly employed in increaſing the ſum total of poſſible happineſs. This fitneſs of the various propenſities of ſentient and intelligent beings, this ſubſerviency to a general purpoſe, ſtrikes theſe obſervers as a mark of intention, evidently diſtinct from, and independent of, all the particular intentions, and ſuperior to them all; and thus it irreſiſtibly leads them to infer the exiſtence of a SUPREME MIND, directing the whole of this INTELLECTUAL SYSTEM, while the individuals of which it conſiſts appear the unconſcious inſtruments in the hand of a great Artiſt, with which he executes his grand and beneficent purpoſes.

21 All nature animate and inanimate, thinking and unthinking, are connected.

But the obſervation goes yet further. The bodies of the inanimate creation are not only connected with each other by a mutual dependence of properties, and the relation of cauſation, but they are alſo connected with the ſentient beings by a ſubſerviency to their purpoſes of enjoyment. The philoſopher obſerves that this connection is admirably kept up by the conſtancy of natural operations and the expectations of intelligent beings. Had either of theſe circumſtances been wanting, had either the operations of nature been without rule, or had ſentient beings no perception or expectation of their uniformity; the ſubſerviency would be totally at an end. This adjuſtment, this fitneſs, of which the effect is the enjoyment of the ſentient inhabitants of the univerſe, appear to be the effect of an intention of which this enjoyment is the final cauſe. This conſtancy therefore in the operations of nature, both in the intellectual and material world, and the concomitant expectation of ſentient beings, appear the effects of *laws* impoſed on the different parts of the univerſe by the Supreme Mind, who has formed both theſe claſſes of beings ſo admirably ſuited to each other.

22 The origin of natural theology.

To ſuch obſervers the world appears a WORK OF ART, a ſyſtem of means employed for gaining certain propoſed ends, and it carries the thoughts forward to an ARTIST; and we infer a degree of ſkill, power, and good intention in this Artiſt, proportioned to the ingenuity, extent, and happy effect which *we are able to diſcern* in his works. Such a contemplation of nature, therefore, terminates in NATURAL THEOLOGY, or the diſcovery of the exiſtence and attributes of GOD.

23 Our mode of reaſoning on the operations of God.

Our notions of this *Supreme Mind* are formed from the indications of deſign which we obſerve, and which we interpret in the ſame way as in the actions of men. Theſe notions, therefore, will differ from our notions of other minds only in the *degrees* which we *are able* to obſerve, and which we aſſign to theſe faculties; for the phenomenon or the effect is not only the mark, but alſo the meaſure of its ſuppoſed cauſe. Theſe degrees muſt be aſcertained by our own capacity of appreciating the extent, the multiplicity, and the variety of the contrivance. Accordingly, the attributes of the Supreme Mind, in the theological creed of a rude Indian, are much more limited than in that of a European philoſopher. In proportion as our underſtandings are enlarged, and as our acquaintance with the operations of nature around us is extended, we ſhall perceive higher degrees of power, of ſkill, and of kind intention: and ſince we find that the ſcene of obſervation is unbounded, we cannot affix any boundaries to theſe attributes in our own imagination, and we are ready to ſuppoſe that they are infinite or unbounded *in their own nature*. When our attentive ſurvey of *this* univerſe, and a careful compariſon of all its parts, as far as we can underſtand or appreciate them, have made us conclude that it is *one* deſign, the work of *one*

Artiſt; we are under the neceſſity of inferring, that, with reſpect to *this univerſe*, his power, wiſdom, and benevolence, are indeed infinite

24
The ſyſtem of nature is governed by general laws.

When men have been led to draw this concluſion from the appearances of fitneſs which are obſerved everywhere around them, they conſider that conſtancy which they obſerve in natural operations, whether in the material or the intellectual ſyſtem, and that expectation of, and confidence in, this conſtancy, which renders the univerſe a ſource of enjoyment to its ſentient inhabitants, as the conſequences of laws impoſed by the Almighty Artiſt on his works, in the ſame manner as they would conſider the conſtancy in the conduct of any people as the conſequences of laws promulgated and enforced by the ſupreme magiſtrate.

25
The nature and progreſs of the ſtudy of mind.

26
The riſe of moral ſentiments and of moral duty.

There can be no doubt of this view of nature being extremely captivating, and likely to engage the curioſity of ſpeculative men; and it is not ſurpriſing that the phenomena of mind have been keenly ſtudied in all ages. This part of the ſtudy of nature, like all others, was firſt cultivated in ſubſerviency to the wants of ſocial life; and the general laws of moral ſentiment were the firſt phenomena which were conſidered with attention. This gradually ripened into a regular ſyſtem of moral duty, accompanied by its congenial ſtudy, the inveſtigation or determination of the *ſummum bonum*, or the conſtituents of human felicity; and theſe two branches of intellectual ſcience were always kept in a ſtate of aſſociation by the philoſophers of antiquity. Juriſprudence, the ſcience of government, legiſlation, and police, were alſo firſt cultivated as arts, or at leaſt in immediate ſubſerviency to the demands of cultivated ſociety; and all theſe ſo nearly related parts of the ſtudy of human nature, had made a very conſiderable progreſs, in the form of maxims or precepts, for directing the conduct, before ſpeculative men, out of mere curioſity, treated them as ſubjects of philoſophical ſtudy. Our moral ſentiments, always involving a feeling of obligation, are expreſſed in a language conſiderably different from the uſual language of pure philoſophy, ſpeaking of things which *ought to be*, rather than of things which *are;* and this diſtinction of language was increaſed by the very aim of the writers, which was generally to influence the conduct as well as the opinions of their ſcholars. It was reſerved for modern times to bring this ſtudy into the pure form of philoſophy, by a careful attention to the phenomena of moral ſentiment, and claſſing theſe according to their generality, and aſcertaining their reſpective ranks by an appeal to experiment, that is, to the general conduct of mankind: and thus it happens that in the modern treatiſes on ethics, juriſprudence, &c. there is leſs frequent reference made to the *officia* or duties, or to the conſtituents of the *ſummum bonum*, than among the ancients, and a more accurate deſcription of the human mind, and diſcrimination of its various moral feelings.

27
The origin of logic and other intellectual ſciences.

It was hardly poſſible to proceed far in theſe diſquiſitions without attending to the powers of the underſtanding. Differences of opinion were ſupported by reaſonings, or attempts to reaſoning. Both ſides could not be in the right, and there muſt be ſome court of appeals. Rules of argumentation behoved to be acquieſced in by both parties; and it could hardly eſcape the notice of ſome curious minds, that there were rules of truth and falſehood as well as of right and wrong. Thus the human *underſtanding* became an object of ſtudy, firſt in ſubſerviency to the demands of the moraliſts, but afterwards for its own ſake; and it gradually grew up into the ſcience of logic. Still further refinement produced the ſcience of metaphyſics, or the philoſophy of univerſals. But all theſe were *in fact* poſterior to the doctrines of morals; and diſquiſitions on beauty, the principles of taſte, the precepts of rhetoric and criticiſm, were the laſt additions to the ſtudy of the phenomena of mind. And now, ſince the world ſeems to have acquieſced in the mode of inveſtigation of general laws by experiment and obſervation, and to agree that this is all the knowledge that we can acquire of any ſubject whatever, it is to be expected that this branch of philoſophical diſcuſſion will attain the ſame degree of improvement (eſtimated by the coincidence of the doctrines with fact and experience) that has been attained by ſome others.

28
The partial practice of natural philoſophy preceded its ſtudy as a ſcience.

The occupations, however, of ordinary life have oftener directed our efforts towards material objects, and engaged our attention on their properties and relations; and as all ſciences have ariſen from arts, and were originally implied in the maxims and precepts of thoſe arts, till ſeparated from them by the curious ſpeculatiſt, the knowledge of the material ſyſtem of nature was poſſeſſed in detached ſcraps by the practitioners in the various arts of life long before the *natural philoſopher* thought of collecting them into a body of ſcientific doctrines. But there have not been wanting in all ages men of curioſity who have been ſtruck by the uniformity of the operations of nature in the material world, and were eager to diſcover their cauſes.

Accordingly, while the moraliſts and metaphyſicians turned their whole attention to the phenomena of mind and have produced the ſciences of pneumatology, logic, ethics, juriſprudence, and natural theology, theſe obſervers of nature have found ſufficient employment in conſidering the phenomena of the material world.

29
The nature of the material ſyſtem with the definition of that and other terms.

The bodies of which it conſiſts are evidently connected by means of thoſe properties by which we obſerve that they produce changes in each other's ſituation. This aſſemblage of objects may therefore be juſtly called a ſyſtem. We may call it the MATERIAL SYSTEM. It is frequently termed NATURE; and the terms NATURAL APPEARANCES, NATURAL CAUSES, NATURAL LAWS, have been generally reſtricted to thoſe which take place in the material ſyſtem. This reſtriction, however, is improper, becauſe there is no difference in the manner in which we form our notions of thoſe laws, and reaſon from them, both with reſpect to mind and body. Or if there is to be any reſtriction, and if any part of the ſtudy of the univerſe is to be excluded in the application of theſe terms, it is that part only which conſiders moral obligation, and rather treats of what *ought to be* than of what *is*. As has been already obſerved, there is a conſiderable difference in the language which muſt be employed; but ſtill there is none in the principles of inveſtigation. We have no proof for the extent of any moral law but an appeal to the feelings of the hearts of men, indicated by the general laws or facts which are obſerved in their actions.

30 The unreſtricted ſenſe in which ſome of theſe terms are uſed, and its bad conſequences.

But this is only a queſtion of the propriety of language. And no great inconvenience would ariſe from the reſtriction now mentioned if it were ſcrupulouſly adhered to; but unfortunately this is not always the caſe. Some authors uſe the term *natural law* to expreſs *every* coincidence of fact; and this is certainly the proper uſe of the term. The French writers generally uſe the term *loi phyſique* in this enlarged ſenſe. But many authors, miſled by, or taking advantage of, the ambiguity of language, after having eſtabliſhed a law founded on a copious and perhaps unexcepted induction of the phenomena of the material ſyſtem (in which caſe it muſt be conſidered in its reſtricted ſenſe), have, in their explanation of phenomena, extended their principle much farther than the induction on which they had founded the exiſtence of the phyſical law. They have extended it to the phenomena of mind, and have led their followers into great and dangerous miſtakes. Languages, like every other production of human ſkill, are imperfect. They are deficient in terms, and are therefore figurative. The moſt obvious, the moſt frequent, and the moſt intereſting uſes of language, have always produced the appropriated terms, and the progreſs of cultivation has never completely ſupplied new ones. There are certain analogies or reſemblances, or certain aſſociations of ideas, ſo plain, that a term appropriated to one very familiar object will ſerve to ſuggeſt another analogous to it, when aided by the concomitant circumſtances of the diſcourſe; and this with ſufficient preciſion for the ordinary purpoſes of ſocial communication, and without leading us into any conſiderable miſtakes; and it is only the rare and refined diſquiſitions of the curious ſpeculatiſt that bring the poverty and imperfection of language into view, and make us wiſh for words as numerous as our thoughts. There is hardly a ſentence, even of common diſcourſe, in which there are not ſeveral figures either of ſingle words or of phraſes; and when very accurate diſcrimination is required, it is almoſt impoſſible to find words or phraſes to expreſs diſtinctions which we clearly feel. We believe it impoſſible to expreſs, by the ſcanty vocabulary of the Hebrews, the nice diſtinctions of thought which are now familiar to the European philoſopher. In nothing does this imperfection of language appear ſo remarkably as in what relates to mind. Being a late ſubject of ſeparate diſcuſſion, and intereſting only to a few ſpeculatiſts, we have no appropriated vocabulary for it; and all our diſquiſitions concerning its operations are in continual metaphor or figure, depending on very ſlight analogies or reſemblances to the phenomena of the material world. This makes the utmoſt caution neceſſary; and it juſtifies the Britiſh philoſophers, who have been the moſt ſucceſsful in proſecuting the ſtudy of the intellectual ſyſtem, for having, almoſt without exception, reſtricted the terms natural laws, natural cauſes, natural philoſophy, and ſuch like, to the material ſyſtem. With us pneumatology makes no part of phyſics. And we may venture to affirm, that the ſciences have fared better by the reſtriction of the terms. In no country has the ſpirit of liberal diſcuſſion been more encouraged and indulged than in Britain; and her philoſophers have been equally eminent in both branches of ſcience. Their performances in ethics, juriſprudence, and natural theology, are conſidered by all their neighbours as the fountains of knowledge on theſe ſubjects; and Locke and Clarke are names no leſs familiar on the continent than Newton. And notwithſtanding the variety of ſyſtems to which the preſent times have given birth, man is ſtill conſidered as a glorious creature, born to, and fitted for, the nobleſt proſpects.

31 The term phyſics defined as it is generally underſtood in Britain.

Phyſics, then, is with us the ſtudy of the material ſyſtem, including both natural hiſtory and philoſophy. The term is not indeed very familiar in our language; and in place of *phyſicus* and *diſciplina phyſica*, we more generally uſe the terms *naturaliſt* and *natural knowledge*. The term *natural philoſophy*, in its common acceptation, is of leſs extent. The field of phyſical inveſtigation is ſtill of prodigious extent; and its different quarters require very different treatments, make very different returns, and accordingly have engaged in their particular cultivation perſons of very different talents and taſtes. It is of ſome importance to perceive the diſtinctions, and to ſee how the wants and propenſities of men have led them into the different paths of inveſtigation; for, as has been more than once obſerved, all ſciences have ſprung from the humble arts of life, and both go on improving by means of a cloſe and conſtant correſpondence.

32 The phenomena of the material ſyſtem arranged into two claſſes.

All the phenomena of the material ſyſtem may be arranged into two claſſes, diſtinguiſhed both by their objects and by the proper manner of treating them.

The firſt claſs comprehends all the appearances which are exhibited in the *ſenſible motions* of bodies, and their actions on each other producing *ſenſible motion*.

The ſecond claſs comprehends the appearances which are exhibited in the *inſenſible* motions and actions of the inviſible particles of matter.

33 Examples of thoſe of the firſt claſs.

Of the phenomena of the firſt claſs we have examples in the planetary motions, the motions of heavy bodies, the phenomena of impulſe, the motions and actions of machines, the preſſure and motions of fluids, the ſenſible actions of magnetical and electrical bodies, and the motions of light.

34 And of thoſe of the ſecond.

We have examples of the ſecond claſs in the phenomena of heat and mixture, and thoſe exhibited in the growth of animals and vegetables, and many phenomena of ſolid, fluid, magnetical, electrical, and luminous bodies, in which no change of place can be obſerved.

35 This arrangement is apparently natural.

Thus it appears that there is a diſtinction in the phenomena ſufficiently great to warrant a diviſion of the ſtudy, and to make us expect a more rapid improvement by this diviſion. Nay, the diviſion has been made by nature herſelf, in the acquaintance which men have attained with her operations without ſtudy, before ſcience appeared, and while art conſtituted all our knowledge.

36 Of the progreſs of knowledge in rude ages.

Before man had recourſe to agriculture as the moſt certain means of procuring ſubſiſtence, our acquaintance with external ſubſtances was principally that of the natural hiſtorian; conſiſting of a knowledge of their fitneſs for food, medicine, or accommodation, their places of growth or habitation, and the means of

37 The origin of agriculture, phyſic, ſurgery, and chemiſtry.

procuring them, depending on their manner of life or exiſtence. It required a ſtudied attention to theſe circumſtances to give riſe to agriculture, which therefore generally made its appearance after men had been in the practice of keeping flocks; by which means they were more at their eaſe, and had ſome leiſure to attend to the objects around them, and in particular to thoſe circumſtances of ſoil and weather which affected the growth of their paſture.

When agriculture and a rude medicine were thus eſtabliſhed, they were the firſt *arts* which had their foundation in a *ſyſtem of laws*, by which the operations of nature were obſerved to be regulated; and with theſe arts we may begin the *general ſtudy of nature*, which were thus divided into two different branches.

The rude phyſician would be at firſt a collector of *ſpecifics*; but by degrees he would obſerve reſemblances among the *operations* of his drugs, and would claſs them according to theſe reſemblances. He would thus come to attend leſs to the drug than to its mode of operation; and would naturally ſpeculate concerning the connection between the operation and the economy of animal life. His art now becomes a ſcientific ſyſtem, connected by principle and theory, all proceeding on the obſervation of changes produced by one kind of matter on another, but all out of ſight. The frequent recourſe to the vegetable kingdom for medicines would cauſe him to attend much more minutely to the few plants which he has occaſion to ſtudy than the huſbandman can do to the multitude he is obliged to rear. The phyſician muſt learn to think, the huſbandman to work. An analogy between the economy of animal and vegetable life could hardly fail to engage the attention of the phyſician, and would make him a botaniſt, both as a claſſifier of plants and as a philoſopher.

He would naturally expect to unite the ſervices of his drugs by combining them in his recipes, and would be ſurpriſed at his diſappointments. Curious and unexpected changes would frequently occur in his manipulations: the ſenſible qualities, and even the external appearances of his ſimples, would be often changed, and even inverted by their mixture; and their medicinal properties would frequently vaniſh from the compound, and new ones be induced. Theſe are curious, and to him intereſting facts; and he would naturally be inquiſitive after the principles which regulate theſe changes. His ſkill in this would by degrees extend beyond the immediate uſe for the knowledge; and the more curious ſpeculatiſt would lay the foundations of a moſt extenſive and important ſcience, comprehending all the phenomena of heat and mixture.

Along with this, and ſpringing from the ſame ſource, another ſcience muſt ariſe, contemplating the appearances of animal and vegetable life, and founded on a careful obſervation and accurate deſcription of the wonderful machine. The moſt incurious of men have in all ages been affected by the diſplays of wiſdom and contrivance in the bodies of animals, and immediately engaged in inveſtigation into the uſes and functions of their various parts and organs. The phenomena have been gradually diſcriminated and arranged under the various heads of nutrition, concoction, ſecretion, abſorption, aſſimilation, rejection, growth, life, decay, diſeaſe, and death; and, in conformity to the doctrines which have with greater or leſs evidence been eſtabliſhed on theſe ſubjects, the action of medicines, and the whole practice of phyſic and ſurgery, has been eſtabliſhed in the form of a liberal or ſcientific art.

38 The origin of the knowledge of the mechanical powers.

The huſbandman in the mean time muſt labour the ground which lies before him. He, too, is greatly intereſted in the knowledge of the vegetable economy, and forms ſome ſyſtems on the ſubject by which he regulates his labours: but he ſees, that whatever is the nature of vegetable life, he muſt work hard, and he ſearches about for every thing which can tend to diminiſh his labour. The properties of the lever, the wedge, and the inclined plane, ſoon become familiar to him; and without being able to tell on what their efficacy depends, he uſes them with a certain ſagacity and effect. The ſtrength of timber, the preſſure and force of water, are daily ſeen and employed by him and other artiſans who labour for their mutual accommodation; and ſome rude principles on theſe ſubjects are committed to memory. Many tools and ſimple machines are by this time familiar; and thus the *general* properties of matter, and the general laws of the actions of bodies on each other, become gradually matter of obſervation and reflection; and the practical mechanic will be frequently improving his tools and machines. The general aim is to produce a greater quantity of work by the ſame exertion. The attempts to improvement will be awkward, and frequently unſucceſsful. When a man finds, that by increaſing the length of his lever he increaſes his power of overcoming a reſiſtance, a ſmall degree of curioſity is ſufficient to make him inquire in what proportion his advantage increaſes. When he finds that a double length gives him a double energy, he will be ſurpriſed and mortified to find, that at the end of the day he has not performed twice the quantity of work: but, after much experience, he will learn that every increaſe of energy, by means of a machine, is nearly compenſated by an increaſe of time in the performance of his taſk; and thus one of the great and leading principles of practical mechanics was inculcated in a manner not to be forgotten, and the practical mechanic was brought to ſpeculate about motion and force, and by gradual and eaſy ſteps the general laws of ſimple motions were eſtabliſhed.

39 The origin of mathematics.

It is evident that theſe ſpeculations cannot be carried on, nor any conſiderable knowledge acquired, without ſome acquaintance with the art of meaſurement: and the very queſtions which the mechanic wiſhes to ſolve, preſuppoſe ſome advances in this art, which in proceſs of time refined itſelf into mathematics, the moſt perfect of all the ſciences. All the phenomena of ſenſible motion afford employment to the mathematician. It is performed in a double or triple time, through a double or triple ſpace, by a double or triple body, by the exertion of a double or triple force, produces a double or triple effect, is more to the right or to the left, upwards or downwards, &c. In ſhort, every affection of motion is an object of mathematical diſcuſſion. Such a ſcience muſt have appeared ere now in the form of an art, in conſequence of the mutual tranſactions of men. Theſe among an uncultivated people are chiefly in the way of barter. If I want corn from a peaſant, and have nothing to give for it but the cloth which I have made, we muſt fall on ſome way of adjuſting our terms in reſpect of the quantity. We ſhould ſoon diſcover that the length, and breadth, and depth, of the box or bag, were equally important; and it was not difficult to ſee, that if any of them were doubled or tripled, the quantity of grain would be ſo too; if two of them were doubled, the grain would be quadrupled; and if all the three were doubled the quantity of grain would be increaſed eight times: the ſame thing would be obſerved with reſpect to my cloth. By ſuch tranſactions as theſe, a few of the properties of plane and ſolid numbers and figures would become known, and the operations of multiplication and diviſion, where arithmetic is combined with geometry, and daily obſervation ſhows us, that the more abſtruſe properties of number and figure, which to the generality of mankind are ſo inſignificant, lay hold on the fancy of ſome individuals with ſuch force, as to abſtract them from every other intellectual entertainment, and are ſtudied with a keenneſs and perſeverance almoſt unequalled in any other walk of ſcience. To moſt men the performance of a machine is a more attractive object than the properties of a figure, and the property of a figure more entertaining than that of a number; but the fact ſeems to have been otherwiſe. Before Pythagoras had invented the theorem that bears his name (ſee PHILOSOPHY, n° 15. and note H.), and which is among the firſt elements of geometry, he had reformed the Grecian muſic by the addition of a note to their ſcale, and this addition proceeds on a very refined ſpeculation on the properties of numbers; ſo that among the Greeks arithmetic muſt have made conſiderable progreſs, while geometry was yet in its cradle: and we know to what aſtoniſhing length they proſecuted the ſcience of pure geometry, while their knowledge of mechanical principles was almoſt nothing. Alſo the Arabs hardly made any addition to the geometry of the Greeks, if they did not rather almoſt completely forget it; whilſt they improved their arithmetic into algebra, the moſt refined and abſtracted branch of human knowledge. There is ſuch a diſtance, in point of ſimplicity, between pure mathematics and the moſt elementary mechanics, that the former continued to make rapid ſteps to improvement in more modern times, while the latter languiſhed in its infancy, and hardly deſerved the name of ſcience till very lately, when the great demand for it, by the increaſe and improvement in manufactures, both intereſted many in the ſtudy, and facilitated its progreſs, by the multitude of machines which were contriving on all hands by the manufacturers and artiſans: and even at preſent it muſt be acknowledged, that it is to them that we are indebted for almoſt every new invention in mechanics, and that the ſpeculatiſt ſeldom has done more than improve the invention, by exhibiting its principles, and thus enabling the artiſt to correct its imperfections; and now ſcience and art go hand in hand, mutually giving and receiving aſſiſtance. The demands of the navigator for mathematical and aſtronomical knowledge have dignified theſe ſciences; and they are no longer the means of elegant amuſement alone but merit the munificence of princes, who have erected obſervatories, and furniſhed voyages of diſcovery, where the mathematical ſciences are at the ſame time cheriſhed and applied to the moſt important purpoſes.

This ſhort ſketch of what may be called *the natural hiſtory of phyſical ſcience* will not, we hope, be thought improper or unprofitable. It tends to confirm an aſſertion often alluded to, that the proſecution of the ſtudy of nature will be more ſucceſsful, if we imitate her mode of proceeding, and divide the labour. It will be ſtill further confirmed by attending to the ſcientific difference of the phenomena, which marks out a different mode of proceeding, and a difference in the knowledge which we ſhall ultimately acquire, after our moſt ſucceſsful reſearches.

40
The connecting principle of concomitant events is totally unknown.

In both claſſes of phenomena already diſtinguiſhed (n° 6.) we muſt grant, that the principle which connects the pairs of concomitant events, rendering the one the inſeparable companion of the other, is totally unknown to us, becauſe it is not the immediate object of our perception.

41
In the firſt claſs, however, the exertion of this principle may be accurately obſerved,

But in the phenomena of the firſt claſs, we ſee the *immediate* exertion of this principle, whatever it may be; we can obſerve the exertion with accuracy; we can determine its kind and degree, which are the ſigns and meaſures of the kind and degree of the unperceived cauſe. This exertion, being always ſome modification of motion, allows us to call in the aid of mathematical knowledge, and thus to aſcertain with the preciſion peculiar to that ſcience the energy of the cauſe, judging of the tendency and quantity by the tendency and the quantity of the obſerved effect.

42
But not in the ſecond;

But in the ſecond claſs of phenomena the caſe is very different. In the operations of chemiſtry, for inſtance, the *immediate* exertion of the cauſe is not perceived: all that we obſerve is the aſſemblage of particles which obtains before mixture, and that which takes place when it is completed, and which we conſider as its reſult. The procedure of nature in producing the change is unſeen and unknown. The ſteps are hid from our obſervation. We are not only ignorant of the cauſe which determines one particle of our food to become a part of our body while others are rejected, but we do not ſee the operation. We are not only ignorant of the cauſe which determines a particle of vitriolic acid to quit the foſſil alkali with which it is united in Glauber ſalt, and to attach itſelf to a particle of magneſia already united with the muriatic acid, which alſo quits it to unite with the alkali, but we do not ſee the operation. The particles and their motions are not the objects of our ſenſes; and all that we ſee is the Epſom ſalt and common ſalt ſeparated from the water in which we had formerly diſſolved the ſal mirabile and the muriated magneſia. The motions, which are the *immediate* effects of the changing cauſes, and therefore their *only indications, characteriſtics, and meaſures*, fitted to ſhow their nature, are hid from our view.

43
And therefore the phenomena of the ſecond claſs are leſs underſtood.

Our knowledge therefore of theſe phenomena muſt be leſs perfect than that of the phenomena of the former claſs; and we muſt here content ourſelves with the diſcovery of more remote relations and remote cauſes, and with our ignorance of the very powers of nature by which theſe changes are brought about, and which are cognoſcible only by their immediate effects, *viz.* the motions which they produce unſeen. The knowledge which we do really acquire is ſomewhat ſimilar to what the mechanical philoſopher has acquired when he has diſcovered, by many experiments and inveſtigations, that magnets attract each other by their diſſimilar poles, and repel each other by their ſimilar poles, and do not act at all on any bodies but loadſtones and iron. Here we leave undiſcovered all that is moſt curious in the phenomenon, *viz.* how theſe attractions and repulſions are produced; and even here the magnetical philoſopher has the advantage of ſeeing the agents and the operation.

44 Though ſome philoſophers have attempted to explain them by the doctrine of motion;

But philoſophers attending to this circumſtance, that, even in theſe caſes, the changes are produced by motions, or conſiſt in motions, however unperceived theſe may be, have concluded, that the laws according to which nature operates in producing theſe changes are ſimilar to the laws which regulate her operations in the ſenſible actions of bodies, or are included in them; and that the motions, though unſeen, and the moving forces are perfectly ſimilar. They have therefore employed ſimilar modes of inveſtigation, applying the laws of impulſe, and calling in the aid of mathematical knowledge.

Of this we have many examples in the writings of Dr Freind, Keil, Bernoulli, Helſham, Boerhaave, Hartley, and others, who have delivered theories of fermentation, ſolution, precipitation, cryſtallization, nutrition, ſecretion, muſcular action, nay even of ſenſation and intelligence, founded, as they think, on the laws of motion, and illuſtrated and ſupported by mathematical reaſoning. Lord Bacon himſelf, that careful and ſagacious diſtinguiſher of intellectual operations, has gone into the ſame track in his explanation of the phenomena of fire and combuſtion: and Sir Iſaac Newton has made ſeveral attempts of the ſame kind, although with peculiarities which always characteriſe his diſcuſſions, and make them very different from thoſe of an inferior claſs.

45 But their attempts have been unſucceſsful.

But the ſucceſs of of theſe philoſophers has hitherto been very diſcouraging: indeed they had no title to expect any; for their whole trains of reaſoning have proceeded on analogies which were not obſerved, but aſſumed or *ſuppoſed* without any authority. There is not that ſimilarity in the phenomenon, or in the viſible effect, which is abſolutely neceſſary for a ſucceſsful reaſoning by analogy. We do not obſerve any local motion, any change of place, which alone enables us to reaſon mathematically on the ſubject. And to make the caſe deſperate, this ill-founded analogy has been mixed with hypotheſes completely gratuitous. Certain forms have been aſſigned to the particles, and certain modes of action have been laid down for them, for whoſe reality we have not the leaſt argument or indication: and to complete the matter, theſe fancied forms and laws of action have been ſuch as are either ſelf contradictory and inconſiſtent, or they have been ſuch as, if allowed to act in a way analogous to what we obſerve in the ſenſible motions of bodies, would produce effects totally different from thoſe which are obſerved. Theſe atomical theories, as they are called, tranſgreſs every rule of philoſophical diſcuſſion, and even the beſt of them are little better than trifling amuſements. By far the greateſt part of them only ſerve to raiſe a ſmile of pity and contempt in every perſon at all acquainted with mechanical philoſophy. Whenever we ſee an author attempting to explain theſe hidden operations of nature by inviſible fluids, by æthers, by colliſions, and vibrations, and particularly if we ſee him introducing mathematical reaſonings into ſuch explanations—the beſt thing we can do is to ſhut the book, and take to ſome other ſubject. That we may not be thought to ſpeak preſumptuouſly on this occaſion, we only beg leave to remind our readers, that the united knowledge of the moſt emient mathematicians of Europe has not yet been able to give any thing more than an approximation to the ſolution of the problem of three bodies; that is, to determine with accuracy the motions of three particles of matter acting on each other in the ſimpleſt of all poſſible manners, *viz.* by forces varying as the ſquares of the diſtances inverſely: and the vibrations of elaſtic bodies, of any but the very ſimpleſt poſſible forms, are to this day beyond the reach of inveſtigation. What then ſhould be our expectations in caſes where millions of particles are acting at once, of forms unobſerved, and with forces unknown, and where the object is not a determination of an average reſult of many, where the preciſe ſtate of an individual particle need not be known, but where it is this very preciſe ſtate of each ſingle particle that we want to know? What can it be but uncertainty and miſtake?

46 The advantage derived in theſe ſpeculations from mathematical philoſophy.

Notwithſtanding theſe diſcouraging circumſtances, we muſt obſerve that this kind of inquiry has greatly improved of late years, along with the improvement and extenſion of mathematical philoſophy, and ſince philoſophers have given over their inceſſant attempts to explain every thing by impulſe; and we need not deſpair of making ſtill farther advances, if we will content ourſelves with going no farther than Newton has done in his explanation of the planetary motions. He has immortalized his own name, and has added immenſely to our ſtock of uſeful knowledge: yet he has ſtopped ſhort at the diſcovery of the fact of univerſal gravitation; and all who have endeavoured to explain or account for this fact have only expoſed themſelves to pity. We may perhaps be one day able to demonſtrate from the phenomena that the particles of matter have certain mutual tendencies to or from each other, exerted according to fixed or invaried rules; and from theſe tendencies we may be able to explain many other phenomena, and predict the conſequences, with as much certainty and evidence as an aſtronomer calculates a future eclipſe. This would be a great acquiſition, and perhaps more is impoſſible: and the road to this has been hinted by Sir Iſaac Newton, who has expreſſed his ſuſpicion, that as the great movements of the ſolar ſyſtem are regulated by univerſal gravitation, ſo the mutual actions of the particles of matter are produced and regulated by tendencies of a ſimilar kind, *equally* but not *more* inexplicable, and of which the laws of action are to be diſcovered by as careful an attention to the phenomena, and by the ſame patient thinking, which he has employed on the planetary motions. And a beautiful introduction to this new and almoſt unbounded field of enquiry has been given us by the celebrated Abbé Boſcovich, in his Theory of Natural Philoſophy, where he has ſhown how ſuch mutual tendencies, ſimilar in every ultimate particle of matter, and modified by conditions that are highly probable, nay almoſt demonſtrable, will not only produce the ſenſible forms of ſolidity, hardneſs, elaſticity, ductility, fluidity, and vapour, under an inconceivable variety of ſubordinate appearances, and the obſerved laws of ſenſible motion, but will go far to explain the phenomena of fuſion, congelation, ſolution, cryſtallization, &c. &c. &c. both in chemiſtry and phyſiology. We earneſtly recommend this work to the peruſal of all who wiſh to obtain a diſtinct notion of the internal conſtitution of natural bodies, and of the way in which the uniting forces produce their ultimate and ſenſible effects. Any perſon, poſſeſſed of a moderate ſhare of mathematical knowledge, will be convinced that the proceſs of nature is not very different from what he deſcribes; and that much of what we obſerve muſt happen as he ſays, even although the ultimate atoms of matter are not inextended mathematical points, accompanied with attracting and repelling forces.

47
Our ignorance ſtill great, and the probable increaſe of knowledge among poſterity.

But we have many ſteps to make before we begin this ſtudy: Nature opens to us an immenſe volume; and we doubt not that our poſterity will long find employment in the peruſal, even though advancing with the eagerneſs and ſucceſs of the laſt century. We have not yet arrived at the threſhold in many parts of this reſearch: In many parts of chemiſtry, for inſtance, we are as yet uncertain with reſpect to the phenomena themſelves, which are to be the ſubjects of this diſcuſſion. The compoſition of bodies muſt be fully underſtood before we begin to ſpeak of the forces which unite their particles, or ſpeculate about their modes of action. As long as water was conſidered as an element, we were ignorant of the forces inherent in its particles; we are perhaps ſtill ignorant of this; but we now know that they are extremely different from what we formerly ſuppoſed them to be. It is but in a very few, if in any, caſes of chemical combination, that we even know what are the ingredients: till we know this, it is too ſoon to ſpeculate about their mode of union. Our ignorance in the real events in the animal and vegetable economy is ſtill greater. Our firſt taſk therefore is to proceed, as we are now doing, in the accurate examination and claſſification of the phenomena themſelves; and, without attempting to bring them within the pale of mathematical philoſophy, by attempting what are called mechanical explanations, let us give up the conſideration of theſe hidden operations, and augment to the utmoſt our liſt of ſecondary laws of viſible but remote connections. All the mechanical ſpeculations of the honourable Robert Boyle about the ſenſible qualities of things are now forgotten; but his chemical experiments preſerve all their value, and are frequently referred to. The ſame may be ſaid of the ſagacious Dr Hales, whoſe fanciful notions of internal conflicts, and colliſions, and vibrations, derogate nothing from the value of the curious facts which he has eſtabliſhed both in the animal and vegetable economy.

48
The particular diviſions of phyſical ſcience in Britain.

This diſtinction in the nature of the phenomena, and this difference in the nature of the knowledge which is to be acquired, and the means which are to be employed for the ſucceſsful proſecution of theſe two branches of general phyſics, has occaſioned a ſtill farther reſtriction (at leaſt in Britain) of the term NATURAL PHILOSOPHY. It is particularly applied to the ſtudy of the phenomena of the firſt claſs, while thoſe of the ſecond have produced the ſciences of CHEMISTRY and PHYSIOLOGY.

Natural philoſophy and chemiſtry have generally been made particular inſtitutions in our ſeminaries of learning, but phyſiology has more commonly been taught in conjunction with anatomy, medicine, and botany.

The phenomena of the firſt claſs have been uſually called MECHANICAL, in order to diſtinguiſh them from thoſe obſerved in the operations of chemiſtry, and in the animal and vegetable economy; and the explanations which have been attempted of ſome of the laſt, by applying the laws obſerved in the phenomena of the firſt claſs, have been called *mechanical explanations*.

As this firſt claſs is evidently but a part of general phyſics, there is ſome impropriety in giving the name *natural philoſophy* to a courſe of doctrines which is confined to theſe alone. Indeed at the firſt inſtitution of univerſities, the lectures given in the *Schola Phyſica* were much more extenſive, comprehending almoſt all the phenomena of the material world; but as all arts and ſciences have improved moſt where the labour has been moſt divided, it was found more conducive to the advancement of knowledge that ſeparate inſtitutions ſhould be founded for the ſtudies of natural hiſtory, chemiſtry, phyſiology, &c.; and thus the phenomena, purely mechanical, and a few others in magnetiſm, electricity, and optics which either were ſuſceptible of mathematical treatment, or had little connection with the ſtudies of chemiſtry and phyſiology, were left to the care of the profeſſor of natural philoſophy.

As the terms *chemiſtry* and *phyſiology* have been applied to two very important branches of general phyſics, we think that a more ſpecific or characteriſtic name might be appropriated to the other, and that it might very properly be termed MECHANICAL PHILOSOPHY.

It only remains to make a few obſervations on the diſtinctive means of proſecuting theſe ſtudies with ſucceſs, and to point out ſome of the advantages which may reaſonably be expected from a careful proſecution of them: and as the ſecond branch has been fully treated under the ſeveral articles of CHEMISTRY, PHYSIOLOGY, &c. we ſhall confine ourſelves to what is uſually called NATURAL PHILOSOPHY.

49
Mechanical philoſophy defined, and its principles explained.

MECHANICAL PHILOSOPHY may, in conformity with the foregoing obſervations, be defined, "the ſtudy of the ſenſible motions of the bodies of the univerſe, and of their actions producing ſenſible motions, with the view to diſcover their cauſes, to explain ſubordinate phenomena, and to improve art."

The principle upon which all philoſophical diſcuſſion proceeds is, that *every change which we obſerve in the condition of things is conſidered by us as an effect, indicating the agency, characteriſing the kind, and meaſuring the degree, of its cauſe.*

In the language of mechanical philoſophy, the cauſe of any change of motion is called a moving or changeing FORCE.

The diſquiſitions of natural philoſophy muſt therefore begin with the conſideration of motion, carefully noticing every affection or quality of it, ſo as to eſtabliſh marks and meaſures of every change of which it is ſuceptible; for theſe are the only marks and meaſures of the changing forces. This being done, it only remains to apply them to the motions which we obſerve in the univerſe.

50 The laws of motion and their application.

From the general principle of philoſophical diſcuſſion already mentioned, there flow directly two axioms.

1. *Every body perſeveres in a ſtate of reſt or of uniform rectilineal motion, unleſs affected by ſome moving force.*

2. *Every change of motion is in the direction and in the degree of the force impreſſed.*

Theſe are uſually called the LAWS OF MOTION. They are more properly laws of human judgment, with reſpect to motion. Perhaps they are neceſſary truths, unleſs it be alledged that the general principle, of which they are neceſſary conſequences, is itſelf a contingent though univerſal truth.

By theſe two axioms, applied *in abſtracto* to every variety of motion, we eſtabliſh a ſyſtem of general doctrines concerning motions, according as they are ſimple or compounded, accelerated, retarded, rectilineal, curvilineal, in ſingle bodies, or in ſyſtems of connected bodies; and we obtain correſponding characteriſtics and meaſures of accelerating or retarding forces, centripetal or centrifugal, ſimple or compound.

We have an illuſtrious example of this abſtract ſyſtem of motion and moving forces in the firſt book of Sir Iſaac Newton's Mathematical Principles of Natural Philoſophy. Euler's *Mechanica ſive Scientia Motus*, Herman's *Phoronomia ſive de Viribus Corporum*, and D'Alembert's *Traité de Dynamique*, are alſo excellent works of the ſame kind. In this abſtract ſyſtem no regard is paid to the caſual differences of moving forces, or the ſources from which they ariſe. It is enough to characteriſe a double accelerating force, for inſtance, that it produces a double acceleration. It may be a weight, a ſtream of water, the preſſure of a man; and the force, of which it is ſaid to be double, may be the attraction of a magnet, a current of air, or the action of a ſpring.

Having eſtabliſhed theſe general doctrines, the philoſopher now applies them to the *general* phenomena of the univerſe, in order to diſcover the nature of the forces which really exiſt, and the laws by which their operations are regulated, and to explain intereſting but ſubordinate phenomena. This is the chief buſineſs of the mechanical philoſopher; and it may with ſome propriety be called *the mechanical hiſtory of nature*.

51 Of the arrangement of the mechanical phenomena of the univerſe.

Some method muſt be followed in this hiſtory of mechanical nature. The phenomena muſt be claſſed by means of their reſemblances, which infer a reſemblance in their cauſes, and theſe claſſes muſt be arranged according to ſome principle. We have ſeen no method which appears to us leſs exceptionable than the following.

52 The generality of the phenomena is the principle of arrangement.

The principle of arrangement is the generality of the phenomena; and the propriety of adopting this principle, ariſes from the probability which it gives us of more readily diſcovering the moſt general actuating forces, whoſe agency is implicated in all other phenomena of leſs extent; and therefore ſhould be previouſly diſcuſſed, that we may detect the diſcriminating circumſtances which ſerve to characteriſe the ſubordinate phenomena, and are thus the marks of the diſtinguiſhing and inferior natural powers.

53 The laws of motion are firſt applied to aſtronomical phenomena.

The moſt general of all phenomena is the curvilineal motion of bodies in free ſpace; it is obſerved through the whole extent of the ſolar ſyſtem.

The mechanical hiſtory of nature begins therefore with aſtronomy. Here, from the general phenomena of the planetary motions, is evinced the *fact* of the mutual deflection of every body towards every other body, and this in the inverſe proportion of the ſquares of the diſtance, and the direct proportion of the quantity of matter. This is the fact of UNIVERSAL GRAVITATION, indicating the agency, and meaſuring the intenſity, of the univerſal force of mutual gravity.

Having eſtabliſhed this as an univerſal fact, the natural philoſopher proceeds to point out all the particular facts which are comprehended under it, and whoſe peculiarities characteriſe the different movements of the ſolar ſyſtem. That is, in the language of philoſophy, he gives a theory or explanation of the ſubordinate phenomena; the elliptical motions of the planets and comets, their mutual diſturbances; the lunar irregularities; the oblate figure of the planets; the nutation of the earth's axis: the preceſſion of the equinoxes; and the phenomena of the tides and trade winds; and he concludes with the theory of the parabolic motion of bodies projected on the ſurface of this globe, and the motion of pendulums.

54 The application of this ſcience to the arts of life.

As he goes along, he takes notice of the applications which may be made to the arts of life of the various doctrines which are ſucceſſively eſtabliſhed; ſuch as chronology, aſtronomical calculation, dialling, navigation, gunnery, and the meaſuring of time.

55 The nature of gravitation.

If a ſquare parcel of ſand be lying on the table, and the finger be applied to any part of it to puſh it along the table, that part is removed where you will, but the reſt remains in its place; but if it is a piece of ſandſtone of the ſame materials and ſhape, and the finger is applied as before, the whole is moved; the other parts accompany the part impelled by the finger in all its motions.

56 And of coheſion.

From the moon's accompanying the earth in all its motions round the ſun, we infer a moving force which connects the moon and earth. In like manner, we muſt conclude that a moving force connects the particles of the ſtone; for we give the name *force* to every thing which produces motion: We call it the force of COHESION; a term which, like gravitation, expreſſes merely a fact.

This ſeems to be the next phenomenon of the univerſe in point of extent.

57 Mode of inveſtigating the laws of coheſion.

Having from the general phenomenon, eſtabliſhed the exiſtence of this force, the philoſopher proceeds to aſcertain the laws by which its exertions are regulated; which is the aſcertaining its diſtinctive nature and properties. This he does in the ſame way that he aſcertained the nature of planetary gravitation, *viz.* by obſerving more particularly the various phenomena.

Here is opened a moſt extenſive and varied field of obſervation, in which it muſt be acknowledged that very little regular and marked progreſs has been made. The variety in the phenomena, and the conſequent variety in the nature of the connecting forces, appear as yet inconceivably great, and there ſeems little probability of our being able to deteƈt in them all any ſameneſs, combined with the other diſtinguiſhing circumſtances, as we have done in the caſe of gravity. Yet we ſhould not deſpair. Boſcovich has ſhown, in the moſt unexceptionable manner, that although we ſhall ſuppoſe that every atom of matter is endued with a perfeƈtly ſimilar force, aƈting in a certain determined ratio of the ſmall and imperceptible diſtances at which the particles of matter are arranged with reſpeƈt to each other, the external or ſenſible appearances may, and muſt, have all that variety which we obſerve. He alſo ſhews very diſtinƈtly how, from the operation of this force, muſt ariſe ſome of the moſt general and important phenomena which charaƈteriſe the different forms of tangible bodies.

We obſerve the chief varieties of the aƈtion of this CORPUSCULAR force on the bodies which we denominate *hard*, *ſoft*, *ſolid*, *fluid*, *vaporous*, *brittle*, *ductile*, *elaſtic*. We ſee inſtances where the parts of bodies avoid each other, and require external force to keep them together, or at certain ſmall diſtances from each other. This is familiar in air, vapours, and all compreſſible and elaſtic bodies.

This is evidently a moſt curious and intereſting ſubjeƈt of inveſtigation. On the nature and aƈtion of theſe corpuſcular forces depends the ſtrength or firmneſs of ſolids, their elaſticity, their power of communicating motion, the preſſure, and motion, and impulſe of fluids; nay, on the ſame aƈtions depend all the chemical and phyſiological phenomena of expanſion, fuſion, congelation, vaporiſation, condenſation, ſolution, precipitation, abſorption, ſecretion, fermentation, and animal and vegetable concoƈtion and aſſimilation.

Out of this immenſe ſtore of phenomena, this inexhauſtible fund of employment for our powers of inveſtigation, the natural philoſopher ſeleƈts thoſe which lead direƈtly to the produƈtion or modification of ſenſible motion.

He will therefore conſider,

58 The production of motion by impulſe has been thought the moſt familiar faƈt in nature.

1. The communication of motion among detached and free bodies, eſtabliſhing the laws of impulſe or colliſion. This has always been conſidered as the elementary doƈtrine of mechanical philoſophy, and as the moſt familiar faƈt obſerved in the material world; and in all ages philoſophers have been anxious to reduce all aƈtions of bodies on each other to impulſe, and have never thought a phenomenon completely explained or accounted for till it has been ſhewn to be a caſe of impulſe. This it is which has given riſe to the hypotheſes of vortices, ethers, magnetic and eleƈtric fluids, animal ſpirits, and a multitude of fancied intermediums between the ſenſible maſſes of matter, which are ſaid in common language to aƈt on each other. A heavy body is ſuppoſed to fall, becauſe it is impelled by a ſtream of an inviſible fluid moving according to certain conditions ſuited to the caſe. The filings of iron are ſuppoſed to be arranged round a magnet, by means of a ſtream of magnetic fluid iſſuing from one pole, circulating perpetually round the magnet, and entering at the other pole, in the ſame manner as we obſerve the flote graſs arranged by the current of a brook.

59 But this opinion is very queſtionable.

But the philoſopher who has begun the mechanical ſtudy of nature by the abſtraƈt doƈtrines of dynamics, and made its firſt application to the celeſtial phenomena, and who has attended carefully to the many analogies between the phenomena of gravitation and coheſion, will be at leaſt ready to entertain very different notions of this matter. He will be ſo far from thinking that the produƈtion of motion by impulſe is the moſt familiar faƈt in nature, that he will acknowledge it to be comparatively very rare; nay, there are ſome appearances in the faƈts which are uſually conſidered as inſtances of impulſion, which will lead him to doubt, and almoſt to deny, that there has *ever been obſerved* an inſtance of one body putting another in motion by coming into abſolute contaƈt with it, and ſtriking it; and he will be diſpoſed to think that the produƈtion of motion in this caſe is preciſely ſimilar to what we obſerve when we gently puſh one floating magnet towards another, with their ſimilar poles fronting each other. There will be the ſame produƈtion of motion in the one and diminution of it in the other, and the ſame uniform motion of the common centre of gravity: and, in this caſe of the magnets, he ſees completely the neceſſity of a law of motion, which is not an axiom, but is obſerved through the whole of nature, and which receives no explanation from any hypotheſis of an intervening fluid, but is even totally inconſiſtent with them. We mean, "that every aƈtion of one body on another is accompanied by an equal and oppoſite aƈtion of that other on the firſt." This is uſually called the *equality of aƈtion and reaƈtion*: it is not intuitive, but it is univerſal; and it is a neceſſary conſequence of the perfeƈt ſimilarity of the corpuſcular forces of the ſame kinds of matter. This general faƈt, unaccountable on the hypotheſis of impelling fluids, is conſidered in the planetary motions as the unequivocal indication of the ſameneſs of that gravity which regulates them all. The rules of good reaſoning ſhould make us draw the ſame concluſion here, that the particles of tangible matter are conneƈted by equal and mutual forces, which are the *immediate cauſes* of all their ſenſible aƈtions, and that theſe forces, like gravitation, vary with every change of diſtance and ſituation.

60 Motion ſeems to be produced from the equality of aƈtion and reaƈtion.

The laws of colliſion and impulſion being now eſtabliſhed, either as original faƈts or as conſequences of the agency of equal and mutual forces which conneƈt the particles of matter, the philoſopher conſiders,

61 Of motion as it reſpeƈts the theory of machines, &c.

2. The produƈtion of motion by the intervention of ſolid bodies, where, by reaſon of the coheſion of matter, ſome of the motions are neceſſarily confined to certain determinate paths or direƈtions. This is the caſe in all motions round fixed points or axes, or along planes or curves which are oblique to the aƈtion of the forces.

62 MECHANICS.

This part of the ſtudy contains the theory of machines, pointing out the principles on which their energy depends, and conſequently furniſhing maxims for their conſtruƈtion and improvement. But theſe obſervations do not complete the diſcuſſion of the mechaniſm of ſolid bodies: they are not only ſolid and inert, but they are alſo heavy; therefore the aƈtion of gravity muſt be combined with the conſequences of ſolidity. This will lead to diſcuſſions about the centre of gravity, the theory and conſtruƈtion of arches and roofs, the principles of ſtability and equilibrium, the attitudes of animals, and many particulars of this kind.

63 The nature and definition of fluidity.

3. The philoſopher will now turn his attention to another form, in which tangible matter exhibits many intereſting phenomena, *viz.* FLUIDITY. The firſt thing

to be attended to here is, *What is that particular form of exiſtence?* What is the preciſe phenomenon which characteriſes fluidity? What is the definition of a fluid? This is by no means an eaſy queſtion, and conſiderable objections may be ſtated againſt any definition that has been given of it. Sir Iſaac Newton ſays, that *a fluid is a body whoſe particles yield to the ſmalleſt impreſſion, and by ſo yielding are eaſily moved among themſelves.* It may be doubted whether this be ſufficiently preciſe; what is meant by the *ſmalleſt impreſſion?* and what is *eaſily* moving! Is there any preciſe degree of impreſſion to which they do not yield; and do they oppoſe any reſiſtance to motion? And a ſtronger objection may be made? It is not clear that a body ſo conſtituted will exhibit all the appearances which a body acknowledged to be fluid does really exhibit. Euler offers ſome very plauſible reaſons for doubting whether it will account for the horizontal ſurface, and the complete propagation of preſſure through the fluid in every direction; and therefore prefers ſelecting *this laſt phenomenon*, the propagation of preſſure *quáqua verſum*, as the characteriſtic of fluidity, becauſe a body having this conſtitution (on whatever circumſtances it may depend) will have every other obſerved property of a fluid. But this definition is hardly ſimple or perſpicuous enough; and we think that the objections againſt Newton's more ſimple and intelligible definition are not unanſwerable. Boſcovich defines a fluid to be, *a body whoſe particles exert the ſame mutual forces in all directions*; and ſhows, that ſuch particles muſt be indifferent, as to any poſition, with reſpect to each other. If no external force act on them, they will remain in every poſition, and will have no tendency to arrange themſelves in one poſition rather than another; differing in this reſpect from the particles of ſolid, or ſoft, or viſcid bodies; which require ſome force to change their reſpective poſitions, and which recover theſe poſitions again when but gently diſturbed. He illuſtrates this diſtinction very beautifully, by comparing a parcel of balls thrown on quickſilver, and attracting each other, with a parcel of magnets in the ſame ſituation. The balls will ſtick together, but *in any poſition;* whereas the magnets will always affect a particular arrangement.

64
Of the preſſure and equilibrium of fluids, or hydroſtatics.

When the characteriſtic phenomenon of fluidity has been ſelected, the philoſopher proceeds to combine this property with gravity, and eſtabliſhes the doctrines of HYDROSTATICS, or of the preſſure and equilibrium of heavy fluids, the propagation of this preſſure in every direction; and demonſtrates the horizontality of ſurface aſſumed by all perfect fluids.

Theſe doctrines and principles enable us to determine ſeveral very intereſting circumſtances reſpecting the mutual preſſure of ſolids and fluids on each other; the preſſures exerted on the bottoms and ſides of veſſels; the ſupport and whole mechaniſm of floating bodies, &c.

65
Of the motion of fluids, or hydraulics.

He then conſiders how fluids will move when their equilibrium of preſſure is deſtroyed; and eſtabliſhes the doctrines of HYDRAULICS, containing all the modifications of this motion, ariſing from the form of the veſſels, or from the intenſity or direction of the preſſure which occaſions it. And this ſubject is completed by the conſideration of the reſiſtance which fluids oppoſe to the motion of ſolid bodies through them, and their impulſe on bodies oppoſed to their action.

66
The importance and difficulty of theſe branches of ſcience.

Theſe are very important matters, being the foundations of many mechanical arts, and furniſhing us with ſome of our moſt convenient and efficacious powers for impelling machines. They are alſo of very difficult diſcuſſion, and are by no means completely inveſtigated or eſtabliſhed. Much remains yet to be done both for perfecting the theories and for improving the arts which depend on them.

It is evident, that on theſe doctrines depend the knowledge of the motions of rivers and of waves; the buoyancy, equilibrium, and ſtability of ſhips; the motion of ſhips through the waters; the action of the winds on the ſails; and the whole arts of marine conſtruction and ſeamanſhip.

67
The nature and definition of vapour.

There is another general form of tangible matter which exhibits very different phenomena, which are alſo extremely intereſting; we mean that of VAPOUR. A vapour is a fluid; and all the vapours that we know are heavy fluids: they are therefore ſubject to all the laws of preſſure and impulſe, which have been conſidered under the articles HYDROSTATICS and HYDRAULICS. But they are ſuſceptible of great compreſſion by the action of external forces, and expand again when theſe forces are removed. In conſequence of this compreſſion and expanſion, the general phenomena of fluidity receive great and important modifications; and this claſs of fluids requires a particular conſideration. As air is a familiar inſtance, this branch of mechanical philoſophy has been called PNEUMATICS.

68
The doctrine of air, or pneumatics.

Under this head we conſider the preſſure of the atmoſphere, and its effects, both on ſolid and fluid bodies. It produces the riſe of waters or other fluids in pumps and ſyphons, and gives us the theory of their conſtruction: it explains many curious phenomena of nature, ſuch as the motions in the atmoſphere, and their connection with the preſſure of the air, and its effect on the barometer or weather-glaſs. Air, when in motion, is called *wind;* and it may be employed to impel bodies. The theory of its action, and of its reſiſtance to moving bodies, are therefore to be conſidered in this place.

But beſides their motions of progreſſion, &c. ſuch as we obſerve in winds, compreſſible or elaſtic fluids are ſuſceptible of what may be termed *internal motion;* a kind of undulation, where the contiguous parts are thrown into tremulous vibrations, in which they are alternately condenſed and rarefied; and theſe undulations are propagated along the maſs of elaſtic fluid, much in the ſame way in which we obſerve waves to ſpread on the ſurface of water. What makes this an intereſting ſubject of conſideration is, that theſe undulations are the more ordinary cauſes of ſound. A trembling chord, or ſpring, or bell, agitates the air adjoining to it: theſe agitations are propagated along the air, and by its intervention agitate the organ of hearing. The mechaniſm of theſe undulations has been much ſtudied, and furniſhes a very beautiful theory of muſical harmony.

69
Of the compreſſibility of elaſtic fluids, and its conſequences.

The philoſopher examines the *law of compreſſibility* of air and other elaſtic fluids; and thus gets the knowledge of the conſtitution of the atmoſphere, and of the action of thoſe fluids when employed to impel ſolid bodies. Gunpowder contains an immenſe quantity of permanently elaſtic air, which may be ſet at liberty by inflammation. When this is done at the bottom of a piece of ordnance, it will impel a ball along the barrel, and diſcharge it from the muzzle, in the ſame way that an arrow is impelled by a bow. And thus having diſcovered in what degree this air preſſes in proportion to its expanſion, we diſcover its action on the ball through the whole length of the piece, and the velocity which it will finally communicate to it. Here then is contained a theory of artillery and of mines.

70 Of the converſion of bodies into elaſtic fluids by fire.

Chemiſtry teaches us, that moſt bodies can be converted by fire into elaſtic fluids, which can be employed to act on other bodies in the way of preſſure or impulſe. Thus they come under the review of the mechanical philoſopher; and they have become intereſting by being employed as moving forces in ſome very powerful machines.

Theſe diſcuſſions will nearly exhauſt all the general mechanical phenomena. There remain ſome which are much more limited, but furniſh very curious and important ſubjects of inveſtigation.

71 Of the phenomena of loadſtone, or magnetiſm.

The phenomena exhibited between loadſtones or magnets and iron have long attracted attention; and the uſe to which the polarity of the loadſtone has been applied, namely, the directing the courſe of a ſhip through the pathleſs ocean, has rendered theſe phenomena extremely intereſting. They are ſpecified by the term MAGNETISM. Conſiderable progreſs has been made in the arrangement and generalization of them; but we have by no means been able hitherto to bring them all under one ſimple fact. The attention has been too much turned to the diſcovery of the ultimate cauſe of magnetiſm; whereas we ſhould have rather employed our ingenuity in diſcovering all the general laws, in the ſame manner as Kepler and Newton did with reſpect to the celeſtial phenomena, without troubling themſelves with the cauſe of gravitation. Dr Gilbert of Colcheſter was the firſt who conſidered the magnetical phenomena in the truly philoſophical manner; and his treatiſe *De Magnete* may be conſidered as the firſt and one of the moſt perfect ſpecimens of the Baconian or inductive logic. It is indeed an excellent performance; and when we conſider its date, 1580, it is a wonder. Æpinus's *Tentamen Theoriæ Magnetiſmi* is a moſt valuable work, and contains all the knowledge which we have as yet of the ſubject.

72 Of electrical phenomena.

There is another claſs of mechanical phenomena which have a conſiderable affinity with the magnetical; we mean the phenomena called ELECTRICAL. Certain bodies, when rubbed or otherwiſe treated, attract and repel other bodies, and occaſion a great variety of ſenſible motions in the neighbouring bodies. Philoſophers have paid much attention to theſe appearances of late years, and eſtabliſhed many general laws concerning them, But we have not been more ſucceſsful in bringing them all under one fact, and thus eſtabliſhing a complete theory of them, than in the caſe of magnetiſm. Franklin and Æpinus are the authors who have been moſt ſucceſsful in this reſpect. Dr Franklin in particular has acquired great celebrity by his moſt ſagacious compariſon of the phenomena; which has enabled him to eſtabliſh a few general laws, almoſt as preciſe as thoſe of Kepler, and of equally extenſive influence. His diſcovery too of the identy of thunder and electricity has given an importance and dignity to the whole ſubject.

73 Theſe are not all mechanical.

There are many phenomena of electricity which cannot be called mechanical, and are of the moſt curious and intereſting kind. As theſe have little connection with any of the other great branches of phyſical ſcience, they have generally been conſidered in treatiſes of natural philoſophy; and along with inquiries into the original cauſe of electricity in general, continue to engage much of our attention.

74 Of the phenomena of viſion

The appearances which are preſented to us by our ſenſe of ſeeing form another claſs, which have always been conſidered as making a branch of natural philoſophy in all ſeminaries of learning. It does not, however, obviouſly appear, that they are mechanical phenomena. The intimate nature of light is ſtill a ſecret. Fortunately it is not neceſſary to be known to give us a very perfect theory of the chief phenomena. The general laws of optics are ſo few, ſo ſimple, and ſo preciſe, that our theories are perhaps more perfect here than in any other branch of phyſics; but theſe theories are as yet far removed from the rank of primary facts. Many unknown events happen before the phenomenon comes under the hands of the ordinary optician, ſo as to become the ſubjects of the ſimple laws of reflection and refraction.

75 It has been doubted whether light is corporeal.

It may even be doubted, and has been doubted, whether the phenomena of optics are caſes of body in motion; whether all the lines which the optician draws are any thing but the directions along which certain *qualities* are exerted. The ſide of a ball which is next the candle may be bright and the other ſide dark, juſt as the ſide of a ball which is next the electrical globe is *minus* and the other ſide *plus;* and all this without any intervening medium. Apparition or viſibility may be a quality of a body, depending on the proximity and poſition of another body, without any thing between them, juſt as weight is; and this quality may be cognizable by our faculty of ſeeing alone, juſt as the preſſure of a heavy body is by our feeling alone.

76 How optics came to be conſidered as a part of mechanical philoſophy.

The firſt thing which made it probable that mechanical philoſophy had any thing to do with the phenomena of optics, was the diſcovery of Mr Roemer, "that apparition was not inſtantaneous;" that ſome time elapſed between the illumination of a body and its being ſeen at a diſtance. He diſcovered, that it was not till 40 minutes after the ſun illuminated one of Jupiter's ſatellites that it was ſeen by an inhabitant of this globe. If therefore a ſun were juſt created, it would be 40 minutes before Jupiter would be illuminated by him, and 200 before the Georgian planet would be illuminated. Here then is motion.

77 The nature of light is ſtill undetermined.

It is therefore highly probable that there is ſomething moved; but it is ſtill doubted whether this ſomething, which we call LIGHT, is a matter emitted from the ſhining body, and moving with great velocity, and acting on and affected by other bodies, in the various phenomena of optics; or whether it is a *certain ſtate* of a medium which is thus propagated, as we ſee that waves are propagated along the ſurface of water, or ſonorous undulations through the maſs of air, while the water or air itſelf is hardly moved out of its place. Either of theſe ſuppoſitions makes optics a legitimate branch of mechanical philoſophy; and it is the philoſopher's buſineſs to examine both by the received laws of motion, and ſee which of them gives conſequences which tally with the phenomena. This has been done; and we imagine that a complete incompatibility has been demonſtrated between the conſequences of the undulations of an elaſtic medium, and the phenomena of optics; while the conſequences of the other or vulgar notion on this ſubject are perfectly conſiſtent with mechanical laws. There are ſome things in this hypotheſis very far beyond our power to conceive diſtinctly; but they are all ſimilar in this reſpect to many facts acknowledged by all; and there is no phenomenon that is inconſiſtent with the legitimate conſequences of the hypotheſis. This gives it great probability; and this probability is confirmed by many chemical facts, and by facts in the vegetable œconomy, which give ſtrong and almoſt undeniable indications of light being a body capable of a chemical union with the other ingredients of ſublunary bodies, and of being afterwards ſet at liberty under its own form, as the cauſe or medium of viſion.

78
But this does not affect the ſcience of optics.

But theſe are queſtions ſimilar to thoſe about the cauſe of gravity, and totally unneceſſary for eſtabliſhing a complete theory of the optical phenomena, for explaining the nature of viſion, the effects of optical inſtruments, the cauſe of colours, the phenomena of the rainbow, halos and periheliums, &c. &c. &c. Only all this theory is unconnected with the principles called mechanical.

79
The probable increaſe of the above extenſive field of obſervation.

Such is the field of obſervation to the mechanical philoſopher of the preſent day. We may hope to extend it, and by degrees apply its doctrines even to the unſeen motions which take place in chemiſtry and phyſiology. But we muſt, in the firſt place, perfect our knowledge and deſcription of the ſenſible motions and actions of bodies. Thoſe of fluids ſtill demand much inveſtigation; and till theſe are thoroughly underſtood, it is not time to attempt penetrating further into the receſſes of nature.

80
Inveſtigation of the law that action is always equal and oppoſite to reaction.

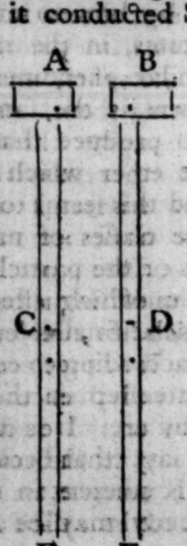
In the proſecution of this ſtudy, it is found that every change which can be obſerved in the ſtate of a body, with reſpect to motion by the action of another body, is accompanied by an equal and oppoſite change in the ſtate of that other body. Thus in the phenomena of gravitation, it is obſerved that the deflections of the ſun and planets are mutual. The ſame thing is obſerved in the actions of magnets on each other and on iron; it is alſo obſerved in the attractions and repulſions of electrical bodies; and it alſo obtains in all the phenomena of impulſe and of corporeal preſſure. It is therefore an univerſal law of motion, that *action is always equal and oppoſite to reaction:* but this muſt be conſidered merely as a matter of fact, a contingent law of nature, like that of gravitation. The contrary is perfectly conceivable, and involves no contradiction. That this is ſo, is evident from the proceedings of philoſophers, who in every new caſe make it their buſineſs to diſcover by experiment whether this law was obſerved or not. It was among the laſt diſcoveries made by Sir Iſaac Newton in his examination of the celeſtial motions. This being the caſe, it ſhould never be aſſumed as a principle of reaſoning till its operation has been aſcertained by obſervation. It has been owing to this improper procedure that much falſe reaſoning has been introduced into mechanical philoſophy, and particularly into the theory of impulſion or the communication of motion by impulſe. In conſidering this ſubject, a term has been introduced which has occaſioned much wrangling and miſconception; we mean the term INERTIA. It ſerves indeed to abbreviate language, but it has often miſled the judgement. When uſed with cautious attention to every circumſtance, it expreſſes nothing but the neceſſity of a cauſe to the production of any effect: but it is generally uſed as expreſſing a quality inherent in matter, by which it *reſiſts* any change of ſtate, or by which it maintains its preſent ſtate. Matter is ſaid to be inert; and as every thing which changes the motion of a body is called a *force*, and as this inertia of A is ſuppoſed to change the motion of B, it is called *vis inertiæ;* and yet matter is ſaid to be indifferent as to motion or reſt, and to be inactive. Theſe are ſurely very incongruous expreſſions. This obſcure diſcourſe has ariſen from the poverty of all languages, which are deficient in original terms, and therefore employ figurative ones. Force, action, reſiſtance, are all appropriated terms related to our own exertions; and ſome reſemblance between the external effects of theſe exertions and the effects of the connecting qualities of natural bodies, has made us uſe them in our diſquiſitions on theſe ſubjects. And as we are conſcious that, in order to prevent our being puſhed by another from our place, we muſt reſiſt, exerting force; and that our reſiſtance is the reaſon why this other man has not accompliſhed his purpoſe, we ſay, that the quieſcent body reſiſts being put in motion, and that its inertia is diſcovered by the diminution made in the motion of the impelling body: and upon the authority of this *vis inertiæ* as a firſt principle, the phenomena of impulſion are explained, and the law of equal action and reaction is eſtabliſhed.

81
The term inertia has occaſioned much wrangling and miſconception on this ſubject.

But all this procedure is in contradiction to the rules of inductive logic; and the obſcurity and confuſion which has ariſen from this original miſconception, the conſequent incongruity of language, and the aukward attempts that have been made to botch and accommodate it to the real ſtate of things, have occaſioned a diſpute, and the only diſpute, in natural philoſophy which has not yet been ſettled, and never can be ſettled, while ſuch miſconceptions are allowed to remain.

82
Its proper meaning, with an example.

If the word *inertia* be taken as expreſſing, not a quality of matter, but a law of human judgment reſpecting matter, as expreſſing our neceſſity of inferring the agency of a moving force whenever we obſerve a change of motion, all difficulties will vaniſh, and the equality of action and reaction will be inferred, as it ſhould be, from the phenomena of colliſion. There will be inferred a *vis inſita corpori impellenti*, not *quâ moventi*, but *quâ corpori;* and this inference will carry us through all the myſteries of corporeal action, as it conducted Sir Iſaac Newton in his grand reſearches.



Let us juſt conſider how we reaſon in a new caſe. Let A and B be two magnets faſtened on the ends of two long wooden laths AE, BF, which turn horizontally on pivots C, D, like compaſs needles, with their north poles fronting each other, 12 inches apart; and let A be puſhed towards B, ſo that it would move uniformly with the velocity of two inches in a ſecond. The phenomena *which have been obſerved* are as follow: A will gradually diminiſh its velocity; and when it has advanced about nine inches, will ſtop completely. B, in the mean time, will gradually acquire motion; and when it has advanced about nine inches, will have a velocity of about two inches per ſecond, with which it will continue to move uniformly. Now what is inferred from theſe phenomena? Becauſe the motion of A is gradually retarded, we infer that a retarding force, that is, a force in the direction BA has acted on it. And ſince this would not have happened if B had not been there, and always happens when B is there, we infer that B is either its cauſe or the occaſion of its action. The vulgar ſay that B repels A; ſo ſay the dynamiſts. The abettors of inviſible fluids ſay, that a ſtream of fluid iſſuing from B impels A in the oppoſite direction. All naturaliſts agree in ſaying, that an active force connected with B has deſtroyed the motion of A, and conſider this curious phenomenon as the indication and characteriſtic of a diſcovery. The ſame inference is made from the motion produced in B: it is conſidered by all as effected by a force exerted or occaſioned by the preſence of A; and the dynamiſts and the vulgar ſay that A *repels* B. And both parties conclude, from the equal changes made on both bodies, that the changing forces are equal: here acknowledging, that they *obſerve* an equality of action and reaction; and they add this to the other inſtances of the extent of this law of motion.

All this while no one thinks of the inertia or inactivity of B, but, on the contrary, conclude this to be a curious inſtance of its activity; and moſt people conclude that both bodies carry about with them a *vis inſita* both when at reſt and when in motion.

83 It is doubtful whether actual contact has ever been obſerved.

If other phenomena give unqueſtionable evidence that, in ordinary colliſions, there is the ſame changes of motion, produced without mathematical contact, the ſame inferences muſt be drawn; and a ſcrupulous naturaliſt will doubt whether contact ſhould make any change in our reaſonings on the ſubject, and whether actual contact ever has been or can be obſerved. He will alſo be convinced, that while this is the general, or perhaps univerſal, proceſs of nature in producing motion by impulſe, all explanations of the action of bodies *a diſtanti*, by the intervention of ethers and other inviſible fluids, are nothing but multiplying the difficulties; for in place of one fact, the approach of one magnet (for inſtance) to another, they ſubſtitute millions of unſeen impulſes, each of which equally needs an explanation. And if this fluid be ſuppoſed to produce its effects by any *peculiarity* in its conſtitution, as in the caſe of Newton's elaſtic ether propoſed by him to explain gravitation, the hypotheſis ſubſtitutes, in the moſt unqualified manner, millions of ſimilar phenomena for the one to be explained; for there is the ſame want of a ſecond fluid in order to produce that mutual receſs of the particles of the ether which conſtitutes its elaſticity.

84 The folly of ſuppoſing intervening ethers, &c

85 The quality of bodies whereby they affect other bodies is inſcrutable by us.

And this ſeems to be the limit to our inquiries into all the claſſes of natural phenomena. We find the maſſes or the particles of matter endued in fact with qualities which affect the ſtate of other particles or maſſes, at ſmaller or at greater diſtances from each other according to certain general rules or laws. This ultimate ſtep in the conſtitution of things is inſcrutable by us. It is arrogance in the higheſt degree for us to ſay, that becauſe we do not comprehend how there is inherent in a body any quality by which another body may be affected at any diſtance from it, therefore no ſuch quality *is poſſible*. It is no leſs ſo to ſay, that matter has no active property but that of moving other matter by impulſe; and that becauſe it may be ſo moved, and alſo by the agency of our own minds, therefore, when it is not moved by impulſe, it is moved by minds. The ſame almighty FIAT which brought a particle of matter into exiſtence could bring thoſe qualities equally into exiſtence; and the *how* in both is equally beyond our comprehenſion.

86 This ſhould not, however, ſtop further inquiries.

But, on the other hand, we muſt guard againſt the incurious reſting on this conſideration as a ſtop to further inquiry. There may be ſpecies of matter poſſeſſed of the mechanical powers, and which notwithſtanding is not cogniſable by our ſenſes. All the properties of matter are not known to a perſon who is both deaf and blind; and beings poſſeſſed of more ſenſes may perceive matter where we do not; and many phenomena may really be produced by the action of intervening matter, which we, from indolence or from haſte, aſcribe to the agency of inherent forces. The induſtry of philoſophers has already diſcovered intermedia in ſome caſes. It is now certain that air is the conveyer of ſound, and it is almoſt certain that there is ſuch a thing as light. Let us therefore indulge conjectures of this kind, and examine the conjectures by the received laws of motion, and reject them when we find the ſmalleſt inconſiſtency; and always keep in mind that even the moſt coincident with the phenomena is ſtill but a poſſibility.

87 Theſe obſervations are not phyſical, but metaphyſical.

We may conclude the whole of theſe obſervations with the remark, that theſe queſtions about the activity or inactivity of matter are not phyſical, but metaphyſical. Natural philoſophy, it is true, commonly takes it for granted that matter is wholly inactive; but it is not of any moment in phyſics whether this opinion is true or falſe; whether matter is acted on according to certain laws, or whether it acts of itſelf according to the ſame laws, makes no difference to the natural philoſopher. It is his buſineſs to diſcover the laws which really obtain, and to apply theſe to the ſolution of ſubordinate phenomena: but whether theſe laws ariſe from the nature of ſome agent external to matter, or whether matter itſelf is the agent, are queſtions which may be above his comprehenſion, and do not immediately concern his proper buſineſs.

88 The above account points out the beſt method of ſtudy.

The account we have now given of natural philoſophy points out to us in the plaineſt manner the way in which the ſtudy muſt be proſecuted, and the helps which muſt be taken from other branches of human knowledge.

89 This method further explained and exemplified.

The cauſes, powers, forces, or by whatever name we chooſe to expreſs them, which produce the mechanical phenomena of the univerſe, are not obſerved, and are known to us only in the phenomena themſelves. Our knowledge of the mechanical powers of nature muſt therefore keep pace with our knowledge of the motions, and indeed is nothing different from it. In order to diſcover and determine the forces by which the moon is retained in her orbit round the earth, we muſt know her motions. To a terreſtrial ſpectator ſhe appears to deſcribe an ellipſe, having the earth in one focus; but, in the mean time, the earth is carried round the ſun, and the moon's real path, in abſolute ſpace, is a much more complicated figure. Till we know this figure, and the variations in the velocity with which it is deſcribed, we know nothing of the forces which actuate the moon in her orbit.

90 The meaning of ſome terms uſed in ſpeaking of the celeſtial motions.

When Newton ſays that the forces by which ſhe is retained in this elliptical orbit are directed to the earth, what does he mean? Only this, that the deflection from that uniform rectilineal motion which ſhe would otherwiſe have performed are always in this direction. In like manner, when he ſays that theſe forces are inverſely proportionate to the ſquares of her diſtances from the earth, he only means that the deflections made in equal times in different parts of her motion are in this proportion. Theſe deflections are conſidered as the characteriſtics and meaſures of the forces. We imagine that we have made all plain when we call this indicated cauſe a *tendency* to the earth; but we have no notion of this tendency to the earth different from the approach itſelf. This word tendency, ſo faſhionable among the followers of Sir Iſaac Newton, is perverted from its pure and original ſenſe. *Tendere verſus ſolem*, is, in the language of Rome, and alſo of Newton, *to go* towards the ſun; but we now uſe the words *tend*, *tendency*, to ſignify, not the *approach*, but the *cauſe* of this approach. And when called upon to ſpeak ſtill plainer, we deſert the ſafe paths of plain language, and we expreſs ourſelves by metaphor; ſpeaking of *niſus*, *conatus ſeſe mutuo accedende*, *vis centripeta*, &c. When theſe expreſſions have become familiar, the original ſenſe of the word is forgotten, and we take it for granted that the words never had another meaning; and this metaphor, ſprung from the poverty of language, becomes a fruitful ſource of miſconception and miſtake. The only way to ſecure ourſelves againſt ſuch myſtical notions as are introduced by theſe means into philoſophy, is to have recourſe to the way in which we acquire the knowledge of theſe fancied powers; and then we ſee that their names are only names for phenomena, and that univerſal gravitation is only an univerſal mutual approach among the parts of the ſolar ſyſtem.

91 The abſurdity of reaſoning à priori.

There is one caſe in which we fondly imagine that we know the cauſe independent of the effect, and that we could have predicted the phenomenon *à priori:* we mean the caſe of impulſe: and hence it is that we are ſo prone to reduce every thing to caſes of impulſion, and that we have fallen upon all theſe ſubterfuges of ethers and other ſubtile fluids. But we might have ſaved ourſelves all this trouble: for after having, by much falſe reaſoning and gratuitous aſſumptions, ſhown that the phenomenon in queſtion *might have been produced* by impulſe, we are no nearer our purpoſe, becauſe that property by which matter in motion puts other matter in motion, is known to us only *by* and *in* the effect.

92 We know nothing of the immediate cauſes of motions except by a knowledge of the motions themſelves.

The fair and logical deduction from all this is, that we muſt not expect any knowledge of the powers of nature, the immediate cauſes of the motions of bodies, but by means of a knowledge of the motions themſelves; and that every miſtake in the motions is accompanied by a ſimilar miſtake in the cauſes. It is impoſſible to demonſtrate or explain the gravitation of the planets to him who is ignorant of the properties of the ellipſe, or the theory of gunnery to him who does not know the parabola.

93 A man cannot be a good natural philoſopher without being a mathematician.

A notion has of late gained ground, that a man may become a natural philoſopher without mathematical knowledge; but this is entertained by none who have any mathematics themſelves; and ſurely thoſe who are ignorant of mathematics ſhould not be ſuſtained as judges in this matter. We need only appeal to fact. It is only in thoſe parts of natural philoſophy which have been mathematically treated, that the inveſtigations have been carried on with certainty, ſucceſs, and utility. Without this guide, we muſt expect nothing but a ſchool-boy's knowledge, reſembling that of the man who takes up his religious creed on the authority of his prieſt, and can neither give a reaſon for what he imagines that he believes, nor apply it with confidence to any valuable purpoſe in life. We may read and be amuſed with the trifling or vague writings of authors of this claſs; but we ſhall not underſtand, nor profit by the truths communicated by a Newton, a D'Alembert, or De la Grange.

Theſe obſervations, on the other hand, ſhow us the nature of the knowledge which may be acquired, and the rank which natural philoſophy holds among the ſciences.

94 The motions of bodies, the only objects of obſervation, are ſubjects of pure mathematical diſquiſition.

Motions are the real and only objects of our obſervation, the only ſubjects of our diſcuſſion. In motion is included no ideas but thoſe of ſpace and time, the ſubjects of pure mathematical diſquiſition. As ſoon, therefore, as we have diſcovered the fact, the motion, all our future reaſonings about this motion are purely mathematical, depending only on the affections of figure, number, and proportion, and muſt carry along with them that demonſtration and irreſiſtible evidence which is the boaſt of that ſcience. To this are we indebted for that accuracy which is attained, and the progreſs which has been made in ſome branches of mechanical philoſophy; for when the motions are diſtinctly and minutely underſtood, and then conſidered only as mathematical quantities, independent of all phyſical conſiderations, and we proceed according to the juſt rules of mathematical reaſoning, we need not fear any intricacy of combination or multiplicity of ſteps; we are certain that truth will accompany us, even though we do not always attend to it, and will emerge in our final propoſition, in the ſame manner as we ſee happen in a long and intricate algebraic analyſis.

95 Mechanical philoſophy thus cultivated is a demonſtrative ſcience.

Mechanical philoſophy, therefore, which is cultivated in this way, is not a ſyſtem of probable opinions, but a *diſciplina accurata*, a demonſtrative ſcience. To poſſeſs it, however, in this form, requires conſiderable preparation. The mere elements of geometry and algebra are by no means ſufficient. Newton could not have proceeded *ſine "ſua matheſi facem preferente;"* and in creating a new ſcience of phyſics, he was obliged to ſearch for and diſcover a new ſource of mathematical knowledge.

96 The lamentable decay of mathematics in Britain.

It is to be lamented that the taſte for the mathematical ſciences has ſo prodigiouſly declined among philoſophers of late years; and that Britain, which formerly took the lead in natural philoſophy, ſhould now be the country where they are leaſt cultivated. Few at preſent know more than a few elementary doctrines of equilibrium; while, on the continent, we find many authors who cultivate the Newtonian philoſophy with great aſſiduity and ſucceſs, and whoſe writings are conſulted as the fountains of knowledge by all thoſe gentlemen who have occaſion to employ the diſcoveries in natural philoſophy in the arts of life. It is

to

97 Notwithſtanding the ampleſt encouragement from the crown.

to the foreign writers that we have recourſe in our ſeminaries, even for elementary treatiſes; and while the continent has ſupplied us with moſt elaborate and uſeful treatiſes on various articles in phyſical aſtronomy, practical mechanics, hydraulics, and optics, there has not appeared in Britain half a dozen treatiſes worth conſulting for theſe laſt forty years; and this notwithſtanding the great munificence of the preſent ſovereign, who has given more liberal patronage to the cultivators of mathematical philoſophy, and indeed of ſcience in general, than any prince in Europe. The magnificent eſtabliſhments of Louis XIV. originated from his inſatiable ambition and deſire of univerſal influence, directed by the ſagacious Colbert. And his patronage being exerted according to a regular plan in the eſtabliſhment of penſioned academics, and in procuring the combined efforts of the *moſt eminent* of all countries, his exertions made a conſpicuous figure, and filled all Europe with his eulogiſts. But all this was done without the ſmalleſt ſelf-denial, or retrenchment of his own pleaſures, the expences being furniſhed out of the public revenues of a great and oppreſſed nation; whereas the voyages of diſcovery, the expenſive obſervations and geodetical operations in Britain, and the numberleſs unheard-of penſions and encouragements given to men of ſcience and activity, were all furniſhed out of the revenues of the prince in whoſe reign they have been accompliſhed. It is ſtill doubtful, however, whether a taſte for the mathematical ſciences is likely to be revived in Britain, and the eyes of Europe once more directed thither for inſtruction and improvement as has been formerly the caſe. The preſent indeed ſeems a moſt favourable era, while the amazing advances in manufactures of every kind ſeem to call aloud for the aſſiſtance of the philoſopher. What pleaſure would it have given to Newton or Halley to have ſeconded the ingenious efforts of a Watt, a Bolton, a Smeaton, an Arkwright, a Dollond? and how mortyfying is it to ſee them indebted to the ſervices of a Belidor, a Boſſut, a Clairaut, a Boſcovich?

We hope to be pardoned for this digreſſion, and return to our ſubject.

98 Mechanical philoſophy is almoſt wholly a mathematical ſtudy.

It appears from what has been ſaid, that mechanical philoſophy is almoſt wholly a mathematical ſtudy, and that it is to be ſucceſsfully proſecuted only under this form: but in our endeavours to initiate the young beginner, it will be often found to require more ſteadineſs of thought than can generally be expected for keeping the mind engaged in ſuch abstract ſpeculations. The object preſented to the mind is not readily apprehended with that vivacity which is neceſſary for enabling us to reaſon upon it with clearneſs and ſteadineſs, and it would be very deſirable to have ſome means of rendering the conception more eaſy, and the attention more lively. This may be done by exhibiting to the eye an experiment, which, though but a ſingle fact, gives us a ſenſible object of perception, which we can contemplate and remember with much more ſteadineſs than any mere creature of the imagination. We could, by an accurate deſcription, give ſuch a conception of a room that the hearer ſhould perfectly comprehend our narration of any occurrence in it: but one moment's glance at the room would be infinitely better. It is uſual therefore to employ experiments to aſſiſt the imagination of the beginner; and moſt courſes of natural philoſophy are accompanied by a ſeries of ſuch experiments. Such experiments, connected by a ſlight train of argumentative diſcourſe, may even ſerve to give a notion of the general doctrines, ſufficient for an elegant amuſement, and even tending to excite curioſity and engage in a ſerious proſecution of the ſtudy. Such are the uſual courſes which go by the name of experimental philoſophy: but this is a great miſapplication of the term; ſuch courſes are little more than *illuſtrations* of known doctrines by experiments.

99 Experiments are however, neceſſary to inſure the attention of young minds.

100 Experimental philoſophy defined and explained.

EXPERIMENTAL PHILOSOPHY is the inveſtigation of general laws, as yet unknown, by experiment; and it has been obſerved, under the article PHILOSOPHY, that this is the moſt infallible (and indeed the ſole) way of arriving at the knowledge of them. This is the *Novum Organum Scientiarum* ſtrongly recommended by Lord Bacon. It was new in his time, though not altogether without example; for it is the procedure of nature, and is followed whenever curioſity is excited. There was even extant in his time a very beautiful example of this method, viz. the Treatiſe of the Loadſtone, by Dr Gilbert of Colcheſter; a work which has hardly been excelled by any, and which, when we conſider its date, about the year 1580, is really a wonderful performance.

The moſt perfect model of this method is the Optics of Sir Iſaac Newton. Dr Black's Eſſay on Magneſia is another very perfect example. Dr Franklin's Theory of Electricity is another example of great merit. That the inveſtigation is not complete, nor the concluſions certain, is not an objection. The method is without fault; and a proper direction is given to the mind for the experiments which are ſtill neceſſary for eſtabliſhing the general laws.

101 A good treatiſe on the method of inquiry by experiment very neceſſary.

It were much to be wiſhed that ſome perſon of talents and of extenſive knowledge would give a treatiſe on the method of inquiry by experiment. Although many beautiful and ſucceſsful examples have been given as particular branches of inquiry, we have but too many inſtances of very inaccurate and inconcluſive inveſtigations. Experiments made at random, almoſt without a view, ſerve but little to advance our knowledge. They are like ſhapeleſs lumps of ſtone, merely detached from the rock, but ſtill wanting the ſkill of the builder to ſelect them for the different purpoſes which they may chance to ſerve; while well contrived experiments are blocks cut out by a ſkilful workman, according as the quarry could furniſh them, and of forms ſuited to certain determined uſes in the future edifice. Every little ſeries of experiments by Margraaf terminates in a general law, while hardly any general concluſion can be drawn from the numberleſs experiments of Pott. Lord Bacon has written much on this ſubject, and with great judgment and acuteneſs of diſtinction; but he has exceeded in this, and has fatigued his readers by his numerous rules; and there is in all his philoſophical works, and particularly in this, a quaintneſs and affectation that greatly obſcure his meaning, ſo that this moſt valuable part of his writings is very little read.

102 An objection to experimental inquiry.

A formidable objection has been made to this method of inquiry. Since a phyſical law is only the expreſſion of a general fact, and is eſtabliſhed only in conſequence of our having obſerved a ſimilarity in a great number of particular facts; and ſince the great rule of inductive logic is to give the law no greater extent than the induction on which it is founded—how comes it that a few experiments muſt be received as the foundation of a general inference? This has been anſwered in very general terms in the article PHILOSOPHY. But it will be of uſe to conſider the ſubject a little more particularly. Our obſervations on this ſubject are taken from the diſſertation on evidence by Dr Campbell in his *Philoſophy of Rhetoric*.

103
The objection anſwered, with examples ſhowing the nature and certainty of this mode of inquiry.

An attentive conſideration of the objects around us, will inform us that they are generally of a complicated nature, not only as conſiſting of a complication of thoſe qualities of things called accidents, ſuch as gravity, mobility, colour, figure, ſolidity, which are common to all bodies; but alſo as conſiſting of a mixture of a variety of ſubſtances, very different in their nature and properties; and each of theſe is perhaps compounded of ingredients more ſimple.

Moreover, the farther we advance in the knowledge of nature, we find the more reaſon to be convinced of her conſtancy in all her operations. Like cauſes have always produced like effects, and like effects have always been preceded by like cauſes. Inconſtancy ſometimes appears in Nature's works at *firſt ſight;* but a more refined experience ſhows us that this is but an appearance, and that there is no inconſtancy: and we explain it to our ſatisfaction in this way.

Moſt of the objects being of a complicated nature, we find, on an accurate ſcrutiny, that the effects aſcribed to them ought often to be ſolely aſcribed to one or more of theſe component parts, while the others either do not contribute to them, or hinder their production; and the variety of nature is ſo great, that hardly any two individuals of the ſame ſpecies are in every reſpect like any other. On all theſe accounts we expect diſſimilitudes in the phenomena accompanying perfectly ſimilar treatment of different ſubjects of the ſame kind; but we find, that whenever we can be aſſured that the two ſubſtances are perfectly alike, the phenomena ariſing from ſimilar treatment are the ſame: and long and extenſive obſervation teaches us, that there are certain circumſtances which inſure us in the perfect ſimilarity of conſtitution of ſome things. Whenever we obſerve the effect of any natural agent on one, and but one, of theſe, we invariably expect that the ſame will be produced on any other.

Should a botaniſt meet with a plant new to him, and obſerve that it has ſeven monopetalous flowers, he will conclude with the utmoſt confidence that every plant of this ſpecies will have monopetalous flowers; but he will not ſuppoſe that it will have ſeven, and no more than ſeven, flowers. Now theſe two facts ſeem to have no difference to warrant ſuch a difference in the concluſion; which may therefore ſeem capricious, ſince there is but one example of both.

But it is not from this example only that he draws the concluſion. Had he never before taken notice of any plant, he would not have reaſoned at all from theſe remarks. But his mind runs immediately from this unknown ſpecies to all the known ſpecies of this genus, and to all the genera of the ſame order; and having experienced in the *figure* of the flower an uniformity in every ſpecies, genus, and order, which admits of no exception, but, in the *number* of flowers, a variety as boundleſs as are the circumſtances of ſoil, climate, age, and culture, he learns to mark the difference, and draws the abovementioned concluſions. Thus we learn, that *perfect* uniformity is not to be expected in any inſtance whatever, becauſe in no inſtance is the ſimplicity of conſtitution ſufficiently great to give us aſſurance of perfect uniformity in the circumſtances of the caſe; and the utmoſt that our experience can teach us is a quick diſcrimination of thoſe circumſtances which produce the occaſional varieties.

The nearer that our inveſtigations carry us to the knowledge of *elementary* natures, the more are we convinced by general experience of the uniformity of the operations of real elements; and although it may perhaps be impoſſible for us ever to arrive at the knowledge of the ſimpleſt elements of any body, yet when any thing *appears* ſimple, or rather ſo exactly uniform, as that we have invariably obſerved it to produce ſimilar effects on diſcovering any *new* effect of this ſubſtance, we conclude, from a general experience of the efficient, a like conſtancy in the energy as to the reſt. Fire conſumes wood, melts lead, and hardens clay. In theſe inſtances it acts uniformly, but not in theſe only. We have always found, that whatever of any ſpecies is conſumed by it in one inſtance, has been conſumed by it on trial at any time. If therefore a trial be made for the firſt time of its influence on any particular ſubſtance, he who makes it is warranted to conclude that the effect, whatever it may be, is a faithful repreſentative of its effects on this ſubſtance in all paſt and future ages. This concluſion is not founded on this ſingle inſtance, but upon this inſtance combined with the general experience of the regularity of this element in its operations.

This general concluſion, therefore, drawn from one experiment, is by no means in oppoſition to the great rule of inductive logic, but, on the contrary, it is the moſt general and refined application of it. General laws are here the real ſubject of conſideration; and a law ſtill more general, viz. *that nature is conſtant in all its operations*, is the inference which is here applied as a principle of explanation of a phenomenon which is itſelf a general law, viz. *that nature is conſtant in this operation*.

The foundation of this general inference from one experiment being ſo firmly eſtabliſhed, it is evident that experiments muſt be an infallible method of attaining to the knowledge of nature; and we need only be ſolicitous that we proceed in a way agreeable to the great rule of inductive logic; that is, the ſubject muſt be cleared of every accidental and *unknown* circumſtance, and put into a ſituation that will reduce the intereſting circumſtance to a ſtate of the greateſt poſſible ſimplicity. Thus we may be certain that the event will be a faithful repreſentative of every ſimilar caſe: and unleſs this be done in the preparation, nothing can reſult from the moſt numerous experiments but uncertainty and miſtakes.

104
Mathematics do not ſuperſede the uſe of experiment.

The account which has been given of mechanical philoſophy would ſeem to indicate that experiment was not of much uſe in the farther proſecution of it. The two laws of motion, with the aſſiſtance of mathematics, ſeem fully adequate to the explanation of every phenomenon; and ſo they are to a *certain degree*. But this degree is as yet very limited. Our mathematical knowledge, great as it is in compariſon with that of former times, is ſtill inſufficient for giving accurate ſolutions even of (comparatively ſpeaking) very ſimple queſtions. We can tell, with the utmoſt preciſion, what will be the motions of two particles of matter, or two bodies, which act on each other with forces proportioned to the ſquares of the diſtances inverſely; but if we add a third particle, or a third body, acting by the ſame law, the united ſcience of all Europe can only give an approximation to the ſolution.

105
Experiment is often the only reſource.

What is to be done then in the caſes which come continually before us, where millions of particles are acting at once on each other in every variety of ſituation and diſtance? How ſhall we determine, for inſtance, the motion of water through a pipe or ſluice when urged by a piſton or by its own weight? what will be its velocity and direction? It is impoſſible, in the preſent ſtate of mathematical knowledge, to tell with any preciſion or certainty. And here we muſt have recourſe to experiment. But if this be the caſe, muſt the experiment be made in every poſſible variety of ſituation, depth, figure, preſſure? or is it poſſible to find out any general rules, founded on the general laws of motion, and rationally deduced from them? Or, if this cannot be accompliſhed, will experiment itſelf furniſh any general coincidences which ſhow ſuch mutual dependences, that we may conſider them as indications of general principles, though ſubordinate, complicated, and perhaps inſcrutable? This can be diſcovered by experiment alone.

106
Accurate experiments cannot always be made.

The attention of philoſophers has been directed to each of theſe three chances, and conſiderable progreſs has been made in them all. Numerous experiments have been made, almoſt ſufficient to direct the practice in many important caſes, without the help of any rule or principle whatever. But there are many caſes, and theſe of by far the greateſt importance, ſuch as the motion of a ſhip impelled by the winds, reſiſted by the water, and toſſed by the waves, where diſtinct experiments cannot be made.

107
Example of the neceſſity of experiment.

Newton, Bernoulli, D'Alembert, and others have laboured hard to deduce from the laws of motion rules for determining what may be called the *average* motion of water in theſe circumſtances, without attempting to define the path or motion of any individual particle: and they have actually deduced many rules which have a great degree of probability. It may here be aſked, why do you ſay *probability?* the rules, as far as they go, ſhould be *certain*. So they are: they are ſtrict deductions from their premiſes. But the premiſes are only *ſuppoſitions*, of various degrees of probability, aſſumed in order to ſimplify the circumſtances of the caſe, and to give room for mathematical reaſoning; therefore theſe deductions, theſe rules, muſt be examined by experiment. Some of the ſuppoſitions are ſuch as can hardly be refuſed, and the rules deduced from them are found to tally preciſely with the phenomena. Such is this, "that the velocities of iſſuing water in ſimilar circumſtances are in the ſubduplicate ratio of the preſſures." And this rule gives a moſt important and extenſive information to the engineer. Other ſuppoſitions are more gratuitious, and the rules deduced from them are leſs coincident with the phenomena. The patient and ſagacious Newton has repeatedly failed in his attempts to determine what is the *abſolute velocity* of water iſſuing from a hole in the bottom of a veſſel when urged by its weight alone, and the attempts of the others have hardly ſucceeded better. Experiment is therefore abſolutely neceſſary on this head.

Thoſe who have aimed at the diſcovery of *rules* purely experimental on this ſubject, have alſo been pretty ſucceſsful; and the Chevalier Buat has, from a compariſon of an immenſe variety of experiments made by himſelf and various authors, deduced an empirical rule, which will not be found to deviate from truth above one part in ten in any caſe which has yet come to our knowledge.

This inſtance may ſerve to ſhow the uſe of experiments in mechanical philoſophy. It is proper in all caſes by way of illuſtration; and it is abſolutely neceſſary in moſt, either as the foundation of a characteriſtic of a particular claſs of phenomena, or as argument in ſupport of a particular doctrine. Hydroſtatics, hydraulics, pneumatics, magnetiſm, electricity, and optics, can hardly be ſtudied in any other way; and they are at preſent in an imperfect ſtate, and receiving continual improvement by the labours of experimental philoſophers in all quarters of the world.

108
The advantages derived from the ſtudy of philoſophy.

Having in the preceding paragraphs given a pretty full enumeration of the different ſubjects which are to be conſidered in the ſtudy of natural philoſophy, it will not be neceſſary to ſpend much time in a detail of the advantages which may reaſonably be expected from a ſucceſsful proſecution of this ſtudy. It ſtands in no need of panegyric: its intimate connection with the arts gives it a ſufficient recommendation to the attention of every perſon. It is the foundation of many arts, and it gives liberal aſſiſtance to all. Indebted to them for its origin and birth, it has ever retained its filial attachment, and repaid all their favours with the moſt partial affection.

109
In navigation.

To this ſcience the navigator muſt have recourſe for that aſtronomical knowledge which enables him to find his place in the trackleſs ocean: and although very ſmall ſcraps of this knowledge are ſufficient for the mere pilot, it is neceſſary that the ſtudy be proſecuted to the utmoſt by ſome perſons, that the unlearned pilot may get that ſcanty pittance which muſt direct his routine. The few pages of tables of the ſun's declination, which he uſes every day to find his latitude, required the ſucceſſive and united labours of all the aſtronomers of Europe to make them tolerably exact: and in order to aſcertain his longitude with preciſion, it required all the genius of a Newton to detect the lunar irregularities, and bring them within the power of the calculator; and, till this was done, the reſpective poſition of the different parts of the earth could not be aſcertained. Vain would have been the attempt to do this by geodætical ſurveys independent of aſtronomical obſervation. It is only from the moſt refined mechanics that we can hope for ſure principles to direct us in the conſtruction and management of a ſhip, the boaſt of human art, and the great means of union and communication between the different quarters of the globe.

110
In architecture,

A knowledge of mechanics not much inferior to this is neceſſary for enabling the architect to execute ſome of his greateſt works, ſuch as the erection of domes and arches, which depend on the niceſt adjuſtment of equilibrium. Without this he cannot unite economy with ſtrength; and his works muſt either be clumſy maſſes or flimſy ſhells.

111 In gunnery and other engines, &c. The effects of artillery cannot be underſtood or ſecured without the ſame knowledge,

The whole employment of the engineer, civil or military, is a continual application of almoſt every branch of mechanical knowledge; and while the promiſes of a Smeaton, a Watt, a Belidor, may be confided in as if already performed, the numberleſs failures and diſappointments in the moſt important and coſtly projects ſhow us daily the ignorance of the pretending crowd of engineers.

The microſcope, the ſteam engine, the thunder-rod, are preſents which the world has received from the natural philoſopher; and although the compaſs and teleſcope were productions of chance, they would have been of little ſervice had they not been ſtudied and improved by Gilbert, Halley, and Dollond.

But it is not in the arts alone that the influence of natural philoſophy is perceived: it lends its aid to every ſcience, and in every ſtudy.

112 In law, It is often neceſſary to have recourſe to the philoſopher in diſputes concerning property; and many examples might be given where great injuſtice has been the conſequence of the ignorance of the judges. Knowledge of nature might have prevented many diſgraceful condemnations for ſorcery.

113 In hiſtory, The hiſtorian who is ignorant of natural philoſophy eaſily admits the miraculous into his narrations, accompanies theſe with his reflections, draws conſequences from them, and fills his pages with prodigies, fables, and abſurdity.

114 In medicine, It is almoſt needleſs to ſpeak of the advantages which will accrue to the phyſician from this ſtudy. So cloſe is the connection between it and medicine, that our language has given but one name to the naturaliſt and to the medical philoſopher. Indeed, the whole of his ſtudy is a cloſe obſervation of the laws of material nature, in order to draw from them precepts to direct his practice in the noble art of healing. During the immaturity of general knowledge, while natural philoſophy was the only ſtudy which had acquired any juſt pretenſion to certitude either in its principles or method of inveſtigation, the phyſicians endeavoured to bring the objects of their ſtudy within its province, hoping by this means to get a more diſtinct view of it; and they endeavoured to explain the abſtruſe phenomena of the animal functions by reducing them all to motions, vibrations, colliſions, impulſes, hydroſtatic and hydraulic preſſures and actions, with which the mechanical philoſophers were ſo ardently occupied at that time. But unfortunately their acquaintance with nature was then very limited, and they were but little habituated to the rules of juſt reaſoning; and their attempts to explain the economy of animal life by the laws of mechanics did them but little ſervice either for the knowledge of diſeaſes or of the methods of cure. The mechanical theories of medicine, which had conſiderable reputation about the end of laſt century, were many of them very ingenious, and had an impoſing appearance of ſymmetry and connection; but are now forgotten, having all been formed on the narrow ſuppoſition that matter was ſubject only to mechanical laws.

But the diſcovery of error diminiſhes the chance of again going wrong, eſpecially when the cauſe of error has been diſcovered, and the means pointed out of detecting the miſtakes; and the vital principle muſt combine its influence with, or operate on, the properties of rude matter. It appears therefore evident that a knowledge of the mechanical laws of the material world is not only a convenient, but a neceſſary, accompliſhment to the phyſician. We are fully juſtified in this opinion, by obſerving medical authors of the preſent day introducing into medicine theories borrowed from mechanical philoſophy, which they do not underſtand, and which they continually miſapply. Appearance of reaſoning frequently conceals the errors in principle, and ſeldom fails to miſlead.

115 In religion, But there is no claſs of men to whom this ſcience is of more ſervice than to thoſe who hold the honourable office of the teachers of religion. Their knowledge in their own ſcience, and their public utility, are prodigiouſly hurt by ignorance of the general frame and conſtitution of nature; and it is much to be lamented that this ſcience is ſo generally neglected by them, or conſidered only as an elegant accompliſhment: nay, it is too frequently ſhunned as a dangerous attainment, as likely to unhinge their own faith, and taint the minds of their hearers. We hope, however, that few are either ſo feebly rooted in the belief of the great doctrines of religion as to fear this, or of minds ſo baſe and corrupted as to adopt and inculcate a belief which they have any ſuſpicion of being ill-founded. But many have a ſort of horror at all attempts to account for the events of nature by the intervention of general cauſes, and think this procedure derogatory to the Divine nature, and inconſiſtent with the doctrine of his particular providence; believing, that "a ſparrow does not fall to the ground without the knowledge of our heavenly Father." Their limited conceptions cannot perceive, that, in forming the general law, the Great Artiſt did at one glance ſee it in its remoteſt and moſt minute conſequence, and adjuſt the vaſt aſſemblage ſo as completely to anſwer every purpoſe of His providence. There never was a more eager inquirer into the laws of nature, or more ardent admirer of its glorious Author, than the Hon. Robert Boyle. This gentleman ſays, that he will always think more highly of the ſkill and power of that artiſt who ſhould conſtruct a machine, which, being once ſet a going, would of itſelf continue its motion for ages, and from its inherent principles continue to anſwer all the purpoſes for which it was firſt contrived, than of him whoſe machine required the continual aid of the hand which firſt conſtructed it. It is owing to great inattention that this averſion to the operation of ſecondary cauſes has any influence on our mind. What do we mean by the introduction of ſecondary cauſes? How do we infer the agency of any cauſe whatever? Would we ever have ſuppoſed any cauſe of the operations of nature, had they gone on without any order or regularity? Or would ſuch a chaos of events, any more than a chaos of exiſtences, have given us any notion of a forming and directing hand? No ſurely. We ſee the hand of God in the regular and unvaried courſe of nature, only becauſe it is regular and unvaried. The philoſo-

pher expreſſes this by ſaying, that the phenomena proceed by unalterable laws. Greatly miſtaken therefore are they who think that we ſuperſede the exiſtence of mind and of providence when we trace things to their cauſes. A phyſical law being an unvaried fact, is an indication, and the ſtrongeſt poſſible indication, of an unerring mind, who is incapable of change, and muſt do to day what He always did: for to change is to deviate from what is beſt*. The operations of unerring mind will therefore be regular and invariable. Phyſical laws, therefore, or ſecondary cauſes, are the beſt proofs of unerring wiſdom. Such regularity of conduct is univerſally conſidered as indications of wiſdom among men. The wiſe man is known by the conſtancy of his conduct, while no man can depend on the future conduct of a fool.

And what aſtoniſhing evidences of wiſdom do we not obſerve in the general laws of the material world? They will ever be conſidered by the intelligent philoſopher as the moſt glorious diſplay of inconceivable wiſdom, which has been able, by means ſo few and ſo ſimple, to produce effects which by their grandeur aſtoniſh our feeble underſtandings, and by their inexhauſtible variety elude all poſſibility of enumeration.

While the teachers of religion remain ignorant of the beautiful laws of nature, the great characteriſtics of the wiſdom and goodneſs of the Almighty Creator, their hearers are deprived of much ſublime pleaſure; God is robbed of that praiſe which he would have received from an enlightened people; and the only worſhip he receives is tainted with mean notions of his attributes, and groundleſs fears of his power.

Let not our minds be haunted with fear of the pernicious effects of philoſophy, in conſequence of the fooliſh extremes into which pretended philoſophers have lately run, they are but the irregular effuſions of the moment, probably ariſing from the preſent perturbed ſtate of ſome of the moſt enlightened nations of Europe. Anarchy and confuſion have ever been unfavourable to calm philoſophic reſearch, whilſt they have contributed to bring into view thoſe reſtleſs ſpirits who blaze like a meteor and like a meteor are extinguiſhed, the illuminations of Philoſophy are ſpoken of as the ſources of their reveries. But their whole phraſeology is equally a perverſion of every thing in language and in ſentiment. The ſacred name of philoſophy is profaned in their mouths. No wonder that religion fled from the torch of their philoſophy: for their philoſophy conſiſts expreſsly in the confounding the moſt diſtinct claſſes of phenomena and of beings, in aſſimilating the heavenly animating ſpark within us to a piece of rude matter, and in degrading man to the level of the brutes, and thus ſhutting out his faireſt proſpects. It is not by the ordinary dialectics of the theologian that this ſacrilegious confuſion can be rectified: this requires an intimate acquaintance with what is characteriſtic of mind, and what is characteriſtic of matter, and a comprehenſive view of the general laws which regulate the appearances in both claſſes of objects. Thus, and thus alone, will the divine be able to confute the miſerable ſophiſms of Mirabeau and Diderot and the other *ſoi-diſant* ſages of France; and perſuade their willing hearers to "render unto Cæſar the things that are Cæſar's, and to God the things that are God's."

But beſides theſe advances which accrue to different claſſes of men from this ſtudy, there are ſome effects which are general, and are too important to be paſſed over unnoticed.

116 And in other ſciences.

That ſpirit of diſpaſſionate experimental inquiry which has ſo greatly promoted this ſtudy, will carry with it, into every ſubject of inquiry, that preciſion and that conſtant appeal to fact and experience which characteriſe it. And we may venture to aſſert, that the ſuperior good order and method which diſtinguiſh ſome of the later productions in other ſciences, have been in a great meaſure owing to this mathematical ſpirit, the ſucceſs of which in natural philoſophy has gained it credit, and thus given it an unperceived influence even over thoſe who have not made it their ſtudy.

117 More general advantages of philoſophy.

The truths alſo which the naturaliſt diſcovers are ſuch as do not in general affect the paſſions of men, and have therefore a good chance of meeting with a candid reception. Thoſe whoſe intereſt it is to keep men in political or religious ignorance, cannot eaſily ſuſpect bad conſequences from improvements in this ſcience; and if they did, have hardly any pretext for checking its progreſs. All diſcoveries accuſtom the mind to novelty; and it will no longer be ſtartled by any conſequences, however contrary to common opinion. Thus the way is paved for a rational and diſcreet ſcepticiſm, and a free inquiry on other ſubjects. Experiment, not authority, will be conſidered as the teſt of truth; and under the guidance of fair experience we need fear no ill as long as the laws of nature remain as they are.

Laſtly, ſince it is the buſineſs of philoſophy to deſcribe the phenomena of nature, to diſcover their cauſes, to trace the connection and ſubordination of theſe cauſes, and thus obtain a view of the whole conſtitution of nature; it is plain that it affords the ſureſt path for arriving at the knowledge of the great cauſe of all, of God himſelf, and for forming proper conceptions of him and of our relations to him: notions infinitely more juſt than can ever be entertained by the careleſs ſpectator of his works. Things which to this man appear ſolitary and detached, having no other connection with the reſt of the univerſe but the ſhadowy and fleeting relation of co-exiſtence, will, to the diligent philoſopher, declare themſelves to be parts of a great and harmonious whole, connected by the general laws of nature, and tending to one grand and beneficent purpoſe. Such a contemplation is in the higheſt degree pleaſant and cheering, and cannot fail of impreſſing us with the wiſh to co operate in this glorious plan, by acting worthy of the place we hold among the works of God, and with the hopes of one day enjoying all the ſatisfaction that can ariſe from conſcious worth and conſummate knowledge; and this is the worſhip which God will approve. "This univerſe (ſays Boyle) is the magnificent temple of its great Author; and man is ordained, by his powers and qualifications, the high prieſt of nature, to celebrate divine ſervice in this temple of the univerſe."

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* Ferguſon's Lectures on Ethics.

PHYSIOGNOMICS, among phyſicians, denote ſuch ſigns as, being taken from the countenance, ſerve to indicate the ſtate, diſpoſition, &c. both of the body and mind: and hence the art of reducing theſe ſigns to practice is termed *phyſiognomy*.

PHYSIOGNOMY,

1
Various definitions of phyſiognomy ancient and modern.

IS a word formed from the Greek φυσις *nature*, and γινωσκω *I know*. It is the name of a ſcience which occupied much of the attention of ancient philoſophers, and which, ſince the revival of learning, has in a great degree been diſregarded. Till of late it has ſeldom in modern times been mentioned, except in conjunction with the exploded arts of magic, alchemy, and judicial aſtrology. Within the two laſt centuries, no doubt, the bounds of human knowledge have been greatly extended by means of the patient purſuit of fact and experiment, inſtead of the haſty adoption of conjecture and hypotheſis. We have certainly diſcovered many of the ancient ſyſtems to be merely creatures of imagination. Perhaps, however, in ſome inſtances, we have decided too rapidly, and rejected real knowledge, which we would have found it tedious and troubleſome to acquire. Such has been the fate of the ſcience of phyſiognomy; which certainly merits to be conſidered in a light very different from alchemy and thoſe other fanciful ſtudies with which it had accidentally been coupled. The work lately publiſhed by M. Lavater on the ſubject has indeed excited attention, and may perhaps tend to replace phyſiognomy in that rank in the circle of the ſciences to which it ſeems to be intitled.

It does not appear that the ancients extended the compaſs of phyſiognomy beyond *man*, or at leaſt animated nature: But the ſtudy of that art was revived in the middle ages, when, miſled probably by the comprehenſiveneſs of the etymological meaning of the word, or incited by the prevalent taſte for the marvellous, thoſe who treated of the ſubject ſtretched the range of their ſpeculation far beyond the ancient limits. The extenſion of the ſignification of the term was adopted univerſally by thoſe naturaliſts who admitted the theory of ſignatures (ſee SIGNATURE); and phyſiognomy came thus to mean, the knowledge of the *internal* properties of *any* corporeal exiſtence from the *external* appearances. Joannes Baptiſta Porta, for inſtance, who was a phyſiognomiſt and philoſopher of conſiderable eminence, wrote a treatiſe on the phyſiognomy of *plants (philognomonica)*, in which he employs phyſiognomy as the generic term. There is a treatiſe likewiſe *De Phyſiognomia Avium*, written we believe by the ſame perſon. In the *Magia Phyſiognomica* of Gaſpar Schottus, *phyſiognomia humana* is made a *ſubdiviſion* of the ſcience.

Boyle too adopts the extenſive ſignification mentioned, which indeed ſeems to have been at one time the uſual acceptation of the word (A). At preſent phyſiognomy ſeems to mean no more than "a knowledge of the moral character and extent of intellectual powers of human beings, from their external appearance and manners." In the Berlin Tranſactions for the years 1769 and 1770 there appears a long controverſial diſcuſſion on the ſubject of the *definition* of phyſiognomy between M. Pernetty and M. Le Cat, two modern authors of ſome note. Pernetty contends, that *all knowledge whatever* is phyſiognomy; Le Cat confines the ſubject to the *human face*. Neither ſeems to have hit the medium of truth. Soon after the celebrated book of Lavater appeared. He indeed defines phyſiognomy to be, "the art of diſcovering the *interior* of *man* by means of his *exterior;* but in different paſſages of his work he evidently favours the extended ſignification of Pernetty. This work gave occaſion to M. Formey's attack upon the ſcience itſelf in the ſame Berlin Tranſactions for 1775. Formey ſtrenuouſly controverts the extent aſſigned by Lavater to his favourite ſcience.

2
Pythagoras probably brought this ſcience to Greece

Before the era of Pythagoras the Greeks had little or no ſcience, and of courſe could not be ſcientifical phyſiognomiſts. Phyſiognomy, however, was much cultivated in Egypt and India; and from theſe countries the ſage of Samos probably introduced the rudiments of this ſcience, as he did thoſe of many others, generally deemed more important, into Greece.

3
It was a profeſſion in the time of Socrates.

In the time of Socrates it appears even to have been adopted as a profeſſion. Of this the well-known anecdote of the deciſion of Zopyrus, on the real character of Socrates himſelf judging from his countenance, is ſufficient evidence. Plato mentions the ſubject; and by Ariſtotle it is formally treated of in a book allotted to the purpoſe.

4
General outline of Ariſtotle's opinions on this ſubject.

It may be worth while to give a brief outline of Ariſtotle's ſentiments on the ſubject.

Phyſiognomy, he in ſubſtance obſerves, had been treated of in three ways: Some philoſophers claſſed animals into genera, and aſcribed to each genus a certain mental diſpoſition correſponding to their corporeal appearance. Others made a farther diſtinction of dividing the genera into ſpecies. Among men, for inſtance, they diſtinguiſhed the Thracians, the Scythians, the Egyptians, and whatever nations were ſtrikingly different in manners and habits, to whom accordingly they aſſigned the diſtinctive phyſiognomical characteriſtics. A third ſet of phyſiognomiſts judged of the actions and manners of *the individual*, and preſumed that certain manners proceeded from certain diſpoſitions. But the method of treating the ſubject adopted by Ariſtotle himſelf was this; A peculiar form of body is invariably accompanied by a peculiar diſpo-

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(A) They'l find i' the phyſiognomies
O' th' planets all men's deſt'nies. HUDIBRAS.

diſpoſition of mind; a human intellect is never found in the corporeal form of a beaſt. The mind and body reciprocally affect each other: thus in intoxication and mania the mind exhibits the affections of the body; and in fear, joy, &c. the body diſplays the affections of the mind.

From ſuch facts he argues, that when in man a particular bodily character appears, which by prior experience and obſervation has been found uniformly accompanied by a certain mental diſpoſition, with which therefore it muſt have been neceſſarily connected; we are intitled in all ſuch caſes to infer the diſpoſition from the appearance. Our obſervations, he conceives, may be drawn from other animals as well as from men: for as a lion poſſeſſes one bodily form and mental character, a hare another, the corporeal characteriſtics of the lion, ſuch as ſtrong hair, deep voice, large extremities, diſcernible in a human creature, denote the ſtrength and courage of that noble animal; while the ſlender extremities, ſoft down, and other features of the hare, viſible in a man, betray the mental character of that puſillanimous creature.

Upon this principle Ariſtotle treats of the corporeal features of man, and the correſpondent diſpoſitions, ſo far as obſerved: he illuſtrates them by the analogy juſt mentioned, and in ſome inſtances attempts to account for them by phyſiological reaſoning.

At the early period in which Ariſtotle wrote, his theory, plauſible certainly, and even probable, diſplays his uſual penetration and a conſiderable degree of knowledge. He diſtinctly notices individual phyſiognomy, national phyſiognomy, and comparative phyſiognomy. The ſtate of knowledge in his time did not admit of a complete elucidation of his general principles; on that account his enumeration of particular obſervations and precepts is by no means ſo well founded or ſo accurate as his method of ſtudy. Even his ſtyle, conciſe and energetic, was inimical to the ſubject; which, to be made clearly comprehenſible, muſt require frequent paraphraſes. Ariſtotle's performance, however, ſuch as it is, has been taken as the ground work and model of every phyſiognomical treatiſe that has ſince appeared.

The imitators of this great man in the 16th and 17th centuries have even copied his language and manner, which are ſententious, indiſcriminate, and obſcure. His comparative phyſiognomy of men with beaſts has been frequently though not univerſally adopted. Beſides his treatiſe expreſsly on the ſubject, many incidental obſervations on phyſiognomy will be found interſperſed through his other works, particularly in his hiſtory of animals.

5
Theophraſtus's ethic characters form an important branch of phyſiognomy.

Next after Ariſtotle, his diſciple and ſucceſſor Theophraſtus would deſerve to be particularly mentioned as a writer on the ſubject in queſtion. His ethic characters, a ſingular and entertaining performance, compoſed at the age of 99, form a diſtinct treatiſe on a moſt important branch of phyſiognomy *the phyſiognomy of manners*: but the tranſlations and imitations of La Bruyere are ſo excellent, that by referring to them we do greater juſtice than would otherwiſe be in our power, both to Theophraſtus and to our readers. We cannot, however, omit obſerving, that the accuracy of obſervation and livelineſs of deſcription diſplayed in the work of Theophraſtus will preſerve it high in claſſical rank, while the ſcience of man and the prominent characteriſtics of human ſociety continue to be objects of attention.

6
Other Greek authors on this ſubject.

Polemon of Athens, Adamantius the ſophiſt, and ſeveral others, wrote on the ſubject about the ſame period. Lately there was publiſhed a collection of all the Greek authors on phyſiognomy: the book is intitled *Phyſiognomiæ veteris ſcriptores Græci. Gr. & Lat. a Franzio Altenb.* 1780, 8vo. From the number of theſe authors, it appears that the ſcience was much cultivated in Greece; but the profeſſors ſeem ſoon to have connected with it ſomething of the marvellous.

7
The ſcience was then coupled with ſomething of the marvellous.

This we have cauſe to ſuſpect from the ſtory told by Apion of Apelles: *Imaginem adeo ſimilitudinis indiſcretæ pinxit, ut (incrediblie dictu) Apion Gramaticus Scriptum reliquerit quemdam ex facie hominum addivinantem (quos melapoſcopos vocant) ex iis dixiſſe aut futuræ mortis annos, aut præteritæ*‡. The novitiates of the Pythagorean ſchool were ſubjected to the phyſiognomic obſervation of their teachers, and it is probable the firſt phyſiognomiſts by profeſſion among the Greeks were of this ſect. They, too, to whom, from the nature of their doctrines and diſcipline, myſtery was familiar, were the firſt, it is likely, who expoſed the ſcience of phyſiognomy in Greece to diſgrace, by blending with it the art of divination.

‡ Pliny Nat. Hiſt. lib. 35. § 35. par. 39.

8
The obſervations of Roman and other writers.

From the period of which we have been treating to the cloſe of the Roman republic, nothing worthy of remark occurs in the literary hiſtory of phyſiognomy. About the laſt mentioned era, however, and from thence to the decline of the empire under the later emperors, the ſcience appears to have been cultivated as an important branch of erudition, and aſſumed as a profeſſion by perſons who had acquired a ſuperior knowledge in it.

In the works of Hippocrates and Galen, many phyſiognomical obſervations occur. Cicero appears to have been peculiarly attached to the ſcience. In his oration againſt Piſo, and in that in favour of Roſcius, the reader will at the ſame time perceive in what manner the orator employs phyſiognomy to his purpoſes, and find a curious inſtance of the *ancient* manner of oratorical *abuſe*.

Many phyſiognomical remarks are to be found likewiſe in the writings of Salluſt, Suetonius, Seneca, Pliny, Aulus, Gellius, Petronius, Plutarch, and others.

That in the Roman empire the ſcience was practiſed as a profeſſion, ample evidence appears in the writings of ſeveral of the authors juſt mentioned. Suetonius, for inſtance, in his *Life of Titus*, mentions that Narciſſus employed a *phyſiognomiſt* to examine the features of Britannicus, who predicted that Britannicus would not ſucceed, but that the empire would devolve on Titus.

9
This ſcience fell with the Roman empire &c.

The ſcience of phyſiognomy ſhared the ſame fate with all others, when the Roman empire was overthrown by the northern barbarians. About the beginning of the ſixteenth century it began again to be noticed.—From that time till the cloſe of the ſeventeenth, it was one of the moſt faſhionable ſtudies. Within that ſpace have appeared almoſt all the approved modern authors on the ſubject (B)

It

(B) They are, Bartholem. Cocles, Baptiſta Porta, Honoratus Nuquetius, Jacobus de Indagine, Alſtedius, Michael

It has been unfortunate for phyſiognomy, that by many of theſe writers it was held to be connected with doctrines of which the philoſophy of the preſent day would be aſhamed. With theſe doctrines it had almoſt ſunk into oblivion.

10
Particular ſtudies have peculiarly prevailed at particular times.

In every period of the hiſtory of literature there may eaſily be marked a prevalence of particular ſtudies. In the early period, for inſtance, of Grecian literature, *mythological morality* claimed the chief attention of the philoſophers. In the more advanced ſtate of learning in Greece and in Rome, *poetry*, *hiſtory*, and *oratory*, held the pre-eminence. Under the latter emperors, and for ſome time afterwards, the hiſtory of *theological controverſies* occupied the greateſt part of the works of the learned. Next ſucceeded *metaphyſics*, and *metaphyſical theology*. Theſe gave place to *alchemy*, *magic*, *judicial aſtrology*, the doctrine of ſignatures and ſympathies, the *myſtic*, *theoſophic*, *and Roſicrucian theology*, with phyſiognomy. Such were the purſuits contemporary with the ſcience which is the object of our preſent inquiry. It is no matter of ſurpriſe, that, ſo aſſociated, it ſhould have fallen into contempt. It is not unuſual for mankind haſtily to reject valuable opinions, when accidentally or artificially connected with others which are abſurd and untenable. Of the truth of this remark, the hiſtory of theology, and the preſent tone of theological opinions in Europe, furniſh a pregnant example.

To phyſiognomy, and the exploded ſciences laſt mentioned, ſucceeded *claſſic philology*; which gave place to *modern poetry* and *natural philoſophy*; to which recently have been added the ſtudies of *rational theology*, *chemiſtry*, the *philoſophy of hiſtory*, the *hiſtory of man*, and the *ſcience of politics*.

11
The obſervations of the writers of the preſent century on this ſubject.

About the commencement of the eighteenth century, and thence forward, the occult ſciences, as they are termed, had declined very conſiderably in the eſtimation of the learned; and thoſe who treated of phyſiognomy forbore to diſgrace it by a connection with thoſe branches of ideal learning with which formerly it had been invariably conjoined. In Britain, Dr Gwither noticed it with approbation.—His remarks are publiſhed in the Philoſophical Tranſactions, vol. xviii.; and Dr Parſons choſe it for the ſubject of the Croonean lectures, publiſhed at firſt in the ſecond ſupplement to the 44th volume of the Philoſophical Tranſactions, and afterwards (1747) in a ſeparate treatiſe, entitled *Human Phyſiognomy explained*.

The obſervations, however, of theſe writers, as well as of Lanciſius, Haller, and Buffon, relate rather to the tranſient expreſſion of the paſſions than to the permanent features of the face and body. The well-known characters of Le Brun likewiſe are illuſtrative of the tranſient phyſiognomy, or (as it is termed) pathognomy.—See *Passions in Painting*.

12
We find nothing very important till the controverſy between Pernetty and Le Cat.

During the preſent century, although phyſiognomy has been now and then attended to, nothing of importance appeared on the ſubject till the diſcuſſion already mentioned between Pernetty and Le Cat, in the Berlin Tranſactions. The ſentiments of theſe authors, in ſo far as relates to the *definition* of phyſiognomy, have been above noticed. Their eſſays are beſides employed in diſcuſſing the following queſtions; *1ſt*, Whether it would or would not be advantageous to ſociety, were the character, diſpoſition, and abilities, of each individual ſo marked in his appearance as to be diſcovered with certainty?

2dly, Whether, on the ſuppoſition that by the higheſt poſſible proficiency in phyſiognomy, we could attain a knowledge in part only of the internal character, it would be advantageous to ſociety to cultivate the ſtudy, mankind being in general imperfect phoſiognomiſts?

No reaſoning *a priori* can poſſibly determine theſe queſtions. Time and experience alone muſt aſcertain the degree of influence which any particular acquiſition of knowledge would have on the manners and characters of mankind; but it is difficult to conceive how the *reſult* of any portion of knowledge, formerly unknown, and which mankind would be *permitted* to diſcover, could be any thing but beneficial.

13
Lavater's celebrated work.

Soon after this controverſy in the Berlin Tranſactions, appeared the great work of M. Lavater, dean of Zurich, which has excited no inconſiderable portion of attention in the literary world. The work itſelf is magnificent: that circumſtance, as well as the nature of the ſubject, which was ſuppoſed to be fanciful, have contributed to extend its fame; and certainly, if we may judge, the book, though many faults may be detected in it, is the moſt important of any that has appeared on the ſubject ſince the days of Ariſtotle. Lavater profeſſes not to give a complete ſynthetical treatiſe on phyſiognomy, but, aware that the ſcience is yet in its infancy, he exhibits fragments only illuſtrative of its different parts. His performance is no doubt deſultory and unconnected. It contains, however, many particulars much ſuperior to any thing that had ever before appeared on the ſubject.

With the ſcholaſtic and ſyſtematic method adopted by the phyſiognomiſts of the laſt and preceding centuries, Lavater has rejected their manner of writing, which was dry, conciſe, indeterminate, and general: his remarks, on the contrary, are for the moſt part preciſe and particular, frequently founded on diſtinctions extremely acute. He has omitted entirely (as was to be expected from a writer of the preſent day) the aſtrological reveries, and ſuch like, which deform the writings of former phyſiognomiſts; and he has with much propriety deduced his phyſiognomical obſervations but ſeldom from anatomical or phyſiological reaſoning. Such reaſoning may perhaps at ſome future period become important; but at preſent our knowledge of facts, although extenſive, is not ſo univerſal as to become the ſtable foundation of particular deductions. Lavater has illuſtrated his remarks by engravings; a method firſt adopted by Baptiſta Porta.—

Lavater's

Michael Schottus, Gaſpar Schottus, Cardan, Taiſnierus, Fludd, Behmen, Barclay, Claromontius, Conringius, the commentaries of Auguſtin Niphus, and Camillus Balbus on the Phyſiognomica of Ariſtotle,—Spontanus, Andreas Henricus, Joannes Digander, Rud. Groclenius, Alex. Achillinus, Joh. Prætorius, Jo. Belot, Guliel. Gratalorus, &c. They are noticed in the Polyhiſtor. of Morhoff. vol. i. lib. 1. cap. 15. § 4. and vol. ii. lib. 3. cap. 1. § 4.

Lavater's engravings are very numerous, often expreſſive, and tolerably executed.

14 His opinions the reſult of obſervation.

The opinions of this celebrated phyſiognomiſt are evidently the reſult of actual obſervation. He appears indeed to have made the ſcience his peculiar ſtudy, and the grand purſuit of his life. His performance exhibits an extended comprehenſion of the ſubject, by a particular attention to *oſſeal* phyſiognomy, and the effect of *profiles* and *contours*. His ſtyle in general is forcible and lively, although ſomewhat declamatory and digreſſive. His expreſſions are frequently preciſe, and ſtrikingly characteriſtic; and the ſpirit of piety and benevolence which pervade the whole performance render it highly intereſting.

15 His imagination has, however, often outſtript his judgement.

The defects of the work, however, detract much from the weight which Lavater's opinions might otherwiſe challenge. His imagination has frequently ſo far outſtript his judgment, that an ordinary reader would often be apt to reject the whole ſyſtem as the extravagant reverie of an ingenious theoriſt. He has clothed his favourite ſcience in that affected myſterious air of importance which was ſo uſual with his predeceſſors, and deſcribes the whole material world to be objects of the univerſal dominion of phyſiognomy*. He whimſically conceives it neceſſary for a phyſiognomiſt to be a well-ſhaped handſome man †. He employs a language which is often much too peremptory and deciſive, diſproportioned to the real ſubſtance of his remarks, or to the occaſion of making them. The remarks themſelves are frequently oppoſite in appearance to common obſervation, and yet unſupported by any illuſtrations of his.

16 Other weakneſſes of this great phyſiognomiſt.

Lavater certainly errs in beſtowing too great a reliance on ſingle features, as the foundation of deciſion on character. His opinions on the phyſiognomy of the ears, hands, nails, and feet, of the human ſpecies, on hand-writing, on the phyſiognomy of birds, inſects, reptiles, and fiſhes, are obviouſly premature, as hitherto no ſufficient number of accurate obſervations have been made, in regard to either of theſe particulars, to authorize any concluſion. He has erred in the oppoſite extreme, when treating of the important topic of national phyſiognomy, where he has by no means proſecuted the ſubject ſo far as facts might have warranted. We muſt farther take the liberty to object to the frequent introduction of the author's own phyſiognomy throughout the courſe of his work. His ſingular remarks on his own face do not ſerve to prejudice the reader in favour of his judgment, however much his character may juſtify the truth of them. We muſt regret likewiſe, for the credit of the ſcience, that the author's ſingularly fanciful theory of apparitions ſhould ſo nearly reſemble a revival of the antiquated opinions of the ſympathiſts.

To theſe blemiſhes, which we have reluctantly enumerated, perhaps may be added that high impaſſioned tone of enthuſiaſm in favour of his ſcience everywhere diſplayed throughout the work of this author, which is certainly very oppoſite to the cool patient inveſtigation befitting philoſophy. To that enthuſiaſm, however, it is probable that in this inſtance (as is, indeed, no unfrequent effect of enthuſiaſm) we are indebted for the excellency which the author has attained in his purſuit; and it poſſeſſes the ſalutary tendency of putting us on our guard againſt a too implicit acquieſcence in his phyſiognomical deciſions.

17 His work was attacked in the Berlin Tranſactions by M. Formey.

In the Berlin Tranſactions for 1775, there appears a formal attack upon Lavater's work by M. Formey. This eſſay we have already mentioned. After diſputing the propriety of the extenſive ſignification applied by Lavater and Pernetty to the term phyſiognomy, M. Formey adopts nearly the ſame definition which we conceive to be the moſt proper, and which we have put down as ſuch near the beginning of this article. He allows that the mental character is intimately connected with, and ſenſibly influenced by, every fibre of the body; but his principal argument againſt phyſiognomy is, that the human frame is liable to innumerable accidents, by which it may be changed in its external appearance, without any correſpondent change of the diſpoſition; ſo that it ſurpaſſes the extent of the ſkill of mortals to diſtinguiſh the modifications of feature that are natural from thoſe which may be accidental. Although, therefore, the ſcience of phyſiognomy may be founded in truth, he infers that the Deity only can exerciſe it.

M. Formey further contends, that education, diet, climate, and ſudden emotions, nay even the temperaments of anceſtors, affect the caſt of human features; ſo that the influence of mental character on theſe features may be ſo involved with, or hidden by, accidental circumſtances, that the ſtudy of phyſiognomy muſt ever be attended by hopeleſs uncertainty. Theſe objections are worthy of notice, but they are by no means concluſive.

18 Lavater's mode of treating his ſubjects.

We ſhall give a ſpecimen of M. Lavater's manner of treating the ſubject on the oppoſite ſide of the queſtion: a ſpecimen, not in Lavater's preciſe words, but conveying more ſhortly an idea at once of his ſentiments, and of his manner of expreſſing them.

19 Phyſiognomy is juſtly called a ſcience.

No ſtudy, ſays he, excepting mathematics, more juſtly deſerves to be termed *a ſcience* than phyſiognomy. It is a department of phyſics, including theology and belles letters, and in the ſame manner with theſe ſciences may be reduced to rule. It may acquire a fixed and appropriate character; it may be communicated and taught.

Truth or knowledge, explained by fixed principles, become ſcience. Words, lines, rules, definitions, are the medium of communication. The queſtion, then, with reſpect to phyſiognomy, will thus be fairly ſtated. Can the ſtriking and marked differences which are viſible between one human face, one human form, and another, be explained, not by obſcure and confuſed conceptions, but by certain characters, ſigns, and expreſſions? Are theſe ſigns capable of communicating the vigour or imbecility, the ſickneſs or health, of the body; the wiſdom, the folly, the magnanimity, the meanneſs, the virtue, or the vice, of the mind?

20 Experiment is limited in extent.

It is only to a certain extent that even the experimental philoſopher can purſue his reſearches. The active and vigorous mind, employed in ſuch ſtudies, will often form conceptions which he ſhall be incapable of expreſſing in words, ſo as to communicate his ideas to the feebler mind, which was itſelf unable to make the diſcovery: but the lofty, the exalted mind, which ſoars beyond all written rule, which poſſeſſes feelings and energies reducible to no law, muſt be pronounced unſcientific.

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* Vol. I. p. 33—38. Vol. II. p. 89. French tranſlation.

† Vol. I. p. 126.

21 Phyſiognomical truth may be defined and communicated to a certain length.

It will be admitted, then, that to a certain degree phyſiognomical truth may as a ſcience be defined and communicated. Of the truth of the ſcience there cannot exiſt a doubt. Every countenance, every form, every created exiſtence, is individually diſtinct, as well as different, in reſpect of claſs, race, and kind. No one being in nature is preciſely ſimilar to another. This propoſition, in ſo far as regards man, is the foundation-ſtone of phyſiognomy. There may exiſt an intimate analogy, a ſtriking ſimilarity, between two men, who yet being brought together, and accurately compared, will appear to be remarkably different. No two minds perfectly reſemble each other. Now, is it poſſible to doubt that there muſt be a certain native analogy between the external varieties of countenance and form and the internal varieties of the mind? By anger the muſcles are rendered protuberant: Are not, then, the angry mind, and the protuberant muſcles, as cauſe and effect? The man of acute wit has frequently a quick and lively eye. Is it poſſible to reſiſt the concluſion, that between ſuch a mind and ſuch a countenance there is a determinate relation?

Every thing in nature is eſtimated by its phyſiognomy; that is, its external appearance. The trader judges by the colour, the fineneſs, the exterior, the *phyſiognomy* of every article of traffic; and he at once decides that the buyer "has an honeſt look," or "a pleaſing or forbidding countenance."

22 This knowledge, however improved, would not be detrimental to man.

That knowledge and ſcience are detrimental to man, that a ſtate of rudeneſs and ignorance are preferable and productive of more happineſs, are tenets now deſervedly exploded. They do not merit ſerious oppoſition. The extenſion and increaſe of knowledge, then, is an object of importance to man: and what object can be ſo important as the knowledge of man himſelf? If knowledge can influence his happineſs, the knowledge of himſelf muſt influence it the moſt. This uſeful knowledge is the peculiar province of the ſcience of phyſiognomy. To conceive a juſt idea of the advantages of phyſiognomy, let us for a moment ſuppoſe that all phyſiognomical knowledge were totally forgotten among men; what confuſion, what uncertainty, what numberleſs miſtakes, would be the conſequence? Men deſtined to live in ſociety muſt hold mutual intercourſe. The knowledge of Man imparts to this intercourſe its ſpirit, its pleaſures, its advantages.

23 It affords great mental gratification.

24 Difficulties in the ſtudy.

Phyſiognomy is a ſource of pure and exalted mental gratification. It affords a new view of the perfection of Deity; it diſplays a new ſcene of harmony and beauty in his works; it reveals internal motives, which without it would only have been diſcovered in the world to come. The phyſiognomiſt diſtinguiſhes accurately the permanent from the habitual, the habitual from the accidental, in character. Difficulties, no doubt, attend the ſtudy of this ſcience. The moſt minute ſhades, ſcarcely diſcernible to the unexperienced eye, denote often total oppoſition of character. A ſmall inflexion diminution, lengthening or ſharpening, even though but of a hair's breadth, may alter in an aſtoniſhing degree the expreſſion of countenance and character. How difficult then, how impoſſible indeed, muſt this variety of the ſame countenance render preciſion? The ſeat of character is often ſo hidden, ſo maſked, that it can only be detected in certain, perhaps uncommon, poſitions of countenance. Theſe poſitions may be ſo quickly changed, the ſigns may ſo inſtantaneouſly diſappear, and their impreſſion on the mind of the obſerver may be ſo ſlight, or theſe diſtinguiſhing traits themſelves ſo difficult to ſeize, that it ſhall be impoſſible to paint them or deſcribe them in language. Innumerable great and ſmall accidents, whether phyſical or moral, various incidents and paſſions, the diverſity of dreſs, of poſition, of light or ſhade, tend to diſplay the countenance often in ſo diſadvantageous a point of view, that the phyſiognomiſt is betrayed into an erroneous judgment of the true qualities of the countenance and character. Such cauſes often occaſion him to overlook the eſſential traits of character, and to form a deciſion on what is purely accidental.—How ſurpriſingly, for inſtance, may the ſmallpox disfigure the countenance, and deſtroy or confound, or render imperceptible, traits otherwiſe the moſt deciſive?

25 May one day be obviated.

We ſhall, then, continues Lavater, grant to the oppoſer of phyſiognomy all he can aſk; and yet we do not live without hopes that many of the difficulties ſhall be reſolved which at firſt appeared inexplicable.

26 The nature of Lavater's work.

He then proceeds to a ſpecific illuſtration of his ſubject under a great variety of titles, in which he treats of human nature in general, and of each particular feature ſeparately.

To enumerate the different diviſions of his book would not be more ſatisfactory to our readers than the peruſal of the *contents* of the book itſelf; and an attempt to epitomize even the eſſential ſubſtance of the vaſt multiplicity of matter contained in his eſſays, (which are yet only *fragments*, and to which indeed he himſelf does not pretend to give any higher appellation), would extend this article to a diſproportionate length. Such an abridgement, after all, would convey no ſolid information on a ſubject which merits all the time and ſtudy that an attentive peruſal of Lavater's works at large would require.

27 Probable cauſes of the diſrepute into which this ſcience has fallen.

From the hiſtorical deduction of the literary progreſs of phyſiognomy which we have thus attempted to lay before our readers, it appears, that although the ſcience has fallen into diſrepute, there can ſcarcely be mentioned a period in which any cultivation of ſcience took place when phyſiognomy was not likewiſe the ſtudy, nay ſometimes even the profeſſion, of men of the moſt eminent abilities and the greateſt learning.

The reaſons why at preſent ſo little attention is paid to the ſubject probably are,

1ſt, That it has been treated in conjunction with ſubjects now with propriety exploded: And,

2dly, That it has been injured by the injudicious aſſertions and arguments of thoſe who have undertaken its defence.

Sometimes, however, the wiſe and the learned may err. The uſe of any thing muſt not be rejected for no better reaſon than that it is capable of abuſe. Perhaps the era is not diſtant when phyſiognomy ſhall be reinſtated in the rank which ſhe merits among the valuable branches of human knowledge, and be ſtudied with that degree of attention and perſeverance which a ſubject deſerves ſo eſſentially connected with the ſcience of man.

That there is an intimate relation between the diſpoſitions

28 There is a relation between the diſpoſitions of the mind and the features of the face.

poſitions of the mind and the features of the countenance is a fact which cannot be queſtioned. He who is ſinking under a load of grief for the death of an affectionate wife or a dutiful child, has a very different caſt of features from the man who is happy in the proſpect of meeting his miſtreſs. A perſon boiling with anger has a threatening air in his countenance, which the moſt heedleſs obſerver never miſtakes; and if any particular diſpoſition be indulged till it become habitual, there cannot be a doubt but that the correſponding traces will be ſo fixed in the face as to be diſcernible by the ſkilful phyſiognomiſt, under every effort made to diſguiſe them. But when we attempt to decide on a man's intellectual powers by the rules of this ſcience, we are often deceived; and in this reſpect we have reaſon to believe that Lavater himſelf has fallen into the groſſeſt miſtakes.

PHYSIOLOGY,

1 Definition.

IS a Greek word, which, in ſtrict etymology, ſignifies that which diſcourſes of nature: but in its common uſe, it is reſtricted to that branch of phyſical ſcience, which treats of the different functions and properties of living bodies; while by living bodies are meant thoſe which are by a certain organized ſtructure enabled to grow and propagate their kind.

By this definition, phyſiology muſt neceſſarily have for its object the explanation of that internal organical economy in plants and animals, which nature has deviſed for the preſervation of the individual, and for the continuance and propagation of the ſpecies.

2 Diviſion.

It is naturally divided into two kinds, particular and general. The former treats of the properties and functions of the individual or ſpecies, as may be ſeen in the article ANATOMY; the latter is the ſubject of our preſent diſcuſſion, and treats of thoſe functions and properties which are general or common to all living bodies.

3 Utility of phyſiology.

To the genuine naturaliſt no ſubject preſents ſuch a field of amuſement and inſtruction. When as complete as the ſtate of cotemporary ſcience will admit, it will exhibit a general reſult of all thoſe experiments and obſervations that have purpoſely been made or occaſionally contributed to illuſtrate the phenomena of animated matter; and when it ſhall reach that ſummit of perfection to which the efforts of genius may carry it, it may be enabled to diffuſe a light, of which the naturaliſt of the preſent day can have no juſt or adequate conception: Particularly in phyſic, anatomy, botany, and in natural hiſtory, its happy effects may be numerous and great. On many occaſions it may there introduce order for confuſion, certainty for doubt; and may be expected to enthrone ſcience in various places which are now occupied by fancy and conjecture.

4 Its near approach to metaphyſics, and the difference pointed out.

Of all the branches of phyſical ſcience it certainly makes the neareſt approach to the region of metaphyſics; but yet there is a difference between theſe, though it may not be very eaſy to point out the preciſe line of termination. Phyſiology, as already defined, being that ſcience which has for its object the organical economy of living bodies, the word organical, we think, here ſhould mark the diſtinction.

Preliminary obſervations.

Wherever the economy of living bodies indicates deſign, and cannot reſult from any combination or ſtructure of organs, it muſt be ſuppoſed the effect of ſomething different from matter, and whoſe explanation belongs to that which is called *metaphyſics*, or which we might term the *philoſophy of mind*. By aſcribing indeed to the glandular contents within the cranium and to that fiction animal ſpirits, the motives of action, the ſuperficial and ill informed may have been led to an opinion that perception, memory, and imagination, are the functions of the cerebrum, the medulla oblongata, and cerebellum; that the ſoul is a conſequence of organization; and the ſcience which treats of it only a particular branch of phyſiology. But mind and its faculties are now ſo well underſtood and inveſtigated, that this opinion can ſeldom prevail but where penetration is not remarkable for its acuteneſs, or where reflection, reading, and reſearch, have long been confined within the limits of a narrow circle.

Inſtead of mind being the effect of organization, we readily allow that every living ſyſtem of organs ſuppoſes mind, and that in the ſtudy of ſuch ſyſtems the phyſiologiſt muſt often meet with many phenomena that are leſs ſingular than ſimple perception, and yet for which he cannot account by any knowledge which he poſſeſſes of organic powers. This truth we partly acknowledge, when, like ancient Athens erecting her altars to unknown gods, we retreat to thoſe aſylums of ignorance, the vis inſita, the vis nervea, the vis vitalis, the vis medicatrix, and a number of others of the ſame kind.

5 The bounds of phyſiology, and the conſequences of not attending to them.

We chooſe here to mark preciſely the bounds of phyſiology, becauſe we have always been led to imagine that it would be extremely fortunate for ſcience that all its diviſions were accurately defined, that each were reſtricted to its own ſphere, where alone it is uſeful and were never allowed to make encroachments on the province of another, where its only tendency can be to miſlead and ſubvert all ideas of arrangement.

In its progreſs of improvement, phyſiology has been much and often retarded from a want of attention to this circumſtance. The time has been when its place was occupied almoſt entirely by an abſurd and ridiculous philoſophy, which accounted for every thing by an hypotheſis, and which pretended to cure wounds a hundred miles diſtant by a power of ſympathy.

6 Introduction of logic into phyſiology.

Nay, as if its nature were not yet aſcertained, in ſome books whoſe titles promiſe much information on the functions of organs, we meet with only a pleaſing account of deſign and intelligence, and a few leſſons, when the fancy is warm, how to exclaim and how we ſhould wonder; or, after ſimilar profeſſions in the titles of others, we are preſented with only a curious diſplay of the art of logic. To a fact or two we ſee numerous chains of reaſoning appended. On theſe chains are hanging important and general concluſions; and theſe concluſions afterwards uniting, ſuſpend an elaborate ſyſtem of pathology. The whole has a wonderfully ſpecious appearance; but upon applying the touchſtone of experiment, the ſyſtem falls, the concluſions turn out to be falſe, the chains are found connected with the fact by only a conjecture or ſome popular opinion of the time; moſt of their links are creations of fancy, and their joinings ſuch logical aſſociations as have no analogy or prototype in nature.

7 And of mathematics.

Inſtead of logic, however, a pompous parade of mathematical learning has been *ſometimes* introduced. This has always an impoſing aſpect, and its preſence here may require to be examined with ſome care. It muſt be allowed, that it would have indeed been rather ſurpriſing if logic and metaphyſics had been employed, and mathematics carrying ſcience in their name had not been thought of. Their character had always been deſervedly high; and there was ſcarcely a department of knowledge to which they had not in ſome reſpect contributed their aid: their reſearches, too, had not been confined to mere number and quantity alone; they had explained the momentum of bodies, and all thoſe motions which ariſe from percuſſion and gravitation; they had aſcertained the diſtance of the ſtars the velocity, magnitude, and orbits of the planets; they had accounted for the phaſes of the moon, the phenomena of eclipſes, and return of comets; and bringing their knowledge from the heavens to the earth, they had ſhown the cauſes of the days and nights, of the years and the ſeaſons, in all their varieties throughout the globe: they had taught the chronologer how to diſpoſe of the periods of time, and how he might beſt aſſiſt the hiſtorian to arrange his events: they had pointed out the origin of tides; had informed the mariner how to direct his courſe through the ocean; and had taught the geographer how to deſcribe the regions of the earth, and aſſiſt the traveller in his laudable purſuits after knowledge and ſcience: they, in ſhort, had unfolded the wonders of mechaniſm; and, diffuſing light over every branch of that philoſophy which is called *mechanical*, and has long been dignified with the name of *natural*, had afforded the fineſt ſpecimens of reaſoning with which the human mind is acquainted.

8 Introduced by Bellini.

A ſcience of ſuch diſtinguiſhed utility could hardly fail to excite the admiration of all who knew it, or even had heard of it. And at a period when it was faſhionable, it was ſcarcely poſſible for the phyſiologiſt to paſs it unnoticed: the truth is, he very ſoon diſcovered its excellency. Bellini of Florence firſt introduced it; and it was at laſt ſo warped with phyſiology, that there were ſome who could hardly conceive a phyſiology exiſting without it.

9 Extended by Borelli.

The juſtly celebrated Profeſſor Borelli, one of its moſt enthuſiaſtic admirers, employed it ſo well in ſhowing how the muſcles acted as ropes and the bones as levers, that he thence explained with the happieſt effect the phenomena of ſtanding, of walking, of leaping, of flying, and of ſwimming, in different animals: this taſk he performed in the firſt part of his famous work *De Motu Animalium*. But, wiſhing to know more of the animal economy, and feeling himſelf inſpired with new hopes, he ventured in the ſecond to explain alſo in the ſame way the interior motions and their proximate cauſes on the principles of mechaniſm: he there gives a minute account of the motion of the muſcles, of the heart and its pulſation, of the circulating blood, of the office of the lungs, the kidneys, and the liver, of the nervous fluid and the ſeminal ſecretion; of vegetation, generation, nutrition, of hunger and thirſt, of pain, of laſſitude, and the heat of fever.

Mathematics by him were conſidered as almoſt univerſal interpreters; for except the mechanical he ſeemed to acknowledge no other ſecondary powers in nature. He thought, with Plato, that God himſelf was always geometriſing; and was fully perſuaded that phyſical knowledge could not be acquired but through the medium of geometrical demonſtrations and forms. Theſe opinions had begun to be general, when his learned work was publiſhed at Rome in the year 1676; and they were no unequivocal ſymptoms that the reigning philoſophy of that time was now in the laſt ſtage of decay.

Still, however, as the ſpirit of that philoſophy was not wholly extinguiſhed, phyſiology continued to be much infeſted with its metaphyſical and logical diſputes, and with its phyſical doctrines of forms of particular ferments, its antipathies, ſympathies, its occult qualities, and ſubtile atoms.

10 By Pitcairn, and others.

For theſe reaſons, in his inaugural diſſertation at Leyden, delivered in the year 1692, the learned Pitcairn expreſſes a wiſh that medicine were made a diſtinct ſcience; that it were eſtabliſhed on mechanical principles, on fewer poſtulates, and more data; and that it was ſupported by a clear train of mathematical reaſoning, which would defy the attacks of the ſophiſt, and which would not be liable to the fluctuations of opinion and prejudice. Theſe ſentiments were warmly ſupported by the great Boerhaave, who, in his aphoriſms, has founded his reaſonings on the ſtructure of the parts and the laws of mechanics, and to whom an edition of Borelli was dedicated in 1710.

11 Abuſed,

Pitcairn, however, was not content with barely expreſſing his wiſhes. Seeing with regret that the ſtate of medicine could never be improved as long as it was connected with the philoſophy which was then in faſhion, be ſeemed anxious to effect a ſeparation; and for ſuch a ſtep he wiſhed to have only ſome plauſible pretext. This pretext *was not long wanting*; and was, to be ſure, one of the moſt whimſical that could have well preſented itſelf to his fancy. It occured to him that the ſtudy of medicine was prior to philoſophy; that it had begun its courſe with aſtronomy, at the time when diſeaſes were ſuppoſed the conſequence of offended Deity; that all along, as it had ſhared the fate of aſtronomy, and had equally ſuffered in the common diſgrace of judicial aſtrology, it was highly reaſonable, in his opinion, that it ſhould ſtill follow the fate of its friend; that it ſhould be eſtabliſhed on ſimilar principles, and ſhould be demonſtrated by that reaſoning which might experience the ſhock of ages without being moved. So attached was he to the geometrical mode of demonſtration, that in his diſſertations he appeared to conſider it as indeed the only ſpecies of evidence, excepting the ſenſes, that could be relied on. But here he was certainly venturing too far; ſo raſh an opinion, and on which had he previouſly conſulted with prudence, might have been ſuppreſſed, was fatal to his cauſe. We muſt here therefore date the commencement of thoſe attacks to which his ſyſtem was afterwards expoſed. Such an indiſcreet ſpecies of pedantry was but ill calculated to procure a generally favourable reception for a book with ſo extraordinary a title as the *Phyſico-*

12 Rejected.

mathematical Elements of Medicine. Many learned and ingenious men, the greater part of whoſe knowledge had depended chiefly on the evidence of teſtimony, were now diſpoſed to examine, with a ſteady and awakened eye, his boaſted demonſtrations. The conſequence was that which might have been expected: the reſult of their inquiries was wholly inauſpicious to thoſe new applications of geometry; they found that his facts and experiments were few, that his poſtulates were endleſs, and that no mathematical reaſoning whatever could extract truth from a falſe hypotheſis, or could fairly deduce a general concluſion from particular premiſes. The Doctor, they obſerved, had impoſed upon himſelf, in imagining that either certainty or truth was naturally inherent in any mere geometrical forms; theſe forms, they ſaid, had been often abuſed: Plato had thought them ſomewhat divine; the ſuperſtitious had employed them as charms; Pythagoras had made them the ſymbols of his creed; and even in the writings of the learned profeſſor himſelf they frequently ſerved no other purpoſe but to give an air of importance to trifles; to beſtow on error the appearance of ſcience; and to give a ſimple and a trite remark the look of reſearch, and of acute and profound erudition.

13 Perhaps too raſhly.

It is unneceſſary to recal here the ſatyrical wit, or more properly the ſcurrilous abuſe, with which this ſyſtem and its author were treated. The mechanic phyſiology has now ſunk into ſuch contempt, that the moſt illiterate affect to ſmile at the mention of its name; they ſeem to forget, or, what is more probable they never knew, that it once was honoured with the great names of Borelli, Boerhaave, and Newton; and their reading perhaps cannot inform them that it was a noble ſtep to improvement; that it explained the ſtructure of the eye, the movement of the bone, and force of the muſcle, and that it may yet perhaps be the means of many intereſting diſcoveries in the living body: diſcoveries, however, which Heaven will reſerve for other minds than thoſe which it makes merely to receive the impreſſions of the day.

14 Introduction of chemiſtry.

A frequent miſtake into which the mechanical philoſophers had fallen, was their hopes of being able to account for digeſtion by the muſcular force and action of the ſtomach. The more they reaſoned from this ſuppoſition, the more widely they wandered from the truth. A thought of Valliſneri, that in acting mechanically, the ſtomach was as liable to be affected as its contents, gave a hint to Reaumur. On this hint he began immediately a ſet of experiments; and from a number that were clear and deciſive, concluded that digeſtion was performed by a ſolvent. Here was a fair introduction to chemiſtry; the action of ſolvents was never yet ſatisfactorily explained by mechanic powers. A new era therefore commences; and chemiſtry now, in phyſiological inveſtigations, holds that place which was formerly poſſeſſed by geometry and mechanics.

15 Chemical inveſtigations.

16 Diſcoveries concerning ſalts.

Nor is chemiſtry undeſerving of this rank. From a ſmall beginning, and from modeſtly profeſſing to obſerve merely the different phenomena which are the effects of heat and of mixture, it has riſen like aſtronomy to the firſt eminence among the ſciences. By its numerous reſearches it has found widely diffuſed over nature a variety of ſingularly active bodies, which are called *ſalts*. Of theſe ſalts it has noticed ſome which change a blue vegetable tincture into green, and others which change that tincture into red: the former of theſe it has called *alkalis*, and the latter are known by the name of *acids*. It has obſerved, that when acids, and alkalis are brought into contact, and either of them nearly in a fluid ſtate, they encounter with violence, efferveſcence and heat, and form a ſalt, which being neither acid nor alkaline, is called *neutral*. It has been remarked that all theſe ſalts, whether volatile or fixed, whether fluid or concrete, have each permanently uniform characters; and that, though ſometimes blended in a mixture, or made to evaniſh in a ſolution, yet when they are ſeparated they reſume their taſte, their ſmell, their colour, and their form, and exhibit, as before, the ſame power in diſſolving earths, metals, and ſtones, and in making inflammable bodies to ſmoke, to kindle and explode with a loud noiſe. All, however, act not alike upon all bodies; thoſe acids which diſſolve iron remain quite harmleſs upon gold. And chemiſtry here has been led to obſerve that particular ſalts ſhow a preference for particular bodies, that there is in them an appearance of choice, and that their character is never to be known but by ſtudying their different elective attractions.

17 Gaſes.

Beſides ſalts, chemiſtry of late has alſo diſcovered a number of bodies that are ſtill more wonderful, ſtill more active, and ſome of them at leaſt ſtill more widely diffuſed over nature. Theſe are certain aeriform fluids which are called *gaſes*: theſe gaſes, like the mind itſelf are diſcernible only by their effects; all are elaſtic, and all are combined with the principle of heat. Their kinds are various; ſome are inflammable, ſome are ſaline and ſoluble in water, ſome are neither the one nor the other, and ſome diſtinguiſhed by the name of *airs*, maintaining combuſtion and reſpiration: their importance is ſuch that there is not a ſingle proceſs in chemiſtry, nor perhaps one regular proceſs in nature, "in which the phenomena of the diſengagement or fixation of heat and the diſengagement or fixation of elaſtic fluids, are not obſerved either ſeparately or together." Two of theſe fluids compoſe water, two the nitric acid, two ammonia, and three of them are found in atmoſpheric air; one of them is thought, with a good deal of reaſon, to be the alkaligenous principle in bodies, and two of them to be the conſtituents of oil: the principle of acidity is already known to be one of the two which compoſe water. The ſame fluid oxidates metals, ſupports flame during combuſtion, communicates heat to the circulating blood, and maintains life in the act of reſpiration.

By that knowledge which it thus has acquired of ſalts and of gaſes, by its more ingenious modes of analyſis, and by ſome diſcoveries which it has made concerning the nature of heat and of light, chemiſtry is now able to account for many phenomena that before were inexplicable. In France particularly it has been recently extending its reſearches with a good deal of ardour towards the phenomena of both the animal and vegetable kingdoms: it has there found its ſalt and its gaſes, its heat, and its light, active and buſy.

18 The food of plants.

It is more than a century ſince it obſerved that plants were nouriſhed by pure water and atmoſpheric air; that from theſe alone they derived their extracts, their mucilage, their oil, their coal, their acids, their alkalis, and aroma. But ſince the diſcovery of different kinds of elaſtic fluids, it has farther remarked that they grow rapidly in hydrogenous gas (A), and in air mixed with carbonic acid; that aſſiſted by light their leaves abſorb hydrogene from water, carbone from the acid of which they are ſo fond; and thus decompoſing the one and the other, diſengage from both the oxigenous principle or vital air, and reſtore to the atmoſphere ſalubrity and health.

19 Animal powers.

20 Electricity and magnetiſm.

Leaving vegetables, which, by analyſis in cloſe veſſels and in red-hot pipes, it has reduced to hydrogene, oxigene, azote, and charcoal, it has made diſcoveries no leſs important in the animal kingdom. It has found that the food of the nobler animals, which immediately or remotely is prepared by vegetables, is generally acted upon by a ſolvent: it has proved by experiment that the animal organs can fix azote; can decompoſe atmoſpheric air; can form lime, iron, and carbonic acid, as well as vegetables, produce a number of ſaline ſubſtances, which no art could detect in their food. Nor is it here that ſuch diſcoveries are meant to terminate; theſe ſeemingly creative powers of vegetation and of animalization, with other phenomena in the ſtructure and economy of living bodies, chemiſtry imagines that it will yet be able to explain. We may ſafely venture, however, to predict that ſomething more than its preſent knowledge of the various effects of heat and of mixture will in this caſe be found neceſſary to enſure ſucceſs. The late diſcovery of elaſtic fluids and their ſingular properties afford the ſtrongeſt reaſons to ſuſpect that we yet may be ignorant of many agents which nature employs in the functions of bodies. But whatever be the truth, we are almoſt certain that theſe agents diſcovered by the chemiſts are not alone concerned. Electricity, magnetiſm, and what have been called animal electricity and animal magnetiſm, muſt not be excluded from acting ſome part. The growth of plants, it is well known, is conſiderably affected by the electrical ſtate of the atmoſphere; it is ſenſibly promoted by a proper uſe of the vegeto-electrometer, and has been ſaid to indicate a difference between the negative and poſitive electricities, whether theſe be kinds or ſtates of the fluid. Such too is our preſent knowledge that electricity as yet ſeems the only cauſe to which we can aſcribe the ſeeming chemical affinities of the dew; its conſtant practice in avoiding ſome bodies its predilection for others, and particularly its attachment to the living points of plants and of leaves: nor is this electricity wholly unconnected with the animal kingdom; when we think of its ſingular fondneſs for points, it occurs that one intention of our hairs may probably have been to collect and diffuſe it. It is plainly excited in croſs rubbing the hair of ſome animals, and when we wear ſilk, it is frequently accumulated upon the ſurface of our own bodies.

The iron found in plants and in animals is certainly ſomewhat of a ſtriking circumſtance, and cannot be denied to be one reaſon why magnetiſm ſhould not be wholly overlooked.

21 Animal electricity,

As for animal electricity, or what has been called ſo, it is now, we believe, generally allowed to hold an important place in the ſyſtem. It is very perceptible in all thoſe nerves which are ſubſervient to voluntary motions; nor is it limited to theſe alone. In ſeveral inſtances where metals were applied to the nerves of the heart, which nature has deſtined to ſpontaneous motions, they were ſeen to awaken the dormant powers in the muſcular fibres of that viſcus. We here ſpeak only of the nerves; but the Torpedo, the Gymnotus electricus, and Silurus electricus, poſſeſs a particular ſtructure of organs for collecting this fluid, for diſcharging it at pleaſure, and for giving a ſhock. If thoſe who are accuſtomed to the common kind of electrical experiments, may at firſt be ſurpriſed that this electrical fluid in the animal is not diſcharged from the nerves by water, or any other metallic conductor that is pure and unmixed, another fact, which is fully as ſtriking, though it has not been hitherto mentioned by any obſerver known to us, appears to merit equal attention: Cut away the leg of a frog, uncover a part of the crural nerve, place the limb now on a table on which an electrifying machine is working, you will ſee the muſcles ſtrongly convulſed at every ſpark which you draw from the conductor, but remaining motionleſs upon the diſcharge of the Leyden phial.

22 And animal magnetiſm,

Animal electricity naturally ſuggeſts animal magnetiſm. This laſt has been productive of more wonders in the human frame than all the preceeding agents together. Under the management of Meſmer at Paris, and his pupil Deſlon, it filled all who obſerved its effects with ſurpriſe and aſtoniſhment. It ſeemed to unhinge the powers of the mind, and affect the whole animal economy; it excited the moſt extraordinary emotions; it rouſed and allayed the different paſſions; it changed averſion into love, and love into averſion; it created pain, it healed wounds, and cured diſeaſes as if by enchantment.

Theſe diſcoveries were made by a quack, who knew not the cauſe by which he produced ſo ſingular appearances. The celebrated Franklin, who firſt ſuppoſed that the electrical fluid was the lightning, was placed at the head of thoſe gentlemen who declared that this ſpecies of magnetiſm was the ſame power that had long been known under the name of *imagination*.

This laſt diſcovery, if the bluſhing pride of modern philoſophy could but ſtoop to improve an important hint, though originally ſuggeſted an by empiric, might greatly enlarge our knowledge of mind, and explain ſome things in the animal economy which appear yet to require a ſolution. At any rate, it ſufficiently proves that the influence of mind is very extenſive in the higher parts of animal creation. Many facts would argue that it increaſes as we riſe in the ſcale: but the ſole intention here was to ſhow, that chemical agents are neither almighty nor every where preſent; that in the internal organical economy of living bodies they act but a part; and that, like the other agents in nature, they are obliged to confine their operations within thoſe limits which the great Author of being has preſcribed.

23 The uſe of anatomy in phyſiology,

The aid which anatomy affords to phyſiology is now to be conſidered. Phyſiology in general and the ſtudy

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(A) Hydrogenous gas acts with more energy than any other ſubſtance in diſſolving carbone; it mixes with carbonic acid and with azote, and ſometimes holds in ſolution ſulphur and phoſphorus. See Fourcroy's Diſcourſe on modern chemiſtry.

ſtudy of anatomy are ſo cloſely connected, that, as Haller imagined, they can hardly be ſeparated even in idea. In his opinion, the man who ſhould attempt to become a phyſiologiſt without anatomy, would act as wiſely as the mathematician who, without ſeeing the wheels or the pinions, or without knowing the ſize, the proportions, or the materials of any machine, would yet preſume from mere calculation to determine its powers, its properties, and uſes. In this compariſon, the importance of anatomy, we are really perſuaded, is not repreſented in a light to ſtrong; nor does that medium through which it has been viewed appear to have magnified beyond nature.

24 Anatomy a diſtinguiſhed branch of human knowledge.

Whether art or ſcience, anatomy is one of thoſe eminent accompliſhments without which no one is able to proſecute his ſtudies with half that pleaſure and ſucceſs which he might in either the animal or vegetable kingdoms. Having been always accuſtomed to aſſign it one of the higheſt and moſt honourable places among thoſe branches of human knowledge which are ſtyled liberal, we muſt be excuſed if we dwell a little in expoſing an attempt to convert it to a craft.

25 The illiberality of ſome of its profeſſors.

It is with ſurpriſe, and a mixture of regret, that we ſee a writer of diſtinguiſhed merit wiſhing thus to degrade it, and ſeeking to confine it as well as phiſiology to that profeſſion which chanced to be his own. The dignity of a ſcience, which he conſidered as his glory and pride, ſhould have certainly extinguiſhed in a generous mind the low and diſguſting policy of his trade. It is indeed with reaſon that he thinks it unfortunate, "that thoſe who, from the nature of their education, are beſt qualified to inveſtigate the intricacies, and improve our knowledge of the animal economy, are compelled to get their living by the practice of a profeſſion which is conſtant employment." We lament the miſfortune as much as he can; but we reaſon not from it in the ſame way. Inſtead of complaining that "idle profeſſional men," particularly "of the church, ſhould become philoſophers and phiſiologiſts as it were inſtinctively," we are happy to learn that men of enlightened and cultivated minds are thus ſo readily diſpoſed to aſſiſt us; that nature conducts them as it were by inſtinct; and that happily they enjoy all that leiſure which is deemed ſo neceſſary for ſuch an undertaking. The genius of ſome, and the liberal education which they all muſt have had opportunities of acquiring, by no means impreſs us with any unfavourable ideas of their aid.

Our author allows them to look through microſcopes and examine the red globlules of the blood: They may too, he ſays, view animalculæ, and give us a candid relation of what they ſee; but ſhould not preſume to carry their reaſoning into a ſcience of which they can know nothing, or hope to throw light on a ſubject which it is impoſſible they can underſtand. But to ſpeak freely, after conſidering the great phyſiological diſcovery of Prieſtley, with reſpect to *reſpiration*, the moſt important probably, not even excepting that of the *ſyſtem of abſorbents*, that the ſcience has witneſſed in the preſent age, we ſee no grounds for preſcribing ſuch laws or fixing ſuch limits: and although he may treat the illuſtrious Reaumur and Abbé Spalanzani as nothing more than makers of experiments, and declare a reſolution to place no confidence in thoſe which are made by *gentlemen* and *prieſts*; he will not certainly deny that others have as well as he a juſt right to think for themſelves.

Were ſuch ſentiments to become univerſal, it is difficult to ſay what would be the conſequence. In Britain, the law and the church require from their members a formal certificate, that, beſides the profeſſional they have alſo attended ſome literary claſſes at the univerſity. To their medical claſſes boys are admitted from the ſhop and from the ſchool, and may afterwards paſs the two colleges of ſurgeons and phyſicians, by exhibiting a little ſkill in their art, or at leaſt by paying the ſtated fees. On theſe accounts, being anxious already for the fate of a profeſſion which they reſpect, and conſidering the degeneracy to which it is expoſed, not they hope the degeneracy into which it is ſinking, they ſhould be ſorry to ſee it deprived of that reſpectability which it may derive from the countenance of men poſſeſſing general literature and ſcience.

It is very true, that gentlemen and prieſts may not be anatomiſts; and not a few anatomical diſputes might ſeem to inſinuate, that perſons may be very eminent anatomiſts without being either gentlemen or prieſts. Still, however, there is nothing incompatible in thoſe characters; and, were we to judge from their writings, it was certainly a thing of which Bacon, Newton, and Locke, never dreamed, that the ſtudy of the prieſt, or the mere circumſtance of being a gentleman, was to blunt their acuteneſs for phyſical reſearch, or in after times to affect their reputation as men of genius.

"When men have begun to reaſon correctly (ſays Dr Hunter), and to exerciſe their own judgment upon their obſervations, there muſt be an end to deluſions. Many doctrines of old phyſicians and of old women will meet with proper contempt; the tyranny of empty pomp and myſtery of phyſic will be driven out of the land, and forced to ſeek ſhelter among leſs cultivated ſocieties of men."

If the learned profeſſions wiſh to be reſpected, let them reſpect each other: for our part we eſteem them all: and whatever aſſiſtance either they or others may afford to phyſiology, they may be aſſured that they will not find us anywiſe diſpoſed to detract from its merit. Diveſted of prejudice, we value as highly the diſcovery of Prieſtley, which explains reſpiration, as if it had come from Albinus or Haller; and with as much readineſs acknowledge obligations to the celebrated painter Leonardo da Vinci, as if he had been a doctor of phyſic. See ANATOMY, p. 667.

But while we are thus impartial to others, we would not be unjuſt to profeſſional anatomiſts. Their learning, their patience, and ardour, have been great; and candour obliges us to aſſert their claim to the moſt numerous and important diſcoveries that have yet been made in phyſiological ſcience. The pains which they have taken, the prejudices which they have ſurmounted, and thoſe feelings which they have ſacrificed in deſcribing the parts of the dead body, place their labours beyond all praiſe.

26 Their labours and diſcoveries.

But their diſcoveries have not been confined to a mere knowledge and deſcription of parts. In the ſtill fabric, juſt as in a time-piece or a broken orrery without motion, the whole preſents a very confuſed and even an unintereſting appearance. In this caſe, ſhould the man of reflection happen to aſk, where are the organs of the different functions? all would be ſilence, and nothing would be found to make a reply to ſuch an inquiry. The arterial ſyſtem is relaxed and empty; the muſcular fibre cannot be rouſed; the heart has ceaſed from its wonted beatings; and the nerve refuſes to convey ſenſations. On this ſcene the eye of the anatomiſt could not be expected to dwell long with much ſatisfaction. Curioſity would induce him to look beyond it, and ſtudy the deſign. He would ſoon perceive, that to know the uſes of the ſeveral parts, they muſt be ſeen alive and in action. But here new difficulties would ariſe, and feelings of compaſſion would exclaim againſt any farther purſuit. The natural zeal, however, of inquiry, the good of mankind, and the love of ſcience in a generous mind, are not eaſily reſiſted.

To his laſting praiſe, and the ſingular improvement of true phyſiology, the anatomiſt has examined the living body, and has there obſerved, that all motion proceed immediately from the muſcular fibre; that the muſcular fibre again derives its power from the nerve, which terminates in the brain; that fibre, and nerve, and the whole ſyſtem, are nouriſhed by the blood which comes from the heart; and that the waſte of blood is ſupplied by the lacteals, which abſorb nutritious matter from the food as it paſſes along the inteſtinal canal.

He has alſo obſerved, that the blood, which is in continual motion, has a circular courſe; that other veſſels along with the lacteals are employed to abſorb; and by means of injection has ſhown the route of the different fluids as clearly in the dead as they could have been ſeen in the living ſubject.

When his eyes have failed in tracing objects that were too minute for unaided ſight, he has called in the help of the microſcope, and diſcovered the red globules of the blood, animalculæ in the ſemen, and the anaſtomoſes of the arteries and veins; and when the microſcope could lead him no farther, he has had recourſe to chemical analyſis, and made diſcoveries equally important in demonſtrating the bodies which compoſe the ſeveral fluids and the ſolids.

Beſides theſe ſervices which the anatomiſt has rendered to phyſiology, the ſcience is likewiſe greatly indebted to him for thoſe various and ingenious methods which he has taken to diffuſe his knowledge. Whatever has occurred remarkable or rare, he has ſtudied to preſerve either dried or in fluids that reſiſt putrefaction. By corroding the parts which he has injected in a certain acid, he has given an idea of the vaſcular ſyſtem, which is at once inſtructive and elegant. Where it has been neceſſary to deſtroy the parts when incapable of preſervation, or where the preſervation would have been expenſive, he has not neglected to repreſent them in models of wax, or to perpetuate them in accurate caſts of lead or of ſtucco: and, laſtly, that the valuable fruits of his labours might not be confined in his room of preparations or to his pupils, he has deſcribed moſt of them in drawings, has multiplied his drawings by correct engravings; he has even publiſhed his numerous engravings, and to render them intelligible, has illuſtrated each with copious explanations.

27
The views of the anatomiſt often too confined.

From this account it might be ſuppoſed that the anatomiſt has done all that can be reaſonably expected from him. If we drew, however, ſuch a concluſion, we might certainly be charged with precipitation. His views have hitherto been too confined, nor have they been directed with all that ſkill which a rational and comprehenſive phyſiology would require. As if chiefly guided by the rant of the poet, that "the nobleſt ſtudy of mankind is man," he has cultivated his art principally with an eye to medicine and ſurgery; and while he has diſſected the human body with a tedious minuteneſs, he has ſeldom looked into thoſe of brutes but when he has wiſhed to illuſtrate a theory or eſtabliſh an hypotheſis.

28
Obſtacles in the way of a more liberal ſtudy of anatomy.

As ſome apology for ſuch a conduct, there is indeed but little immediate or pecuniary advantage to be derived from comparative anatomy; and thoſe who have heard of the fox and the grapes will readily perceive, that few will be diſpoſed to commend a ſcience which reflects not much credit on their knowledge, and which they are led from ſentiments of pride to treat as either contemptible or uſeleſs. The deciſive tone and affected air of ſuperior diſcernment being not unuſually a very tender part of the character, they often form that mark of diſtinction which is ſeldom reſigned but with the utmoſt degree of reluctance. It is, however, allowed, that any oppoſition from theſe cauſes ought not to frighten an aſpiring genius. His nobler mind ſhould look beyond pecuniary proſpects; and he ought to have fortitude enough to deſpiſe the ſneers and malevolence of pompous ignorance. The other difficulties which he has to encounter in his own eſtimation may not be ſo ſmall.

29
The want of a nomenclature.

In ſeeking to enlarge the field of inquiry, he will ſoon experience that he wants a language, or at leaſt a nomenclature fitted to expreſs the different objects which muſt neceſſarily occur in his reſearches. He will find too that he wants thoſe proper claſſifications of the animal kingdom, which are equally neceſſary both to abridge and direct his labours.

30
Origin of the anatomical nomenclature.

The firſt nomenclature of the anatomiſt was formed upon the diſſection of brutes; and moſt of its terms, as the *rete mirabile*, are now uſeleſs, or tend to miſlead thoſe who employ them in their diſſections of the human body. The few of its parts which ſtill are retained, as the different names and diviſions of the gut, are much more applicable to the uſual appearances in certain quadrupeds, than to any thing which we meet with in man.

This firſt nomenclature declined with the ſtudies which gave it birth, and with the decline of that ſuperſtition which permitted no other ſtudies of the kind. Since the days of Veſalius the human body has been chiefly diſſected; and the nomenclature which has thence ariſen, and has ſince been aſſuming the form of a language, if adapted at all, is peculiarly adapted to that ſubject. Were we now therefore diſpoſed to examine the internal economy of animals in general, we ſhould ſee at once that the preſent nomenclature is as ill ſuited to comparative anatomy as the former nomenclature was to the diſſection of the human body. The ſeveral facts which confirm this aſſertion are but too numerous. To give one or two: In a late work, *The Phyſiology of Fiſhes*, the celebrated author is obliged to inform his reader in a note, that when he makes uſe of the following terms, ſuperior, inferior, anterior, and poſterior, the fiſh is ſuppoſed to be ſtanding erect, in the attitude of man: and in his ingenious *Contemplation on Nature*, Bonnet, beſides the abſurd practice of calling nerve by the name of marrow, has been pleaſed to obſerve that in certain inſects the ſpinal marrow

row is not in the ſpine, but in the oppoſite ſide of the body, running longitudinally along the breaſt.

31 Defects of the preſent nomenclature.

Applying occaſionally this nomenclature to the ſmall number of birds and quadrupeds which we have diſſected, it was much ſtrained with reſpect to their ſkeletons. Even forced analogy could not bring it to expreſs many diſtributions of the nerves and blood veſſels; and when it was employed in naming the muſcles, in moſt caſes it turned out to be uſeleſs or abſurd.

We were firſt led to obſerve its defects on hearing of the nameleſs bones of the pelvis, called the os ilium, the os iſchium, and the os pubis, united behind by an os ſacrum, which is tipped with a coccyx or bone of a cuckow: we thought it likewiſe ſomewhat remarkable to find a goat, a boat, and a conch ſhell, among the external parts of the ear; and within the tympanum a hammer and its ſhaft, a ſtithy, a ſtirrup, and a periwinkle. But theſe defects were moſt ſeriouſly felt in raiſing the different muſcles of a dog, and comparing them ſeverally with Albinus's tables. Theſe tables and muſcles, to our great ſurpriſe, did not reflect that mutual light upon one another which we expected. To obtain here more accurate ideas we got the comparative myography of Douglas. At one glance the etymological table of this work demonſtrated the confuſion and the imperfection of the nomenclature. In his, as in other books of myography, the muſcles are explained by deſcribing their origins, inſertions, and uſes: but the table ſhows, that their names are never, excepting only in a few caſes, derived from any of theſe three circumſtances, which in every deſcription are uniformly noticed in all muſcles. Their names on the contrary are frequently taken from their particular form and appearance in the human body, or from thoſe circumſtances which are conſtantly varying in every animal; juſt as if muſcles of the ſame origin, inſertion, and uſe, ſhould in all animals have a ſimilar colour, a ſimilar mode of inſertion and origin, a ſimilar compoſition and variety of parts, a ſimilar courſe and direction of fibres, a ſimilar figure and ſhape, a ſimilar paſſage through certain places, a ſimilar proportion with reſpect to one another, or ſhould be formed of a ſimilar ſubſtance.

If we paſs to the membranes, as expreſſed in this nomenclature, we ſhall not diſcover that their names are more philoſophical. A perioſteum covers the bones, a pericranium the ſkull; the cavity of the thorax is lined with a pleura, that of the abdomen with a peritoneum; and what is ſurely ſomewhat remarkable, bones which are hollow have a perioſteum on their inſide: the membranes in the ſkull are by way of diſtinction denominated *mothers;* the one which lies next to the cranium is the dura mater or hard-hearted mother, while that which immediately enwraps the brain is the mater pia or the affectionate mother.

Of all the terms, however, that occur, the cavity of the ſkull contains the moſt extraordinary collection: we there meet with a Turkiſh ſaddle and with the feet of a ſea-horſe, with a ring, with a lyre, with a ſickle, with a bridge, with a writing pen, and a wine preſs. A few of theſe names belong to the ſubſtance of the brain itſelf: where one part is called from its hardneſs the callous body, another from ſome fancied analogy the medullary ſubſtance, and a third from being on the outſide is named the corticle, and from its colour the cineritious. Theſe are not all: there are beſides footſtalks of the cerebrum and cerebellum; the thighs and arms and fore and hind legs of a grand diviſion, the medulla oblongata; there is alſo a vault and two or three pillars, one pair of ſtriated bodies, two beds, and a couple of horns; ſome cavities which, from a ſuppoſed reſemblance to ſtomachs are called ventricles choroid coats; two bodies, named from the olive, two from a pyramid, and one from a vine, which is chiefly remarkable for having once been thought the reſidence of the ſoul. At ſome diſtance in the cerebellum we are however pleaſed to meet with a name that is ſomewhat elegant, the *tree of life*. In this there is a degree of refinement, which muſt ſtrike one as it comes unexpectedly. The following names are in the loweſt ſtyle of obſcenity: they are wormlike and mamillary proceſſes, they are nates, teſtes, an anus, and a vulva; which, in order to ſave the bluſhes of our readers, we ſhall leave in the language in which they were conceived. A ſingular part is placed immediately under a funnel, and is named from its uſe the pituitary gland; it was meant originally to ſecrete a phlegm, but it holds that office now as a ſinecure (B).

Ridiculous and whimſical as many of theſe appellations are, they generally have ſome alluſion to their ſubject, and are by no means the moſt exceptionable in this nomenclature. The names of diſcoverers which have been impoſed upon various parts, contain no deſcription at all; and the only purpoſe which they can ſerve is not to promote the intereſt of ſcience, but to immortalize the anatomiſts. As many of thoſe have not been more than inſenſible to fame, they or their friends have taken the freedom to introduce parts to our notice, not by telling us what is their nature, but by demonſtrating who was the firſt that obſerved them. Upon reading therefore the catalogue of names that occur in anatomy, one would imagine that many of theſe ingenious diſſectors had ſuppoſed themſelves not the diſcoverers but the inventors of ſeveral parts in the animal economy. In our vaſcular ſyſtem is the ring of Willis, the vein of Galen, and the large wine-preſs of Herophilus. We have in our brain the bridge of Varolius; and in our nerves we poſſeſs the property of various diſcoverers. The holes of Vidius, and the caverns of Highmore, are in our bones; ſome ſmall muſcles in the ſole of our foot is the fleſhy maſs of Jacobus Sylvius; a part of our eye is the membrane of Ruyſch; and in thoſe caſes where they are to be found, Couper lays claim to particular glands; two canals from our mouth to our ears are the tubes of Euſtachius;

(B) That our readers may judge whether or not theſe names be fairly tranſlated, we ſubjoin the originals here in a note. In the ear, *tragus, ſcapha, concha, malleus, incus, ſtapes, cochlea:* in the cavity of the ſkull, *ſella Turcica, pedes hippocampi, annulus Williſii, pſalloides vel lyra, falx duræ matris, pons Varolii, calamus ſcriptorius, torcular Herophili, corpus calloſum, ſubſtantia medullaris, ſubſtantia corticalis vel cinerea, pedunculi cerebri et cerebelli, femora, brachia, crura anteriora et poſteriora medullæ oblongatæ, fornix, corpora ſtriata, thalami nervorum opticorum, cornua nervorum opticorum, corpora olivaria, corpora pyramidalia, glandula pinealis, arbor vitæ, tubercula mamillaria, appendices vermiformes.*

chius; the duct of our pancreas is the right of Virſungus; Poupart has a ligament almoſt in our groin; a lobe of our liver belongs to Spigelius; and the female would certainly ſtare at being told, that among the diſtinguiſhing marks of her ſex are the tubes of Fallopius, a tench's mouth, and ſeveral veſtiges of the devil's teeth *.

32
The perſons moſt apt to perceive theſe defects.

The man who will readily obſerve the effects of this nomenclature is not he who has learned it already, and who no longer is acquiring his ideas through its imperfect and confuſed medium; nor is it he whoſe ſtudies are confined to the human body, the particular ſubject on which it was formed: He who will ſenſibly feel its inconvenience is the young anatomiſt, who muſt receive his knowledge through its channel, commit its vocables to his memory, and uſe them afterwards in recalling his ideas. Another who muſt ſoon perceive its failings, is he who engages in comparative anatomy, and who is anxious to extend his views beyond that which the fooliſh indolence of conceited bombaſt has called the *microcoſm*. A third will be he who has remarked the numerous ſynonymes which different authors have thought themſelves warranted to ſubſtitute in place of the old terms: for theſe repeated attempts at amendment are a ſtrong proof of that eſtimation in which it is held by the anatomical writers in general: And, laſtly, that man cannot heſitate long to paſs upon it a condemnatory ſentence, who, like Wilkins, Locke, Condillac, and Reid, is a perſon of extenſive and profound reflection, who is well acquainted with the intimate connection between accurate expreſſions and accurate ideas; who knows how much the improvements of language are able to facilitate the progreſs of ſcience; or who has experienced the wondrous effects that have already reſulted from the example and labours of Linnæus, and particularly from the new nomenclature in chemiſtry, which can hardly be too much valued and admired.

33
Hints reſpecting a new nomenclature.

Our intention here is not to ſuggeſt a particular plan for any new anatomical nomenclature: the ſtate of our knowledge may in this reſpect be yet too imperfect, and perhaps it may be neceſſary to ſee more of the animal economy, before we ſhould venture on ſuch an undertaking. We may however, in general, obſerve, that this nomenclature, like the languages of nations, ought not to be formed with any view to an individual, a ſpecies, or genus; and after that be careleſsly extended by fanciful analogies to new objects, and from theſe again be extended to others; thus making metaphor to ſpring out of metaphor without end, until the original figure be loſt, and revived and loſt again, times without number. It ought to contain as many as poſſible of thoſe terms which, underſtood in their primary ſenſe, might apply to the whole animal kingdom and living bodies, without any metaphorical expreſſions, if, in deſcribing the taſtes and colours, ſuch expreſſions can be avoided. Inſtead of the words anterior, poſterior, inferior, and ſuperior, which are perpetually ſhifting their meaning with a change of attitude, it ought to have words of one conſtant invariable import, expreſſing the regions of the head and the back and their two oppoſites. Theſe terms, with right and left, would be found in anatomy to anſwer nearly the ſame purpoſe that the degrees of longitude and latitude, or the points of the compaſs, do in geography. Every part would then be conſidered as lying within or as pointing to ſix different regions, the right, the left, the head, the back, and their two oppoſites. If more particular deſcriptions were wanted, the definitive terms might then be taken from the more immediately ſurrounding parts; thus giving an account of the ethmoid bone, D'Azyr borrows the definitive words from the regions of the cranium, the ſincipital, baſilar, facial; and occipital; or from the regions in immediate contact, the cerebral, palatine, naſal, and ſphenoidal.

If an object attainable, this momenclature too ſhould be derived from one origin, and not like the preſent be a wild incoherent Babyloniſh gibberiſh of a number of mixtures. It ought to aim at conveying its ideas with clearneſs and preciſion, and yet fully, conciſely, and promptly. In point of ſimplicity it ought to ſtudy the eaſe of the memory in receiving, retaining, and in recollecting. To prevent a needleſs multiplicity of terms, it ought to avoid puerile minutiæ, which ſerve no end but to render deſcription tedious and confuſed; it ought to avoid ſuch trivial diviſions, as thoſe of the gut into duodenum, jejunum, ileum; or thoſe of the artery into ſubclavian, axillary, brachial; and, laſtly, it ought to be formed on a plan containing certain rules of conſtruction for giving names not only to parts already diſcovered, but to thoſe parts which are ſtill unknown, or which diſtinguiſh individual and ſpecies.

In impoſing names, it might perhaps be of ſome advantage to examine not only together, but ſeparately, the great conſtituent parts of the ſyſtem; as the bones, the ligaments, the cartilages, the muſcles, the membranes, and the glands; the nervous, the ſanguiferous, and abſorbent ſyſtems; and all theſe with their properties and uſes perſpicuouſly arranged. How far a regularity in compoſition, and an uniform variety of terminations, might be of uſe in this momenclature, can beſt be conjectured from their great importance in the new philoſophical language of chemiſtry.

It has been obſerved, that ſuch a nomenclature, to encourage and aſſiſt the comparative anatomiſt, is ſtill wanting; and it alſo was remarked, that we yet are unacquainted with proper claſſifications of animals, peculiarly fitted to direct and abridge the anatomiſt's labour, and to ſatisfy the inquiries of the phyſiologiſt.

34
The preſent phyſiological arrangements too confined.

Our preſent phyſiological arrangements are, like our momenclature, principally ſuited to the human body. To take our inſtance from the celebrated Haller, he begins his Outlines with the ſimple fibre, and the cellular texture, of which he is anxious to compoſe as many of the ſolids as he can. He then proceeds to more of the organs, deſcribing with great erudition and care their different uſes and ſtructure in man. Theſe organs, however, which he deſcribes, and thoſe analagous with reſpect to their ſtructure, are confined to a part of the animal creation. As different claſſes of the animal kingdom have with ſimilar functions varieties of organs, and as one function is conſequently performed in different ways, it is evident that organs ought not to form the general diviſions in any phyſiological ſyſtem of arrangement, becauſe we ſhould then have a new arrangement for every new ſpecies of organs. Of this truth Haller and others have not been ignorant. They have alſo divided their ſubject into functions;

35
Two kinds of arrangement according to the functions, or according to their organs.

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* Morſus diaboli.

functions; but ſtill they are functions in the manner performed by the human body. This body has engroſſed ſo much of phyſiology, that we often ſee the functions explained with ſcarcely any alluſion to their organs; as theſe are ſuppoſed to be always the ſame, and already known from the uſual diſſections.

36
Haller's phyſiology refers chiefly to the human body.

Haller's phyſiology is profeſſedly that of the human body. His conduct here was ſeemingly the effect of general cuſtom: it did not ariſe from any contempt of comparative anatomy. There have been few who eſteemed it ſo highly, who have ſtudied it more, or applied it ſo ſkilfully. He declares that there are many parts of our bodies whoſe functions can never be fully explained, unleſs we examine their ſtructure in quadrupeds, in birds, in fiſhes, and even in inſects; though he therefore had diſſected of human ſubjects to the number of 350, yet the number which he diſſected of brutes, and what is more, diſſected alive, was much greater. Numerous, however, as were his diſſections, they were too confined for general phyſiology. That requires a range more extenſive; and, to ſhorten the labour different claſſifications of animals from any of thoſe to be uſually met with. This aſſertion hardly needs a proof.

37
Zoological and phyſiological arrangement.

There is nothing more certain, than that were the anatomiſt to diſſect animals as they occur in the ſyſtem of Linnæus, or any other naturaliſt, his toil would be immenſe, and the knowledge which he thence would acquire of functions would ſcarcely be found to bear to it even the ſmalleſt proportion. By this obſervation we mean not to object to thoſe ingenious claſſifications which Linnæus and others have employed to facilitate the ſtudy of zoology. All their claſſifications may be uſeful; and many diſplay that extent and clearneſs of comprehenſion, that diſtinguiſhing acuteneſs, and that laudable ardour for the intereſt of ſcience which ought to render their authors immortal, and intitle them to the gratitude of future ages. Yet theſe ſyſtems are formed with a view different from that which principally ought to direct the phyſiologiſt. They were meant to contain a full enumeration of the objects of zoology ſo far as known; to exhibit them arranged in different claſſes and ſubordinate diviſions, according to ſuch obvious and diſtinct marks as might ſtrike at a glance, or appear on a curſory examination. To him who is entering on the ſtudy of zoology, they ſhow at once the extent of his ſubject; they elevate his mind by the grandeur of the proſpect; and when better employed than in pleaſing the fancy or in rouſing the rapturous feelings of a poet, they draw his attention to thoſe ſignificant and marked ſigns in which the language of nature is written. They aſſiſt his judgment in the art of arrangement, and give to his memory a power of recollection which it had not before. To the natural hiſtorian they perform a ſervice equally important, if not eſſential, to his undertaking: to him they ſupply the place of chronology; and inſtruct his readers by the chain of connection which they give to his thoughts, and by that perſpicuity which they invariably beſtow on his language.

38
Difference between them.

Theſe arrangements, however, with all their advantages, are not the arrangements which the phyſiologiſt would wiſh the anatomiſt to obſerve in his diſſections. They are certainly uſeful in ſtudying the manners, diſpoſitions, and habits of different animals, and all that part of the outward economy which indicates ſomething of their wiſdom and deſign. But they little illuſtrate that internal ſtructure on which this outward economy is founded, or tend to explain the more ſecret functions which, not depending on the will of the creature, only diſplay the power and omniſcience of him who made it. This conſequence is eaſily conceived, from conſidering the difference between zoology and what has been here defined phyſiology. Zoology is chiefly led to examine the animal kingdom as it uſually preſents itſelf to the eye, including a great variety of objects; phyſiology only that ſingle part of the animal economy which is chiefly made known by anatomy and chemiſtry. Zoology has been wont to divide its kingdom into ſo many claſſes or orders of animals; phyſiology would naturally divide its economy into ſo many functions. Zoology has ſubdivided its claſſes by certain obvious and exterior marks, as the teeth and the claws; phyſiology would naturally ſubdivide its functions by the many varieties of thoſe organs which are deſtined to perform them, as the different kinds of lungs and of ſtomachs. Zoology but curſorily mentions the functions as forming a part of the hiſtory of animals; phyſiology takes notice of animals only when they are of uſe to illuſtrate its functions. From this compariſon it will readily appear, that things which are primary in a zoological will often be ſecondary in a phyſiological ſpecies of arrangement; and that things which are primary in a phyſiological will often be no more than ſecondary objects in a zoological. This is very conſpicuouſly the caſe in one of the grand diviſions of Linnæus into mammalia, where the important ſecretory organs of the milky fluid are noticed only, like the colour of hair or the length of a tail, as a good outward mark of diſtinction; and likewiſe in the excellent table of D'Aubenton, where the function of digeſtion is not even alluded to at all; although he had complained that there was more of art than of nature in the common arrangements, that claſſification by outward marks had confounded things of a different ſtructure, and that the leſſer diviſions ſhould be made only by marks relating to the functions.

Preliminary observations.

39
Daubenton's arrangement,

ANIMALS.							
With a Head.							The most part without a Head.
Nostrils.						Without Nostrils.	
Ears.						Without Ears.	
Two ventricles in the Heart.			One Ventricle in the Heart.			The Heart variously formed or unknown.	
Warm Blood.			Blood nearly cold.			A whitish Fluid instead of Blood.	
Inspiration and Exspiration of the Air at short Intervals.			Inspiration and Exspiration of the Air at long Intervals.		Admission of Air by Gills.	Admission of the Air by Spiracula.	No apparent Entrance to admit air.
Viviparous.		Oviparous.					
With Teats.		Without Teats.					
1st Order. QUADRUPEDS.	*2d Order.* CETACEOUS ANIMALS.	*3d Order.* BIRDS.	*4th Order.* OVIPAROUS QUADRUPEDS.	*5th Order.* SERPENTS.	*6th Order.* FISHES.	*7th Order.* INSECTS.	*8th Order.* WORMS.
Four Feet and hairy Skin.	Fins and no Hair.	Feathers.	Four Feet and no hair.	Scales without Feet or Fins.	Scales with Fins.	Antennæ.	Neither Feet nor Scales.

Preliminary observations.

It is plain from this table, and from what we have mentioned concerning **Haller**, that it would be injuſtice to anatomiſts and naturaliſts to ſay they have never paid any attention to the phyſiological modes of arrangements. It can only be ſaid that they have not paid to them all that attention which they deſerve; and that no general phyſiological ſyſtem of arrangement, excepting D'Azyr's, has, ſo far as we know, been yet attempted.

40 Whence materials might be collected for a phyſiological arrangement.

How ſuch an arrangement ought to be made is eaſily deſcribed, though by no means very eaſily executed. It needs not a proof that functions ſhould form its primary diviſions; that its ſubdiviſions ſhould be the varieties of theſe functions; that the whole ſhould be both diſtinguiſhed and explained by the kinds and varieties of thoſe organs, by which they are performed; that the deſcriptions of theſe organs might partly be collected from the ſeveral works of natural hiſtorians and comparative anatomiſts, as from the diſſections of the French academy, from numerous fragments of the *Curieux de la Nature*, from the collections of Blaſius and Valentini, from the writings of Haller, from the works of the celebrated Hunters and Monros, from the publications of Hewſon and Cruikſhank, and thoſe who have lately been making diſcoveries in the ſyſtem of abſorbents. D'Azyr has mentioned a great many more. He particularly recommends Perrault, Du Verney, Collins, and D'Aubenton, on Birds and Quadrupeds; Charas, Roeſel, and Fontana, on Reptiles; Ray and Willoughby, Artedi, the Gouans, and Brouſſonet, on Fiſhes; Swammerdam, Malpighi, and Reaumur, the Geoffroys, Bonnet, and Lyonnet, on Inſects; and, laſtly, the curious reſearches of Willis, Ellis, and Donati; of Trembley, Baker, Baſter, and Boadſch; of Forſkal, of Adanſon, of Muller, Pallas, Spalanzani, and Diquemare, concerning Worms, Zoophytes, and Polypes. Where any errors are to be corrected, or where any deficiencies are to be ſupplied, it is needleſs for us to obſerve that recourſe muſt be had to new examinations and to new diſſections, where it may be of ſome uſe to attend to the foods of animals, to their places of abode, and their modes of life, as circumſtances leading to ſome internal varieties of ſtructure. To the liſt of authors we might have added Campſer on Fiſhes; and we ſhould not forget the excellent writings of D'Azyr himſelf, whoſe table of phyſiological arrangement is a work of merit that beſpeaks reflection, ingenuity, and labour, and which follows here, with only a ſmall variation in form.

41 D'Azyr's arrangement.

A TABLE *of the* FUNCTIONS *or* PROPERTIES *of* LIVING BODIES.

1. DIGESTION.
2. NUTRITION.
3. CIRCULATION.
4. RESPIRATION.
5. SECRETION.
6. OSSIFICATION.
7. GENERATION.
8. IRRITABILITY.
9. SENSIBILITY.

Every body in which one or more of theſe functions are obſerved is to be conſidered as poſſeſſing organization and life.

1 DIGESTION.	Living Bodies	Which have	One or more ſtomachs, eaſily diſtinguiſhable from the œſophagus and inteſtinal canal,	Man. Quadrupeds. Cetaceous animals. Birds. Cruſtaceous animals.
			A ſtomach diſtinguiſhable only by certain expanſions from the œſophagus and inteſtinal canal,	Oviparous quadrupeds. Serpents. Cartilaginous fiſhes. Fiſhes properly ſo called.
			An alimentary canal, not diſtinguiſhable into œſophagus, ſtomach, and inteſtines,	Inſects. Worms. Zoophytes.
			Neither ſtomach nor inteſtines,	Plants.
2 NUTRITION.	Living Bodies	Whoſe nutritious juices are abſorbed	By veſſels beginning from internal cavities,	Man. Quadrupeds. Cetaceous animals. Birds. Oviparous quadrupeds. Serpents. Cartilaginous fiſhes. Fiſhes properly ſo called. Inſects. Cruſtaceous animals. Worms.
			By veſſels opening upon the external ſurface,	Plants.

Preliminary obſervations.

Preliminary obſervations.

3 CIRCULATION.	Living Bodies	With blood	Having a heart with two ventricles and two auricles,	Man. Quadrupeds. Cetaceous animals. Birds.
			With one ventricle divided into ſeveral cavities and two auricles,	Oviparous quadrupeds. Serpents.
			With one ventricle and one auricle,	Cartilaginous fiſhes. Fiſhes properly ſo called.
		With a whitiſh fluid	Whoſe heart is formed of one longitudinal veſſel, tuberous and contractile, in which there is a whitiſh fluid inſtead of blood.	Cruſtaceous animals. Inſects. Worms. In ſome cruſtaceous animals there is obſerved ſomething reſembling a heart.
		With juices	In which no heart has been yet obſerved, but only veſſels filled with juices of a nature different from that of blood,	Zoophytes. Plants.
4 RESPIRATION.	Living Bodies	Which reſpire	By lungs free from all adheſion, and ſpongy,	Man. Quadrupeds. Cetaceous animals.
			By lungs free from all adheſion, veſicular, and muſcular,	Oviparous quadrupeds. Serpents.
			By lungs adhering to the ribs, and provided with appendages,	Birds.
			By gills of different forms,	Cartilaginous fiſhes. Fiſhes properly ſo called. Cruſtaceous animals.
			By ſtigmata or holes in different rings,	Inſects. Earth worms.
			By an opening called trachea, or by external fringes,	Aquatic worms.
			By tracheæ,	Plants.
			In which there have been diſcovered neither ſtigmata nor tracheæ,	Polypes.
5 SECRETION.	Living Bodies			There are no bodies in which ſecretions are not carried on.
6 OSSIFICATION.	Living Bodies	Whoſe ſkeleton is	Internal and oſſeous,	Man. Quadrupeds. Cetaceous animals. Birds. Oviparous quadrupeds. Serpents. Fiſhes properly ſo called.
			Internal and cartilaginous,	Cartilaginous fiſhes.
			External and corneous,	Perfect inſects. Lithophytes.
			External and cretaceous,	Cruſtaceous animals. Shell fiſh. Madrepores. The greateſt part of Zoophytes.
			External and ligneous,	Plants.
			Which have no ſkeleton,	Inſects in their firſt ſtate. Worms. Polypes.

7 **GENERATION.**	Living Bodies	Which are	Viviparous,	Man. Quadrupeds. Cetaceous animals.
			Oviparous, whether the evolution of the eggs takes place within or without the female.	Birds. Oviparous quadrupeds. Serpents. Cartilaginous fiſhes. Fiſhes properly ſo called. Inſects. Cruſtaceous animals. Worms. Plants.
			Which propagate by ſlips,	Worms. Polypes. Plants.
8 **IRRITABILITY.**	Living Bodies	Which have	A body muſcular or contractile,	Greateſt part of inſects in the firſt ſtate of their transformation. Worms. Polypes.
			Muſcles covering the ſkeleton,	Man. Quadrupeds. Cetaceous animals. Birds. Oviparous quadrupeds. Serpents. Cartilaginous fiſhes. Fiſhes properly ſo called.
			A ſkeleton covering the muſcles,	Perfect inſects. Cruſtaceous animals.
			No muſcular power; no ſpontaneous movements,	Plants.
9 **SENSIBILITY.**	Living Bodies	Which have	Nerves and brain eaſily diſtinguiſhable from the ſpinal marrow,	Man. Quadrupeds. Cetaceous animals. Birds. Oviparous quadrupeds. Serpents. Cartilaginous fiſhes. Fiſhes properly ſo called. Inſects.
			Nerves and brain ſcarcely diſtinguiſhable from the ſpinal marrow,	Cruſtaceous animals. Worms.
			In which there have not yet been diſcovered nerves or brain, or ſpinal marrow,	Zoophytes. Plants.

42
Difference between mineral, vegetable, and animal.

The above table, which has its diviſions marked by the functions, and their kinds and varieties by the kinds and varieties of thoſe organs by which they are performed, differs conſiderably from a zoological. Borrowing its ſeveral marks of diſtinction from internal characters, it more clearly demonſtrates the difference between the mineral, vegetable, and animal, than any ſyſtem that attempts to arrange by outward appearances.

No minerals, whatever be their forms or the regularity and beauty of their figures were ever ſaid to poſſeſs any thing like organs of nutrition; and however frequently ſome may recover their loſt ſhapes, they are never ſuppoſed either to produce, or aſſiſt in producing, their own kind by generative powers. And no plants, however much may be ſaid of animals that want a nervous ſyſtem and a heart, and are fixed, without the power of locomotion, to one place; we ſay no plants, though ſome may repreſent a few of the ſimpler effects of ſenſation, and others may be free to float through the ocean, were ever ſaid to diſcover any ſigns of voracity, to poſſeſs any thing reſembling a ſtomach, to diſtend their body by ſwallowing their food, to apply their food to the mouths of abſorbents opening internally; and when the nutritious juices were extracted, to eject it *in cumulo*. It has been ſaid that zoophytes preſent ſimilar penomena. But what are zoophytes? One half of their name would imply that they are animals, and another half would inſinuate that they are plants. D'Aubenton reaſons with clearneſs on this ſubject. True, ſays he, the greateſt part of them are branched like plants, and like plants are compoſed of concentric circles. Some have a ſoft exterior ſubſtance which is called, bark, and a hard interior which is called wood. Along their branches, and at their extremities, they put forth veſicles which reſemble buds; and when a part falls from the whole, it is ſufficient, like a vegetable ſlip, to produce a zoophyte: but do theſe appearances prove that they are plants?

If ramifications conſtitute a plant, then many cryſtallizations will be plants; the ſhootings of froſt on our windows will be plants; the ſilver tree of Diana a plant; our veins will be plants, our arteries plants; and our very feet which ramify into toes, and our hands into fingers, will have ſome title to be called plants. The truth is, ramification is not univerſal in the vegetable kingdom; and although it be general, it is no more peculiar to plants than ſwimming is to fiſhes or flying to birds. If concentric circles conſtitute a plant, ſome bones of animals will then be plants, and ſome minerals muſt alſo be plants. The wood and the bark are only two metaphorical expreſſions, which with equal propriety might have been uſed of the bone and perioſteum. But once ſuppoſe the zoophyte a plant, it was natural to carry on the analogy and certainly neceſſary to have it provided with wood and bark; though it muſt be allowed that a corneous ſubſtance is not what we commonly mean by bark, nor an evidently hard calcareous ſubſtance what we mean by wood. The ſmall veſicles, except in appearance have no ſimilarity to buds or fruits: they are the reſidences of ſmall polypes, to whom the whole ſtructure has been owing, by whom the whole either is now or has been inhabited, and to whom it anſwers the ſame purpoſe as the ſhell does to teſtaceous animals.

43
Difference between living bodies and machines.

After thus endeavouring to point out the boundaries between the mineral, the plant, and the animal (A), before we begin to treat of the functions, we muſt alſo take notice of another diſtinction; the want of which has occaſioned much unneceſſary trouble, and has given riſe to not a few ridiculous diſputes. This is the diſtinction between living bodies and ſome ingenious contrivances of art, which are called machines. It has not been aſſerted that any machine can either grow or propagate its kind; that it can aſſimilate the particles of matter that come in contact; that it is able to repair the injuries which it may ſuffer; that it can accommodate itſelf to circumſtances, can create heat when the cold is keen, or cold when the heat becomes too violent: yet it has been ſuppoſed, from eſtabliſhed prejudices, and from the ſucceſſive evolution of parts in plants and in animals, that there is an analogy between a machine and a living body. The living body has been called a machine; and notwithſtanding the acknowledged truth of that obſervation ſo often repeated ſince the days of Hippocrates, That the whole is a circle, that nothing is firſt and nothing laſt in the animal economy, we are ſtill talking as if living bodies were nought but machines; we are ſtill reaſoning as if their parts had exiſted in ſucceſſion, had acted in ſucceſſion, were combined in ſucceſſion; we are ſtill ſeeking for what is prior and what is poſterior, for what is derived and what is original in point of ſtructure, as if we were examining a work of art; we ſpeak gravely of the viſcera, of the thorax deriving a coat from the membranous pleura, the abdominal viſcera from the peritoneum, and the branches of nerves deriving a pair from the dura and pia mater of the head; we argue with people who maintain that faſciæ are nervous expanſions, and the muſcles themſelves but nervous productions: and although we be hardly able to conceive how the brain could be nouriſhed without blood drawn from the heart, or the heart move without the aſſiſtance of nerves from the brain, we are ſtill diſputing about which was prior and which was poſterior in point of exiſtence; a diſpute that will probably terminate as ſoon as that of the ancients, whether the firſt eggs were from birds, or the firſt birds were hatched out of eggs.

44
The vital organs ſeemingly coeval in point of exiſtence.

45
Functions form a circle.

Theſe dark and inſcrutable myſteries of nature we preſume not to explain: they point out almoſt the creative hand, and bring us almoſt into the immediate preſence of that Being by whom we live, move, and exiſt; and before whom the truly feeling and elevated mind is leſs diſpoſed to examine than adore. We are only to obſerve, that from this coeval formation of parts which the microſcopic part of anatomy has often diſtinguiſhed from their evolutions, and from this mutual dependance of organs one on another, we are left at freedom to begin at any part of the circle, and treat of the general properties and functions of living bodies.

We now venture on a rude ſketch of the order and manner in which theſe properties may be explained, and in which the facts in general phyſiology may be afterwards arranged. Another opportunity may produce ſomething more full and correct. In the preſent ſketch, many imperfections will no doubt be found; we already are able to foreſee many from our own inability to treat the ſubject according to its merit. And perhaps the reader, who is poſſeſſed of temper and candour, will impute ſome to the newneſs of the plan, and the preſent infant ſtate of the ſcience.

Without blaming the arrangement of D'Azyr, whoſe genius and labours we ſhall always reſpect, we have been induced to adopt the following, from thoſe reaſons with which the reader is now to be acquainted.

Attending minutely to a living body, which already has eſcaped from the ſeed, the egg, or membranes of the parent, which is wholly diſengaged from the placenta,

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(A) It is curious to obſerve how careleſs we are in annexing preciſe ideas to our words. Bonnet ſuppoſes that in ſome world more perfect than ours, the rocks may be organized, plants may feel, brutes may reaſon, and men may be angels. In this paſſage the form was all that ſeems to have entered into his idea of the man and the brute, and ſo new was his notion of a perfect world, that one who believed in the metempſychoſis, would naturally imagine that he here had been fancying a ſtate for the damned, where angry heaven was to fetter the angel in the form of a man, a man in that of a brute, a brute in that of a vegetable, and a vegetable in that of an uncouth rock. How much to be pitied would the creatures be that reaſoned and felt, and were at the ſame time more incapable of moving than an oyſter or a limpet!

Preliminary obſervations.

placenta, and depends for the future on the operations of its own organs (B), we may obſerve, that in order to live, it muſt be allowed the free uſe of air, as applied by the organs of—*Reſpiration*.

46
The arrangement of functions in this article.

That, in order to grow, it muſt have likewiſe a ſupply of food, which is a ſubſtance ſomehow adapted to its conſtitution; and which, on being received into the ſyſtem, is

Prepared by—*Digeſtion*,
Taken up by—*Abſorption*,
Diſtributed by—*Circulation*,
Aſſimilated by—*Nutrition*,
And the whole carried on by means of—*Secretion*.

We next may obſerve, that in order to enjoy the free exerciſe of theſe functions, it muſt be ſecured from the more common and external injuries of its ſituation; and that this is done by certain integuments originally produced, and when it is neceſſary, afterwards renewed by that function; which, till we receive a new numenclature, we ſhall venture to call by what may be rather an uncouth word—*Integumation*,

We again may perceive, that theſe functions are all dependant on a general principle—*Irritability*:

By which the ſyſtem is rendered by ſtimulants ſuſceptible of—*Motion*;

Accommodates itſelf, to different circumſtances by means of—*Habit*;

Alters its ſhape by ſucceſſive—*Transformation*;

Produces the ſpecies by—*Generation*;

And when the buſineſs of life is finiſhed, is, after many a languid affection from the influence of—*Sleep*,

At laſt ſubjected to the general fate of all living bodies—*Death*.

Theſe we imagine are the general properties of living bodies; and ſuch is the order in which we are now to take a ſhort and curſory view of them.

SECT. I. *Reſpiration*

47
Reſpiration defined,

Is that function by which air is brought into the ſyſtem, and by which it is prepared in particular organs, that in ſome reſpect ſucceed the placenta in the general economy. For as any interruption of the uſual intercourſe between the placenta and fœtus in ovo proves ſoon fatal, ſo when that communication naturally ceaſes, and the new one ſucceeds between the lungs and external air, it is likewiſe found, that any preternatural interruption of this laſt is in all living bodies preſently attended with various ſymptoms of increaſing languor, and in many with an almoſt inſtantaneous death.

48
Its importance to living bodies,

So eſſential is reſpiration to the ſyſtem, that ſnails chameleons, and ſome other animals, can live for years upon air alone. We have ſeen a chameleon that lived and was vigorous for twenty two months without any food, and which might have continued to live much longer but for an unfortunate bruiſe by a fall.

Other phenomena equally demonſtrate the importance of air to the living body. The frog leaps away wanting its heart; it ſurvives the loſs of the greateſt part of its ſpinal marrow. Without its head, it lives for ſome days, and its heart continues to circulate its blood (c). Spalanzani took one from the back of a female, cut off his head, and after performing this whimſical experiment, ſaw the gallant return to his miſtreſs graſp her in his arms, and finiſh the taſk which he had begun: And Borelli found, that eels and ſerpents, though their bodies be opened, and the whole of their viſcera be taken out, are able to move for a day after; and yet notwithſtanding, in all theſe animals, the life is obſerved to be ſuddenly extinguiſhed when the all-vivifying air is excluded. Even the ſmalleſt inſect has died, and the plant loſt its vegetative power, when retained for any while in a vacuum. The fiſh itſelf, when placed under the exhauſted receiver, has ſtarted anxiouſly to the ſurface of the water in queſt of freſh air; and finding none, has ſunk to the bottom and expired in convulſions.

If

(B) To give a general view of the manner in which living bodies are nouriſhed and ſupported in the egg and uterus, and before they begin to depend entirely on their own organs, we have ſubjoined a Plate (ſee Plate CCCXCI.), repreſenting embryos of various kinds. The three firſt figures are from Swammerdam: the firſt is the membrane containing the inſect, the ſecond the membrane after the eſcape of the inſect, the third is the inſect itſelf, fed by abſorbents, opening on different parts of the body.

The fourth, fifth, and ſixth, figures, are from Grew: the fourth is a bean, ſpreading its ſeminal roots into the lobes. In the fifth, and ſixth the lobes of the ſeed are ſeen converted into ſeminal leaves.

The ſeventh to the twelfth repreſent the transformations of the chick in ovo: the firſt of theſe figures is from Aquapendens; the reſt are from Blaſius, who got them from Malpighi.

The remaining figures are all from Aquapendens: the two laſt repreſent a fiſh that is ſometimes oviparous and ſometimes viviparous.

Plants and animals are here obſerved ſpreading their roots in a ſimilar manner. The proper proportions are overlooked, not being neceſſary to convey the idea which is here intended.

(c) "Two days (ſays Dr Monro) after cutting off the head of a frog at its joining with the firſt vertebra, I found it ſitting with its legs drawn up in their uſual poſture; and when its toes were hurt it jumped with very conſiderable force. Its heart likewiſe continued to beat about forty times in a minute, and ſo ſtrongly as to empty itſelf and circulate the blood.

"In ſeveral frogs, after cutting off the back part of the ſix undermoſt true vertebræ, I took out all that part of the ſpinal marrow with the cauda equina which they cover. The lower extremities were rendered inſenſible to common injuries, and lay motionleſs: yet the frogs lived ſeveral months thereafter, and the wounded parts of their backs cicatriſed, and the bones of their legs which I fractured were reunited, the blood circulating freely in their veſſels." *Experiments on the Nervous Syſtem*, made chiefly with the view of determining the nature and effects of animal electricity.

If objections ſhould be made to theſe trials performed in a vacuum, if it ſhould be ſaid that under the receiver the ſhrivelled fruit ſwells and turns plump, that the body of the frog is ſtrangely inflated, that its turgid eyes grow prominent in its head, and that thin phials corked full of air are broke by its expanſion; ſtill there are facts which do not admit of the like equivocal interpretation. All living bodies will die in the air which they have reſpired; and when ice covers the whole of the water, many of the fiſhes are known to periſh: or if an opening be made in the ice, to haſten to the air, and rather than retire, quietly ſuffer themſelves to be caught.

49 Seeming exceptions.

To this general dependence of life upon reſpiration, there occur but few things like an exception: theſe are ſome ſerpents and worms and cruſtaceous animals found alive in the hearts of the ſtones, ſome inſects that were found in wood, and a number of toads which in different places have been taken from the hearts of trees and of rocks, where they left an impreſſion, and where they were ſuppoſed in ſome caſes to have lived for centuries without air. Theſe facts, real or pretended, have been the cauſe of much ſpeculation. Some philoſophers, who imagine that nature is always obliged to act agreeably to thoſe ideas which they have already formed of her laws, are, notwithſtanding the high authorities by which ſome of theſe facts are atteſted, diſpoſed to doubt them. General analogy, which regularly oppoſes ſingular phenomena, is upon their ſide; and without her concurrence, they will grant exiſtence to no living body that will not ſubmit to the old eſtabliſhed modes of reſpiration. Others again, who would not preſume to dictate for nature, who have long experienced that ſhe is not forward to obtrude her ſecrets, and who can believe that ſhe may have ſtill ſome to communicate, conſider theſe facts as ſomething new which ſhe means to impart; and as one of the inſtances where ſhe ſeems to deviate from general analogy in adhering to her grand accommodating principle by which ſhe fits every living body for a certain range of varying circumſtances.

50 Animals incloſed in ſtones, &c.

51 Opinions on this ſubject.

Theſe laſt, receiving the facts as ſufficiently authenticated, have ſtudied only how to account for them. When ſtones therefore were thought coeval with the world itſelf, they ſuppoſed their toads to have ſprung from the ova that were ſcattered through the earth at its firſt formation; they did not recollect, that if the earth muſt have exiſted before thoſe ova could have been ſown, and that if the ſtones were coeval with the earth, the ova could not have entered their ſubſtance. When they afterwards learned that the conſolidation of ſtones is an operation ſtill carried on in the mineral kingdom, they acknowledged their ova to be leſs ancient, but did not perceive that all theſe ova involved ſuppoſitions that cannot be admitted by ſound reaſon. For how was an ovum to grow without air and without food? and how particularly was it to grow with ſuch a force as to make an impreſſion in a ſolid rock? This would imply a power of expanſion ſcarcely to be equalled by gun-powder, and which we ought not to be raſh in aſcribing to the nutritive effects of abſtinence and nothing. Were it not for the toad, the expanſion itſelf might have found a ſolution in *a theory of the Earth*, which has caſt all its ſtones in a foundery under the water, where the moiſture might have rendered them apt to be formed with numerous cavities.

Perhaps the way to remove theſe difficulties concerning the toad, would be to aſcertain its mode of exiſtence in the heart of the ſtone. Suſpecting that the air communicated ſomehow with the ſolitary cell, we procured a toad that was crawling out from its den in the evening. It was put into a glaſs juſt large enough to hold it with eaſe. The mouth of the glaſs was filled with cork ſufficiently cloſe to retain water; the glaſs was then laid on its ſide, and the animal reſpired for ſeveral days without diſcovering ſigns of uneaſineſs: but ſuppoſing that air might ſtill be admitted, the cork received a covering of wax, and the animal died ten hours after.

From this experiment, and the fate of toads when put under an exhauſted receiver, from an air paſſage in the cruſt of chryſalids, from the porous texture of the white ſpeck, or the opening which the ſnail leaves in the membrane that is ſpread over the mouth of its ſhell, we were led to think on d'Aubenton's remark, that the incloſed toads might have breathed, and that the wood has been always cleft, and the ſtone broken, before it was ſhown how the external air was excluded †.

On farther reflection, our own experiment appeared inconcluſive; and d'Aubenton's remark, after cloſe examination, ſeemed not entitled to much attention. He would have it ſuppoſed that a toad is lurking in every block of ſtone and of wood; and on this ſuppoſition would have an inquiry to be regularly made, whether or not there be any communication between this ſuppoſed animal and air; becauſe, when the ſtone or wood is in fragments, the attempt to diſprove ſuch communication is in his opinion impoſſible.

But are we certain that the admiſſion of external air would remove the difficulty? We are not ſo poſitive now as we were upon this ſubject. In the ſummer months, we recollect to have drowned frogs which were living in the fields, by keeping them ſome hours under water: but if we allowed them to riſe to the ſurface, and reſpire at pleaſure, they became at laſt ſo accuſtomed to that element, that if the temperature was not much above that of ſpring-water, they lay in the bottom not only for days but for weeks together.

In the winter ſeaſon, it is well known that frogs are ſometimes diſcovered in cluſters below ſtones and under water in the neighbourhood of ſprings; and often ſeen in the bottom of ponds, marſhes, and ditches, where water is collected, and the whole ſurface covered with ice. In this ſituation, we have frequently examined their ſides and their noſtrils and can venture to aſſert, that they did not reſpire in the ſame manner that they did when on land: for the moment that this animal is put under water, the palpitating motions of its ſides and its noſtrils are obſerved to ceaſe; and Chaptal has ſeen them ſuſpending reſpiration as it were at pleaſure even when in air ‡.

While they move, however, and exhibit indications of active life, we would not ſay that air is excluded. In the roots of plants, in aquatic worms, in polypes, and in the placenta itſelf, the ſame organs ſeem to perform the double office of lungs and abſorbents. When

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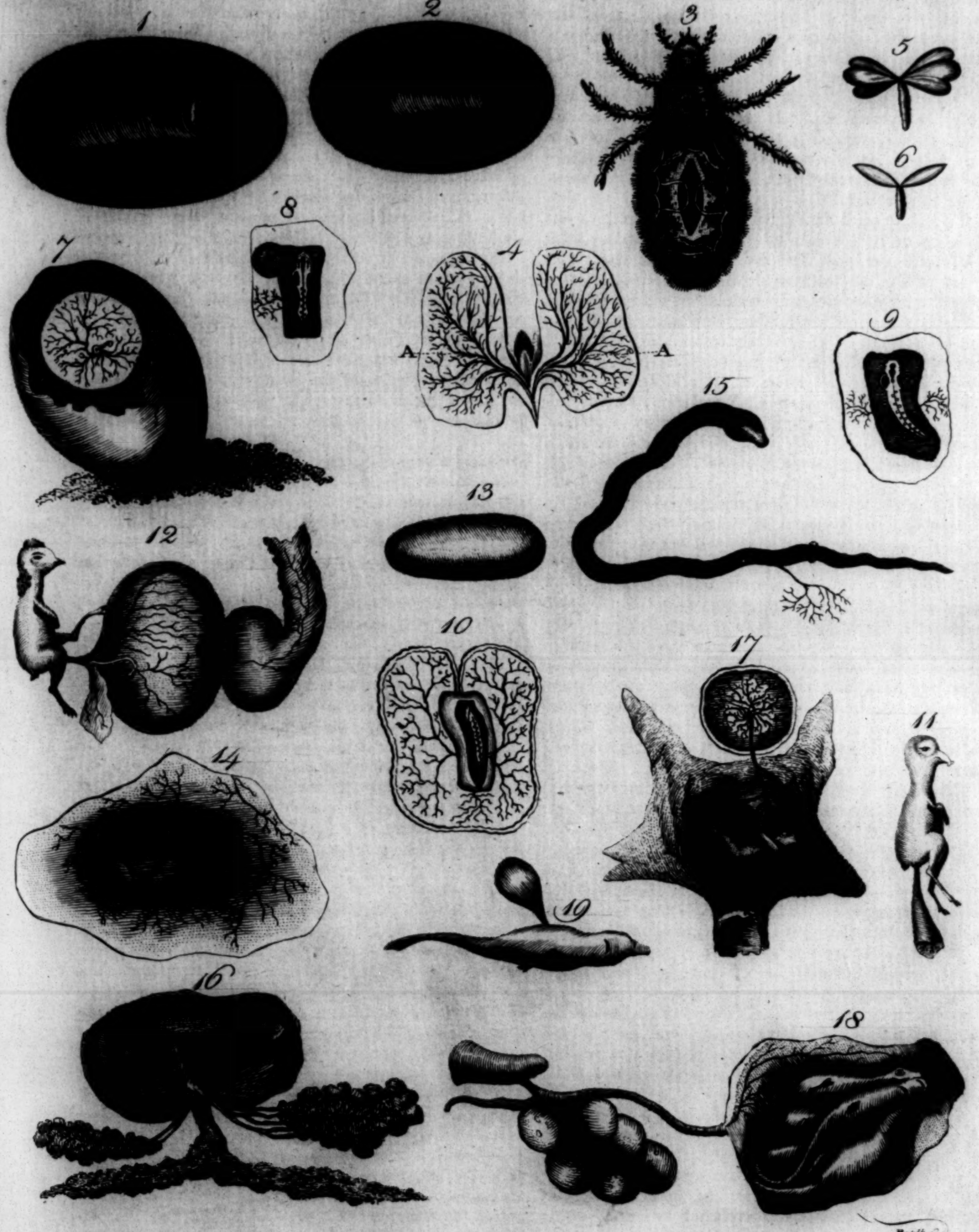
† Encyclopedie Methodique, tom. 2. partie 2. p. 610.

PHYSIOLOGY. Plate CCCXCI.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Ralph ſc.

BRITISH MUSEUM

52 Some things relating to frogs and toads.

under water, what are the functions of theſe organs in frogs and in toads? It is not diſputed that in moiſt places they can live longeſt without food; and ſome phenomena which have been obſerved relating to this ſubject appeared to us not unworthy of attention. In the beginning of the ſummer 1793, while we were making a few experiments on the nervous influence with ſome metals, a frog was taken out of the water in the duſk of the evening, and put into a deep and wide-mouthed glaſs till next morning: but next morning a quantity of water was found in the glaſs, the animal was dead, its mouth full of foam, and the greater part of its body covered with froth. The following autumn a boy came with a couple of toads wrapt up in tow. Till we had leiſure to make our experiments, they were allowed to remain as they were for three days in the corner of a room. When taken out, their colour was pale, their bodies much ſwelled, and a quantity of water collected between the ſkin and the muſcles. When held in the hand with their head upwards, the water was evacuated downwards by the anus. It was one of theſe toads that afterwards died when confined in the glaſs without air. Its body was put into a ſolution of madder for two days; and when the ſkin and muſcles were removed, the bones, which are ſtill preſerved, were found red. A live frog in the ſame ſolution, though allowed to breathe, expired in a few hours. In three days its bones became of the red colour, but not ſo deep as that of the toad's. Another frog died in the ſolution; but the bones, from age or ſome other cauſe, did not receive the colour of the madder. In all caſes the ſkins were found red.

53 Different functions of their abſorbents.

As we know not how far the great accommodating principle of nature may be extended, perhaps the abſorbents opening externally may in theſe animals ſometimes ſupply the place of the lungs, as the lungs ſupplied the place of the gills which they uſed when tadpoles, and as the gills had formerly ſupplied the place of a placenta, or the primary abſorbents, through which they derived their nouriſhment in ovo.

54 What ſorts of ſtones incloſe animals, and what ſort of animals are incloſed.

Thoſe ſtones which incloſe animals are known to be ſuch as have gradually aſſumed the ſolid form, and thoſe animals which have been incloſed are known to be ſuch as in other caſes have been ſubjected to the torpid ſtate: But this ſtate has not been examined with all the attention which it deſerves. From this ſtate, Bonnaterre ſays, in his introduction to Ereptology *, that it is impoſſible to rouſe the animal by the loudeſt noiſe, the rudeſt ſhock, or the deepeſt wound; the internal motion is juſt ſufficient to preſerve the ſyſtem from that decompoſition to which animal ſubſtances are expoſed. It retains only the form of what it was. It appears neither to live nor to grow; and the whole maſs, if what is expoſed to the air be excepted, is not ſenſibly altered while the torpor continues. All the ſenſes are ſhut up; all their functions are entirely ſuſpended: digeſtion is no longer in the ſtomach; all reſpiration has apparently ceaſed; and it has been doubted whether or not this function be in ſome caſes at all retained. When the genial warmth, however, returns, in ſix, in eight, or in ten months, according to that variety of climates between the frigid poles and the tropics, the animal revives. But the queſtion is, if the firſt circumſtances in which the animal became torpid had been artificially or naturally continued, how long in this way might the different functions of life have been ſuſpended; and how far are we warranted by the analogy of ſeeds and of eggs to lengthen this period of their exiſtence, without ſuppoſing a decompoſition or deſtruction of organs?

* Encyclopedie Methodique.

55 Eggs and ſeeds preſerved long when air is excluded.

Experiments muſt tell what are the limits which nature has here preſcribed to herſelf. New eggs, when covered with varniſh, or placed under the exhauſted receiver, are ſecured againſt the attacks of corruption. Bomare, in his Dictionary, has mentioned three, which, protected from air, were found freſh in the wall of a church after a period of 300 years (D).—And if it be true that a ſnake found in a block of marble died as ſoon as expoſed to the air, or if the parts in contact with air be the only ones which in torpid animals appear to be changed, it would ſeem probable that a total excluſion of this varying and active element would tend more to the preſervation of torpid animals, in certain inſtances, than a free admiſſion, which, in thoſe caſes where all vital functions have ceaſed, is regularly found a principal agent in their diſſolution.

56 Heriſſant's experiments reſpecting the toad.

M. Heriſſant of the French Academy was the firſt philoſopher who, by means of experiment, thought of interrogating nature herſelf upon this ſubject. On the 21ſt of February 1771, he with great accuracy ſhut up three toads from the air, two of which were taken out alive on the 8th of April 1774. D'Aubenton ſays†, after a period of 18 months; but in this inſtance we depend more on the friend‡ of Fontana, who has mentioned the dates. The two toads were again incloſed, and Heriſſant died before there was a ſecond inſpection. D'Aubenton ſays, that when taken out their bodies were hard and ſhrivelled, and their whole moiſture totally abſorbed. A fourth toad that had been incloſed was heard to croak whenever the box in which it was confined happened to be ſhaken. Since that period the practice is common of confining ſnails in a ſealed phial, where they exiſt in torpor for years.

† Encycl. Method. Hiſt. Nat. tom. 2. Ovipares.

‡ Dict. de Merveilles de la Nat. Animaux Vivans Renfermés.

Theſe phenomena ſtill excite wonder, but to wonder leſs, and examine more, would ſooner procure us that information which we are wanting. In theſe obſervations concerning toads, have no circumſtances been overlooked? Has it been determined whether they lived in the heart of ſtones, or, exiſting merely in a torpid ſtate, had come alive when expoſed to air? We have ſeen a toad that was dead for two days; its body was opened; its heart was ſeen motionleſs, but expoſed to air in a few ſeconds it began to beat.—Conſidering the complex function of abſorbents, we perhaps might conceive how a toad could live in the clefts of rocks, or the hearts of trees, where there is moiſture; but has it yet been determined whether all ſtones in which toads have been found ſupplied them with moiſture? We at leaſt are certain that they did not

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(D) See Bomare, under the article Œuf; and a fuller account of the ſame eggs in the *Dictionaire de Merveilles de la Nature*, under Œuf.

abſorb the animal fluids, like the plaſter uſed by the French academicians.

57 Queries reſpecting this kind of experiments.

One of the toads was heard to croak after being incloſed. In making their experiments, has it, therefore, been thought a matter of indifference by the French philoſophers, whether the animal was immured alive in the full exerciſe of all its functions, or exiſting only in its torpid ſtate? and with reſpect to this ſingular ſtate, (might not the queſtions be fairly put), have its ſeveral kinds, have the cauſes which induce it, or thoſe degrees to which it may be carried in different animals, been yet aſcertained? Is not our knowledge of the torpid ſtate at this moment principally the reſult of caſual obſervation? Has it not been oftener than once ſuppoſed that the torpor of all animals is ſimilar, or takes place to a ſimilar degree? Have not torpid animals been therefore ſpoken of in general terms? and has it not been aſſerted that they retain a portion of heat and internal motion? though ſome have been found congealed in the ice, and many been dried to ſuch a degree that they could be revived only by moiſture.

“ That ſnakes and fiſhes, after being frozen, have ſtill retained ſo much of life as when thawed to reſume their vital functions, is a fact,” ſays Mr Hunter, “ ſo well atteſted, that we are bound to believe it.” How came it, we would aſk, that fiſhes which had been frozen by this truly ingenious phyſiologiſt never recovered? He recovered parts of different animals which had been frozen? Had the ſnakes and fiſhes of which he had heard been only partially congealed in the ice? or had the fiſhes which he ſelected for theſe experiments been properly choſen? or may all animals with equal fairneſs be made the ſubject of ſuch experiments? and may all tranſitions from heat to cold, and from cold to heat, whether ſlow or rapid, if not in the extremes, be viewed as nearly of the ſame conſequence? Are all ſeaſons and conditions of body equally favourable to this ſtate of torpor? and will theſe cauſes which induce torpor by operating externally in the months of autumn be able to continue it by the like action in the months of ſpring? We can anſwer, no.

58 Reabſorption of fat in the torpid ſtate.

It has been ſaid that animals ſubſiſt in their torpid ſtate by the reabſorption of fat. Has it therefore been proved that all animals, not to ſay living bodies, are poſſeſſed of fat? or if they be, has it been demonſtrated that they have a ſuperfluous quantity to be reabſorbed? Has it been ſhown that their waſte of fat is always occaſioned by this reabſorption; or has this reabſorption in all caſes been of that kind to counteract the effects of abſtinence? If it has not been proved that all animals contain fat, and that this fat is reabſorbed in their torpid ſtate, ought not the general aſſertion to be limited? Granting that in many reſpects it were true, have not philoſophers been here amuſing themſelves with logic, where they could have been employed in making experiments? Have they not ventured to give us concluſions, where we had reaſon to expect facts? and on this account has not their conduct been ſomewhat ſimilar to that of navigators who, ſailing along the coaſt of Patagonia on one ſide, and obſerving a few men of an uncommon ſtature, have from thence peopled the whole of the country with a race of giants? or rather to that of ſome calculators, who, from ſeeing a few parts of a continent, have ventured to give a map of the whole, to deſcribe kingdoms that are yet unexplored; and by their ſkill in addition and ſubtraction to exhibit the figure, the extent, and proportion of lands unknown?

Leaving therefore the torpid ſtate as one of thoſe ſubjects with which we at preſent are little acquainted, and of which we therefore cannot ſpeak with certainty in the general abſtract language of ſcience; it will naturally be aſked, In what reſpect is air ſo neceſſary to all living bodies in their active ſtate, and how it contributes to the regular performance of the different functions?

59 Opinions of the ancients reſpecting the uſe of reſpiration.

The ancients, who were led by the heat of the blood to ſuppoſe a vital ſpark in the heart, who had noticed the appearance of ſmoke in the breath, and who had obſerved that fire was extinguiſhed when deprived of air, naturally inferred that the end of reſpiration was to ſupport their imaginary flame, to ventilate the blood in the arteries and lungs, and to keep alive their vivifying ſpark. They were far, however, from being agreed as to the manner how this was effected. Some were of opinion that a certain principle of the air was abſorbed, to which they gave the name of *the provender of life* †, or the food of the ſpirit ‡; while others were perſuaded that the air acted as a refrigeratory, and was merely intended to moderate the fire, to aſſiſt in expelling the fuliginous vapour, and preſerve the ſyſtem in an equal temperature.

† Pabulum vitæ

‡ Spiritus alimentum.

The moderns, who, after all their reſearches, have been unable to diſcover this vital ſpark of the ancients, are more puzzled to aſſign an adequate cauſe for the heat than for any cold which they diſcover. To account for this ſingular phenomenon, they have been ranſacking nature for cauſes; and perceiving that putreſcence, mixture, and friction, are in many inſtances accompanied with heat, have thence conjectured that they ſometimes operate in producing the warmth of the living body. But theſe are theories which have been imported from the hot-bed, the laboratory, and mechanic's ſhop, and which have never yet been countenanced by phyſiological facts and obſervations. No one has been able to ſhow that putreſcence exiſts in a healthy ſtate, except in the feces: no one has proved that any mixture which regularly occurs in the alimentary canal or veſſels, generates heat; and though friction has been a favourable hypotheſis, yet thoſe circumſtances, in which it evidently produces heat, have not been diſcovered in the living body; and it is not determined whether it be there a friction of the fluids, a friction of the ſolids, or a friction of the fluids and ſolids together.

60 Opinion of Verheyen.

Of animal heat, the moſt rational theory, we think, is one which properly belongs to the laſt century; it is confirmed by modern diſcoveries, and has aſcribed this heat to reſpiration. Many had obſerved, that thoſe animals which reſpire moſt have the warmeſt blood (E).

Lower

(E) Quod antem animalia calidiora fortius reſpirent, non probat reſpirationem illis potius datum eſſe, ad ſanguinis refrigerium, quam calorem illum intenſum produci a validiori reſpiratione: imo poſterius non tantum æque, et magis probabile apparet: quia ſecundum omnium ſententiam calido vivimus, frigido extinguimur.

Ut

Lower demonſtrated, that this blood received a new and a brighter colour in paſſing through the lungs (F). Verheyen and Borelli both proved, that the air loſt ſomething by coming in contact with that organ (G). Mayow ſhowed, that this ſomething which the air loſes is contained in nitre (H). Experience taught the workers in nitre, that this ſomething was abſorbed from the air (I): and Verheyen remarked, that it is alſo abſorbed by the lungs; and is probably that which maintains combuſtion; which qualifies the air for giving ſupport to animal life, and imparts to the blood the vermilion colour (K).

61
Supported by a diſcovery of Dr Prieſtley's.

How well the whole of this reaſoning was founded, is proved by the late diſcoveries of Prieſtley and other chemiſts. There is now obtained, in a ſeparate ſtate, an aerial fluid, which maintains both life and combuſtion, and gives a vermilion colour to the blood. It is extracted in a very large quantity from nitre; is one of the component parts of the atmoſphere, and the vital principle of that element; without which, in moſt animals, life is extinguiſhed. From ſome phenomena which happen in combuſtion, it has been termed *principium ſorbile*. It was called dephlogiſticated air by Prieſtley the firſt diſcoverer; as the great acidifying cauſe in nature, the French nomenclature has given it the name of *oxygenous gas*; and, as one of the cauſes on which the exiſtence both of fire and of life depends, it is named *empyreal* or *vital air*.

62
Reſpiration the cauſe of animal heat, and how this heat is produced.

Late diſcoveries have ſhown farther, how this air may in reſpiration produce heat. From the moſt accurate inveſtigations, it appears, that caloric, or the principle of heat, is a diſtinct ſubſtance in nature; that it combines with different bodies in different degrees; that it is the cauſe of fluidity in all; and that, in proportion to that capacity which they have for it, and to that diſtance at which they are removed from the fluid ſtate, the more or leſs caloric they contain. Aeriform bodies being all therefore exceedingly fluid, it muſt be evident, that when they are fixed or condenſed in the blood, and made to approach nearer ſolidity, a quantity of heat muſt be evolved. A part of this is very plainly evolved in the lungs where the air is abſorbed, as appears by the breath; and a part evolved by the action of veſſels, as appears from nearly an equal heat over the ſyſtem, from the partial heat of a morbid part, and the ſudden tranſition from heat to cold, and from cold to heat, over the ſurface, when the veſſels are affected by either internal or external ſtimuli. When the heat, thus evolved by the gradual fixation of that body with which it was combined, has been ſucceſsful in making its eſcape by the lungs and integuments, the blood returns in a dark and a ſluggiſh ſtream by the veins, and mingles again with the genial fluid, which before gave it ſpring, activity, and life.

Of that oxygene which remains in the ſyſtem, part is employed in forming different ſaline combinations and ſupplying the waſte occaſioned by that conſtant reabſorption; which, from many experiments that have been made with ſolutions of matter, is known to take place in the ſolid bones. The uſe of that oxygenous gas which returns with the breath, is beſt underſtood after knowing its affinities. Its baſis oxygene, combining with hydrogene, which is the baſis of inflammable air, forms water; and combining with carbone, the carbonic acid. It carries, therefore, back with the breath a part of the carbone produced by the ſlight combuſtion of the blood, and a quantity of hydrogene ariſing from the watery fluid decompoſed.

63
Gaſes which compoſe the atmoſphere which we breathe, and their uſe in reſpiration.

But oxygenous gas does not alone enter the lungs. Of 100 parts of the atmoſphere, but 28 are oxygenous gas $\frac{1}{100}$ is carbonic acid, and 72 are azotic gas (L). Theſe laſt, though intended chiefly for other beings different from man, which are in immenſe numbers on the globe, but which, like him and the nobler animals are not formed

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Ut proinde non videatur aliquid a natura datum eſſe, quo intenditur frigus vitæ contrarium. *Verheyen*, Tract. 2. cap. 7. *de Uſu Reſpirationis*.

(F) Poſtquam circulatio ſanguinis innotuit, diu creditum fuit ſanguinem venoſum colore illo coccineo rurſus indui in ventriculis cordis, et præcipue ubi calor, quem judicabant iſtius coloris authorem, eſt intenſior: At negotium iſtud peragi in pulmonibus, nempe reſpirationis beneficio, evidenter oſtendit cl. Lowerus experimentis. *Ibid.*

(G) Inquiramus quale ſit iſtud aereum adeo nobis et multis animalibus neceſſarium. Ut ejus defectu vita extinguatur citiſſime. Vulgaris enim aer dici non poteſt, cum illum per meatus notabiliores ſanguini immitti conveniret, ſitque experientia certiſſimum, animalia reſpirantia non tantum aëre ſimpliciter; ſed etiam recenti continuo indigere, unde concludendum eſt tantummodo aliquas particulas ſubtiliores ab aëre ſecerni, et maſſæ ſanguinis immiſceri, quibus ſpoliatus ad ulteriorem reſpirationem ſit inidoneus.

(H) Et quidem veriſimile eſt, inquit Mayow, particulas quaſdam indolis nitroſalinæ, eaſque valde ſubtiles, agiles, ſummeque fermentativas ab aëre pulmonum miniſterio ſecerni, inque cruoris maſſam tranſmitti. Adeo enim ad vitam quamcunque ſal iſtuc aëreum neceſſarium eſt, ut ne plantæ quidem, in terra, ad quam aëris acceſſus precluditur vegetari poſſint; ſin autem terra iſta aëri expoſita, ſale hoc fæcundante denuo impregnetur, ea demum plantis alendis iterum idonea evadet.

(I) In aëre autem quid nitroſum contineri norunt ipſi vulgaris nitri confectores, qui terram aut laterum fragmenta ex quibus nitrum elixiviare intendunt, aëri liberiori diu multumque exponunt; utque ab eodem undique ea tangente ac perfluente uberius impregnetur, ſæpius vertunt, atque ita ſuorum ſumptuum et laborum ampliorem meſſem mercedemque referunt.

(K) Inſuper, ſi poſt confectionem nitri terra aut laterum fragmenta exponantur libero aëri, ea denuo poſt aliquod temporis ſpatium, quodam ſale nitroſo abundabunt. Eſt autem veriſimile, aerem gratia ejuſdem materiæ et vitæ noſtræ continuationi et ignis accenſioni neceſſarium eſſe; præcipue cum rurſus experientia doceat ruborem ſanguinis e corpore educti, per additionem ſalis nitri intenſum iri in eodem prorſus modo ſecuti, per reſpirationem in corpore vivente. *Ibid.*

(L) Theſe are nearly the proportions.

ed to breathe the empyreal air, muſt notwithſtanding be of ſome important and eſſential uſe to all living bodies. It has accordingly been found by experiment, that pure and unmixed oxygenous gas cannot be breathed for any very conſiderable time without danger; that ſome azote is contained in the blood, and has been extracted from the muſcular fibre, when properly treated with the nitric acid. According to Berthollet, five of its parts with one of hydrogene forms ammonia or volatile alkali; which diſpels the glandular tumours of the body, and prevents the coagulation of blood and the thickening of mucus which ariſe from acids (M). The azotic gas may therefore in part unite with hydrogene, may prevent the coagulation of ſerum, the catarrhous formation of viſcid mucus, and many combinations that oxygene might form, injurious to the ſyſtem. The carbonic acid, which is $\frac{28}{100}$ of carbone and $\frac{72}{100}$ of oxygene, may alſo be neceſſary in regulating the effects of the other two. In aerated water, its uſes are very generally known: it allays the pain of the urinary bladder when excited by calculus; it has been employed in the cure of wounds, and been thought uſeful in the pulmonary phthiſis. It is generated in the lungs of thoſe animals which reſpire oxygene. In ſmall proportions it favours the growth of the vegetable tribes. Theſe tribes readily decompound it; and, with the addition of other prepared oxygene from water, reſtore what is pure to the general maſs of the vital fluid, that plants and animals might thus live by the mutual performance of kind offices.

We return again to animal heat. Every theory that pretends to account for animal heat, ought alſo to account for that ſingular equality of heat which the ſyſtem preſerves, or endeavours to preſerve, in different temperatures. The above theory explains it ſimply in the following manner.

64
How an animal preſerves its natural warmth in a cold temperature.

Venous blood, if expoſed to the air, is known to abſorb a portion of oxygene, and aſſume that colour which it has in the pulmonary veins and aorta. Suppoſe an abſorption of a ſimilar kind taking place in the lungs, a fact which may be proved by deciſive experiments; it is plain that the oxygene by this abſorption muſt recede from its gaſeous or fluid ſtate; that a quantity of heat muſt be therefore evolved, which, along with the heat of the refluent blood, is carried away by that vapour which iſſues from the lungs. In the courſe of circulation the oxygene will naturally incline with hydrogene to form water; it will tend likewiſe to the formation of many other compounds; and, as it enters into new ſtates, and is further removed from gaſeous fluidity, it muſt ſtill be giving out a portion of heat. If the ſurrounding temperature be cold, this ſeparation will be eaſily effected. The caloric will, in that caſe, be greatly abſorbed from the interior ſurface of the lungs and exterior ſurface of the whole body. The oxygene, meeting with the neceſſary temperature, will readily paſs into new forms; and the venous blood returning to the lungs, will demand a ſupply which will be either greater or leſs according as the cold, by favouring the eſcape of the caloric, and promoting new combinations with oxygene, had removed it from the point of uſual ſaturation.

65
And its natural coolneſs in a warm temperature.

The gradual evolution of heat is a proof that the temperature muſt be ſometimes reduced before the oxygene can properly enter into all the uſual combinations of the ſyſtem. Suppoſe the body then to be placed within a hot circumambient atmoſphere. This atmoſphere, if warmer than the animal, will be more apt to part with heat than to receive it; and the oxygene abſorbed, being thus unable to diſpoſe of its caloric, will be prevented from paſſing into thoſe combinations and forms where heat is evolved. The venous blood will therefore conduct it back to the lungs, and make a demand for a new ſupply; but proportionally leſs according as the hot circumambient air, by preventing the eſcape of the caloric, and the uſual facility of new combinations, has confined its removal to a ſmaller diſtance from the point of ſaturation.

In this laſt caſe the thing principally entitled to notice is a very curious effort of nature to reſiſt the growing increaſe of heat. In the warm atmoſphere, as during violent muſcular exertion, the exhaling vapour is commonly diſcharged in a greater quantity from the ſurface of the body; and conſequently the heat furniſhed with an excellent temporary conductor, that in ſome meaſure counteracts the dangerous effects from without.

66
The air reſpired by plants and inſects different from what is reſpired by man.

After all, the reader is not to ſuppoſe that he here has received a general theory of reſpiration. All living bodies are not ſupported by the ſame kind of aerial food. Oxygenous gas has indeed been honoured with the flattering appellation of vital air; and nitrogenous gas been uſually diſtinguiſhed by that degrading epithet azotic; a word which ſignifies deſtructive of life. But though man, and all the warm-blooded animals that have yet been examined, may die in reſpiring the nitrogenous gas, this gas however, which conſtitutes more than two thirds of the whole atmoſphere, may in general be called the vital air of the vegetable tribes, and of not a few of the orders of inſects which thrive and live in it. For while man, and others which reſpire as he does, emit both the hydrogene and carbone, and return the hydrogene not ſenſibly diminiſhed; moſt vegetables and many inſects eagerly inhale them, and emit oxygene as noxious or uſeleſs. Theſe effects are the indications of a radical difference in conſtitution. Even the fibres of thoſe living bodies which exhale oxygene, will, after death, attract it ſo powerfully, as to decompoſe the nitric acid; but thoſe bodies which inhale nitrogene, have ſo very weak an affinity to oxygene, and ſo ſtrong a one to ſome of the bodies with which it is combined, that they can eaſily decompoſe water and carbonated air.

67
Reſpiration of fiſhes and their temperature.

What fiſhes reſpire is not aſcertained. Neither the change of the air, nor of the water which they occaſion when in cloſe veſſels, have, ſo far as we know, been fully examined. Chaptal is aſſured, that, like other animals, they are ſenſible of the action of all gaſes. Fourcroy

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(M) Weak volatile alkali diſſolves mucus, whoſe morbid viſcidity Fourcroy has aſcribed to a too great abſorption of oxygene.

eroy ſays, that they do not generate the carbonic acid; and that the air which Prieſtly and he found in the air veſicles of carp was nitrogene gas. Their thermometrical heat is ſo low, that in D'Aubenton's table they are reckoned among the cold-blooded animals.

68 Temperature of plants.

The temperature of plants is ſtill lower. The heat of a tree which the very ingenious Hunter examined, though ſeveral degrees above that of the atmoſphere when below the 56th diviſion of Fahrenheit, was always ſeveral degrees below it when the weather was warm. When taken out, the ſap was obſerved to freeze at 32°; while in the tree, it would not freeze below 47°. The very profuſe perſpiration of vegetables greatly moderates the heat in their ſurface; and as air which abſorbs moiſture expands, and becomes thereby ſpecifically lighter, there is a regular current produced, and evaporation rapidly promoted by the denſe air diſplacing the rarefied.

69 How the natural heat of living bodies is to be eſtimated.

To adopt here a general language with reſpect to the heat which is developed in all living bodies, it is proportioned to the quantity of matter which is by means of the vital powers reduced to a ſtate more nearly approaching ſolidity; to the kinds of the ſubſtances which are reduced, and to the degrees and kinds of the reduction.

70 Certain degrees of heat natural to every ſpecies.

In all living bodies there appear to be certain degrees of heat, peculiarly fitted for carrying on their various economical operations. What theſe are, in the different kinds of plants and animals, is not known. The bear, the hedge-hog, the dormouſe, and the bat, may probably not digeſt when reduced to 73°, 70,° or 80°. The frog, however, will digeſt at 60° (N); and the birch before it arrives at 47° (O). It would ſeem that reſpiration, beſides imparting aerial food, was intended to preſerve and regulate theſe different degrees of heat. It raiſes the heat after a meal; it ſuffers it to fall in the time of ſleep; it withdraws the ſupply when the atmoſphere is warm, and increaſes it again when the atmoſphere is cold. It ſhould therefore be remembered, that heat merely is not the object which is ſolely aimed at in reſpiration. All living bodies have their congenial degrees of heat. The regulation of theſe is important: on the one ſide, it prevents the diſſipation, on the other the coagulation, of their fluids; it preſerves the living power of their organs; and, by a natural and proper temperature, aſſiſts their action in mixing, compoſing, in decompoſing, and in variouſly preparing the different parts for ſecretion, excretion, abſorption, reabſorption, and aſſimilation (P).

71 Regulated by reſpiration.

As various fixations of the vaſcular fluid are regularly taking place in the different parts of the living body, and as air is not the only fluid concerned, it ſhould almoſt be unneceſſary again to obſerve, that the whole of the heat is not evolved in the lungs, nor the whole that is evolved diſengaged from air.

It

(N) See obſervations on certain parts of the animal economy by Mr Hunter. We allude here to his experiments and obſervations on animals, with reſpect to the power of producing heat.

(O) See Dr Walker's excellent Paper on the motion of the ſap in trees, 1ſt volume *Philoſophical Tranſactions, Edinburgh*.

(P) The ingenious Dr Crawford has publiſhed a theory of animal heat different from that which we have here preſented to our readers. Aſſuming as a fact, that heat and phlogiſton are two oppoſite principles in nature, he goes on as follows.

"Animal heat ſeems to depend upon a proceſs ſimilar to a chemical elective attraction. The air is received into the lungs containing a great quantity of abſolute heat; the blood is returned from the extremities highly impregnated with phlogiſton; the attraction of the air to that of the phlogiſton is greater than that of the blood. This principle will therefore leave the blood to combine with the air: by the addition of the phlogiſton, the air is obliged to depoſite a part of its abſolute heat; and, as the capacity of the blood is at the ſame moment increaſed by the ſeparation of the phlogiſton, it will inſtantly unite with that portion of heat which had been detached from the air.

"We learn from Dr Prieſtley's experiments with reſpect to reſpiration, that arterial blood has a ſtrong attraction to phlogiſton (become a vague word with different meanings in different authors). It will conſequently, during the circulation, imbibe this principle from thoſe parts which retain it with the leaſt force, or from the putreſcent parts of the ſyſtem: and hence the venous blood, when it returns to the lungs, is found to be highly impregnated with phlogiſton. By this impregnation its capacity for containing heat is diminiſhed. In proportion, therefore, as the blood which had been dephlogiſticated by the proceſs of reſpiration becomes again combined with phlogiſton in the courſe of circulation, it will gradually give out that heat which it had received in the lungs, and diffuſe it over the whole ſyſtem.

"To account for the ſtability of animal heat, he obſerves, that as animals are continually abſorbing heat from the air, if there were not a quantity of heat carried off equal to that which is abſorbed, there would be an accumulation of it in the animal body. The evaporation from the ſurface, and the cooling power of the air are the great cauſes which prevent this accumulation: and theſe are alternately increaſed and diminiſhed in ſuch a manner as to produces an equal effect. When the cooling power of the air is diminiſhed by the ſummer heats, the evaporation from the ſurface is increaſed: and when, on the contrary, the cooling power of the air is increaſed by the winter colds, the evaporation from the ſurface is proportionally diminiſhed." See *Crawford on Animal Heat*, p. 73—84.

Beſides, ſuppoſing that the principles of fire and inflammability are oppoſites in nature: this theory ſuppoſes that the blood, while in the lungs, gives out phlogiſton and takes in heat; but that, during the remaining courſe of circulation, it gives out heat and takes in phlogiſtion: it ſuppoſes, that this phlogiſton is collected from parts that retain it with little force, or from the putreſcent parts of the ſyſtem; it is not ſaid where: it

ſuppoſes

72 **All the air in a living body does not enter by the lungs, nor is contained in them.**

It may farther be remarked, that the whole of the air does not enter by the lungs; much is contained in the liquid and ſolid parts of the food. It is extricated often in the proceſs of digeſtion; and when the organs are vigorous and healthy, is made ſubſervient to the general economy. If the organs, however, ſhould happen to be languid, it ſcorns their authority, which cannot be enforced; from being friendly, it ſoon becomes inimical to the ſyſtem, and threatening danger accumulates, not only in the ſtomach and inteſtines, but in other cavities. It has been found in the cellular membrane; in certain veſicles formed for itſelf; in the uterus; in an abſceſs; and in gun-ſhot wounds: It has ſometimes burſt from the vagina with a ſort of noiſe*. And in a nephritic complaint of a horſe, we have obſerved it flowing in a ſtream from what the farriers denominate the *ſheath*.

In ſome kinds of aquatic plants, in eggs, and in a variety of fiſhes, there are certain veſicles containing air, which ſeem to have certain neceſſary functions allotted them by nature. In the plants and in fiſhes they were once ſuppoſed to have been wholly intended for ſwimming (Q). It was remarked, that thoſe fiſhes which remain conſtantly at the bottom of the water have no air veſicle; and that a fiſh whoſe veſicles was burſt by means of the torricellian vacuum, though it lived for a whole month after in a pond, was never able to riſe to the ſurface†. The practice, however, which ſome fiſhes have of aſcending at times to inhale air, and deſcending after their veſicle is filled‡; the communication which, in ſome fiſhes, this air veſicle has with the ſtomach; that power in the pigeon and ſome other birds of introducing air into the crop‖; and laſtly, the air which is uniformly found in impregnated eggs—would tempt us to believe that theſe natural collections of air, with their other uſes, may perform ſome eſſential ſervice in nutrition.

73 **Reſpiratory organs.**

Having explained the general intention of reſpiration, we are now to inquire, what are the kinds of reſpiratory organs, and in what manner their functions are performed? The preceding table has in ſome meaſure made us acquainted with the ſubject. Some animals breathe by a trachea and lungs; inſects, by either ſtigmata or tracheæ, opening into air veſſels; plants, by air veſſels and leaves; fiſhes, and numbers of the watery element, if they do not breathe, at leaſt receive air by their gills; the fœtus in ovo, the polypus tribe, and many more organized bodies, by the ſame organs which convey their food.

74 **Abſorbents.**

The abſorbents appear to be the firſt and moſt general way by which living bodies are ſupplied with air: the mouths of theſe veſſels are like ſmall tubercles, ſcattered over the body of the inſect while wrapt in its membrane. In the horſe and the bird they are blood-veſſels ſpreading on a membrane, and deriving nouriſhment from the uterus or egg, that had been itſelf nouriſhed by abſorbents: In a cow, they are veſſels which, ſpreading on a membrane, terminate in glands; theſe glands being oppoſite to others which adhere to the uterus; and the membranous and uterine glands, when in contact, incloſing a third gland like a kernel. In man, they are veſſels ſpreading on a membrane, and entering a large glandular body called the *placenta*. In the mouſe and the hare, they are likewiſe veſſels branching on a membrane, and entering a placenta: this placenta, when it appears to be fixed, receives large veins from the parent, and which may be either inflated or injected from the cavity of the uterus.

75 **Reſpiratory organs late in exerciſing their functions.**

Thoſe which are properly reſpiratory organs, exerciſe not their function till circulation and nutrition are begun: though, if the obſervation of Garman be juſt, that the air may become a real food for the claſs of ſpiders, or if it be true that the larvæ of ants as well as of ſeveral inſects of prey, increaſe in bulk, and undergo their metamorphoſes without any other nouriſhment than air §, this law is not univerſal. It may, however, be doubted, whether ſome moiſture be not abſorbed. With regard to the ant, we have reaſon to ſuſpect that the obſervations on which ſuch a concluſion was founded have not been accurate.

76 **Sometimes renewed, ſometimes changed for a different kind.**

Not only are the reſpiratory organs thus late in exerciſing their functions; in many vegetables a great part of them is annually renewed and laid aſide in the torpid ſtate. In thoſe inſects which undergo the moſt remarkable kinds of transformation they ſuffer a change; and in all thoſe animals which ſpend their earlier days in the water, and afterwards come to live in the air, they are altered in kind.

* See obſervations on Digeſtion, by the late Mr Hunter.

† Borelli de Motu Animalium, cap. 23. De Natatu, prop. 209.

‡ Chaptal's Elements of Chemiſtry, vol. i. § 5. chap. 2.

‖ Anatomical Deſcript. of the Demoiſelle of Numidia, by the French Academy.

§ Chaptal's Elements of Chemiſtry, vol. iii. § 1; art. 5.

ſuppoſes that the blood, in paſſing through the lungs, receives heat only: that the whole of this heat is evolved in the lungs by precipitation; and is thence diffuſed over the ſyſtem as from a centre or focus: in which caſe, we muſt alſo ſuppoſe that the lungs are the warmeſt part of the body; and that the heat of the other parts will be in proportion to their diſtance from the lungs, or the length of the veſſels through which it has paſſed.

As for the ſtability of animal heat, this theory aſcribes it entirely to foreign cauſes; to the different degrees of evaporation; or to the varying ſtates of the air.

The ſingular meaning which this theory gives to the word *Phlogiſton*, muſt ſtrike every one who knows the etymology of that word. The celebrated Stahl found it in the Greek; and applied it naturally to ſignify pure elementary fire, or the moſt pure and ſimple inflammable principle in a ſtate of combination. Mr Kirwan has ſince uſed it to expreſs hydrogene: Dr Prieſtley has called the azotic phlogiſticated air: and Dr Crawford, who ſeems to take phlogiſton in the ſenſe of Mr Kirwan, ſpeaks likewiſe as if he underſtood it in the ſenſe of Dr Prieſtley. Mr Kirwan's phlogiſticated air, however, will not kindle without oxygene: Dr Prieſtley's will extinguiſh fire: and Dr Crawford's is directly oppoſed to that principle. Theſe are not the ancient doctrines of Stahl: they are new ideas expreſſed in one of his antiquated words; the meaning of that great man is neglected. The ſounds which he uttered, like the dead language of an old ritual, are among a few ſtill in veneration.

(Q) Borelli has ſhewn how, by contracting the air veſicle or allowing it to expand, the fiſh can riſe, ſink, or remain ſtationary in the water. *Borelli de Natatu.*

In all living bodies the proper function of one part of the reſpiratory organs is, to ſecrete from the water or air that particular aeriform fluid which mingles with their juices, and which is neceſſary to life and nutrition. In many caſes theſe organs are placed externally, and are always in contact with the air or water from which they ſecrete. In other caſes they are lodged internally; and air or water are then alternately admitted and expelled by varieties of organs which ſerve as auxiliaries.

77 Reſpiratory organs of plants;

The plants ſecrete their aeriform fluid from water and air. They receive air along with the liquids of their abſorbents, which open on the roots, the trunk, and the branches, and upon the inferior ſurfaces of leaves; or, if nature has plunged theſe leaves under water, the abſorbents open and imbibe their fluids on both ſides. In many, however, the upper ſurface of the leaf is intended to inhale air. Bonnet obſerved, that when this ſurface was applied to the water the leaf died ſoon; but that when the lower ſurface was applied, it lived for months. It has alſo been remarked, that the upper ſurfaces of ſome leaves will repel water; and that the death of the leaf will enſue when its breathing pores are obſtructed with oil *. We hence learn why aquatic plants riſe up to the ſurface of the water and ſpread their leaves in the open air: and as it is proved by Ingenhouſe and others, that the reſpiration of many leaves is aſſiſted by light, we ſee a reaſon why plants growing in a dark room turn to the place where light is admitted; why the flowers and the leaves of many plants follow the diurnal courſe of the ſun; why the branches of trees, which require much light, die when placed in a thick ſhade; why moonſhine in autumn contributes ſo much to the ripening of grain; and why leaves and branches are arranged in ſuch a manner as leaſt to intercept that quantity of light which nature has allotted to the genius of each.

The air veſſels in the body of plants are thoſe veſſels which contain juices but at certain times, and which during the greateſt part of the ſeaſon are filled with air †. This air is collected from the ſap of the roots as it paſſes along the diametral inſertions, and from thoſe veſſels which open upon the trunk and upon the leaves ‡. Like pulmonary tubes, which are ſeen branching through the bodies of inſects, they perform an office ſimilar to that of the tracheæ and bronchia; and are thoſe general receptacles of air from which the neighbouring parts of the plant ſecrete what is needed: for in plants and a certain number of inſects, the functions of the lungs, the ſtomach, and the heart, are generally diffuſed. The ſeveral parts can reſpire, digeſt, and circulate fluids on their own account; and if they ſhould chance to be ſevered from the whole, can live and grow, and propagate their kind.

78 Of inſects;

The air veſſels are ſurrounded by thoſe which contain a liquid during the whole time of the growth. They are the largeſt veſſels of the wood, as diſtinguiſhed from the bark; and in the leaves they may ſometimes be ſeen even without the aſſiſtance of glaſſes. Their cavity is formed by certain fibres which wind ſpirally like a cork-ſcrew. In the leaf they generally approach and recede like the filaments of nerves; but they never inoſculate from one end of the plant to the other, except at the extremities §; they reſemble the pulmonary tubes of inſects by their general diſperſion over the ſyſtem, and the ſpiral rings of which they are compoſed (R); they differ in this, that the pulmonary tubes are frequently obſerved to anaſtomoſe in their larger branches, as the ramifications of a vein or artery do in their ſmaller capillary twigs.

79 And opinions concerning the pulmonary appendages in birds, &c.

The reſpiratory organs, which are ſimilar either to the gills of fiſhes or the lungs of man, can hardly here claim a deſcription, as their nature and forms are ſo generally known. There is one circumſtance, however, in birds which arreſts our attention: the cells of their bones, and the numerous veſicles of their ſoft parts which communicate with the lungs, have been deſervedly a matter of ſurpriſe to moſt phyſiologiſts. In accounting for their uſe, the ingenious Hunter ſuppoſed that they leſſened the ſpecific gravity and aſſiſted flying; that being the circumſtance which he thought moſt peculiar to birds. Learning afterwards that they were in the oſtrich and not in the bat, he ſuppoſed that they were appendages to the lungs. In amphibious animals, in the ſnake, viper, and many others, he obſerved, that "the lungs are continued down through the whole belly in form of two bags, of which the upper part only can perform the office of reſpiration with any degree of effect, the lower having comparatively but few air veſſels (S)." In theſe animals, the uſe of ſuch a conformation of the lungs was to him evident. "It is in conſequence of this ſtructure," ſaid he, "that they require to breathe leſs frequently than others." From this reaſoning he naturally

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* Botanic Garden, note 37.

† Grew's Anat. of Plants, B. 3. ch. 3. § 16.

‡ Ibid. B 3. ch. 2.

§ Grew's Anat. of Plants, B. 3. ch. 3. § 27—29.; and B. 4. part 1. ch. 4. § 17—19.

(R) See the ſpiral rings in the pulmonary tubes of a bee, Plate XVII. fig. 10. Swammerdam's Book of Nature, or Hiſtory of Inſects.

(S) The ſame obſervations were long ago made by the immortal Harvey. After obſerving that both the tranſverſe and longitudinal membranous diaphragms of birds contributed to reſpiration, he adds, " Et alia, ut nunc taceam. Avis præ cæteris animalibus non modo facillime reſpirat, ſed vocem etiam in cantu diverſimode modulatur: cum tamen ejus pulmones lateribus et coſtis adeo affixi ſunt, ut parum admodum dilatari, aſſurgere, et contrahi poſſint.

Quinetiam (quod tamen a nemine hactenus obſervatum memini) earum bronchia ſive aſperæ arteriæ fines in abdomen perforantur. Aëremque inſpiratum intra civitates illarum membranarum recondunt. Quemadmodum piſces et ſerpentes intra amplas veſicas in abdomine poſitas, eundem attrahunt et reſervant, eoque facilius natare exiſtimantur. Et ut ranæ ac bufones cum æſtate vehementius reſpirant, aëris plus ſolito in veſiculas numeroſiſſimas abſorbent (unde earum tam ingens tumor) quo eundem poſtea in coaxatione liberaliter exſpirent. Ita in pennatis pulmones potius *tranſitus et via ad reſpirationem* videntur quam hujus adequatum organum." *De Generat. Animal.* Exercit. 3.

turally inferred, that the motion of flying might render the frequency of reſpiration inconvenient; and that a reſervoir for air might therefore become ſingularly uſeful. The bat and the oſtrich, however, are here as formidable objections as before. The bird reſpires frequently when at reſt, and when it flies to our boſom from the hawk; that frequency ſeems to have been increaſed by what is a general and a common cauſe, an increaſed degree of muſcular exertion. Had air cells been intended merely to prevent the effects of a rapid motion on reſpiration, we might expect to ſee them in greyhounds and a number of quadrupeds, much more readily than in ſome birds whoſe flights are neither rapid nor long.

This great phyſiologiſt was not aware that the circumſtance moſt peculiar to birds was not their act of flying, but their feathers, which contain a large quantity of air, and which require a regular ſupply, whether they ſoar on the wings of the eagle, or remain on the ground, attending the oſtrich (T).

Both in amphibious animals and birds, the air of the veſicles has paſſed the reſpiratory ſurface of the lungs. In the tracheæ of plants and the pulmonary tubes and veſicles of inſects, it is only proceeding on its way to be reſpired. Would it be worth while to inquire whether vegetable ſubſtances, and thoſe which are called corneous in animals, require a different preparation of air from what is the common preparation of lungs? whether hair grows beſt, or the cuticle thickeſt over ſoft parts that are cellular and ſpongy (U)? and whether the animals that bear horns have larger ſinuſes in the frontal bone of their cranium than others? From the general diffuſion of air through the birds, and the ſituation of their veſicles beyond the lungs, it would appear that the pulmonary viſcus in theſe animals does not reſpire or ſecrete air for the whole ſyſtem; and we are certain, that in plants and inſects moſt parts reſpire the air for themſelves, and that there is no particular part appointed to ſecrete air for the whole.

80 Air abſorbed by the fluids which paſs along the reſpiratory ſurface.

We here ſpeak of reſpiratory organs as thoſe which ſecrete an aeriform fluid from water and air; but our language probably had been more accurate had we called them the organs in which an aeriform fluid is abſorbed by their liquid contents, as theſe flow by, either wholly or in part, in their courſe through the ſyſtem. It was long denied that any abſorption of the air took place from the pulmonary ſurface; and ſpeculative reaſoners had attempted to prove that no air could paſs to the blood through the membranes of the lungs, becauſe air had refuſed upon ſome occaſions to paſs through pieces of wet leather that had been expoſed to it for that purpoſe. Borelli, however, endeavoured to ſhow how air in the lungs might mingle with the blood, and how ſome always diſappeared in reſpiration. There are few doubts now entertained on this ſubject. Venous blood incloſed in a bladder by the celebrated Prieſtley diſcovered ſuch an attraction for oxygene, that it abſorbed the aeriform fluid through all the coats of the reſiſting medium, exhibiting an inſtance and beautiful illuſtration of the chemical affinities which take place in this function.

81 Two kinds of reſpiratory organs.

The reader will obſerve, that the two words *reſpiratory organs* are here employed in what may be called rather a particular ſenſe. The truth is, there are two kinds of reſpiratory organs, which, though ſometimes included in the general expreſſion, ſhould always be conſidered as perfectly diſtinct. The firſt kind comprehends thoſe in which the water and air is decompoſed; the ſecond, thoſe by which theſe fluids are properly applied to the reſpiring ſurfaces of the former. We obſerve theſe laſt in the fluttering motion of the leaf itſelf, or in that tendril which turns the ſurface of the

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(T) "The uſe of this retention (of the air in the veſicles of birds) is not well known to us, at leaſt in reſpect of the upper pouches; ſo in regard of the lower ones. The uſe of this retention has been explained in the deſcription of the OSTRICH: where it was ſhown that there is a probability that the air contained in the lower pouches ſerves to compreſs the viſcera, and make them riſe upwards. Some do think that this retention of air ſerves birds to render them lighter in flying, like as the bladder which is in fiſh helps them to ſwim. And this conjecture would have ſome foundation, if the air contained in the bladders of birds were as light in proportion to the air in which they fly, as the air contained in the bladders of fiſh is in proportion to the water in which they do ſwim. But to ſay ſomething which hath at leaſt a little more probability, waiting till we have a more certain knowledge of the truth and uſe of this retention of air, we conſider that the birds generally riſing very high, and even to the place where the air is a great deal lighter than it is near the earth, might be deprived of the principal advantages of reſpiration for want of an air whoſe weight might make on the heart and arteries the compreſſion neceſſary to the diſtribution and circulation of the blood: If they had not the faculty of containing a long time a portion of air, which being rarefied by the heat which this retention produceth therein, might, by enlarging itſelf, ſupply the defect of the weight of which the air that they do breathe in the middle region is deſtitute. For if there be a great many birds which do never riſe very high into the air, whoſe lungs have notwithſtanding theſe bladders in which the air is retained; there are alſo a great many that have wings which they uſe not for flying. And it may be obſerved, that there are found ſome parts in animals which have not any uſe in certain ſpecies, and which are given to the whole genus, by reaſon that they have an important uſe in ſome of the ſpecies. It is thus that in ſeveral kinds of animals the males have teats like the females; that moles have eyes; oſtriches and caſſowars wings; and that land tortoiſes have a particular formation of the veſſels of the heart which agrees only with water tortoiſes, as it is explained in the deſcription of the TORTOISE." *The Anatomical Deſcription of a Caſſowar*, by the Royal Academy of Sciences at Paris. We can hardly anſwer for the juſtneſs of this reaſoning, which maintains that the genus has uſeleſs parts merely in complaiſance to the ſpecies.

(U) Nails and hair grow after death, and a quantity of air is evolved in putrefaction.

82 Auxiliary organs of reſpiration,

the leaf to the ſun. We ſee them producing theſe oſcillatory motions in the branching gills of the *pulex arboreſcens*. When the breathing ſurface is within the body, we diſcover them again in the tracheæ of plants, whoſe cavity is formed by a ſpiral fibre that is ſeemingly intended for ſome kind of periſtaltic motion. We detect them likewiſe in the pulmonary tubes, in the ſpiral rings, and in the abdominal movements of inſects. We ſee them in fiſhes ſwallowing the water and propelling it onward through the fringes of the gills. In the frog, we note them by the motions of the pouch between the ſternum and the lower jaw. After this animal is divided tranſverſely behind the fore legs, this pouch continues to fill and to empty itſelf downwards by the trachea where the lungs were. When the whole integuments and ſome of the muſcles between the jaw-bone and ſternum are removed, we ſee how the pouch was dilated and contracted by a broad cartilage connected with the trachea, and attached by muſcles to the inſide of the ſternum and the neighbouring parts. When the pouch is enlarged, the air ruſhes in through the two noſtrils at that time expanded; and when it is contracting, the glottis ſtarts up with an open mouth to the middle of the pouch, and the air is preſſed down through the trachea to the lungs. This amuſing ſight will ſometimes continue for a whole hour. In man and all the warm-blooded quadrupeds, the thorax or cavity where the lungs are placed is dilated and contracted by the diaphragm and muſcles attached to the ribs. In the time of dilatation the glottis opens, as we ſee in birds: the air ruſhes in, ſupports the incumbent weight of the atmoſphere, and enables the thorax to expand wider. The expanding powers having made at laſt their uſual effort, their antagoniſts ſucceed, exert their force, and the air is expelled.

83 Aſſiſted by the preſſure of the atmoſphere

In applying either the water or air to the breathing ſurface, all theſe auxiliary organs are aſſiſted by the circumambient fluid which preſſes equally on all ſides. When a Florentine flaſk is applied to the mouth, and all communication between the larynx and external air entirely cut off, it requires an effort to bring the air of the flaſk into the lungs. The weight of the atmoſphere is therefore aſſiſting in reſpiration; and the air, whether in the lungs or the thorax (x), muſt not be ſo denſe as that which is without. When Verheyen perforated the thorax of a dog, and reſtored the equilibrium betwixt the external and internal air, the reſpiration of the lungs ceaſed, though for ſome time the alternate admiſſion and expulſion of air was continued through canulas introduced into the wounds.

84 How this preſſure raiſes the thorax.

It cannot ſurely be aſked here, how the preſſure of the atmoſphere ſhould be aſſiſting in raiſing the thorax and thus ſeemingly counteract itſelf? The heat of the lungs expands the air as ſoon as it enters. The air rapidly abſorbs moiſture; and though not uſually noticed by philoſophers, yet the ſudden expanſion, which is always the conſequence of that abſorption, is a very general phenomenon in nature. By this heat, or by this abſorption, the air would occaſion greater dilatation, were it not for the lungs, which ſeek to collapſe; the cartilages of the ſternum, which ſeek to recoil; and the ſtretched-out muſcles, which either ſpontaneouſly, or directed by the will, endeavour to contract and produce expiration.

85 How the expanſion is continued.

Having ſeen how the air will ruſh in on the opening of the glottis, we may alſo conceive how the ſhutting of the glottis will reſiſt the force of internal expanſion, and ſupport a weight laid upon the breaſt. The confined air will expand equally on all ſides, and the preſſure muſt be great before the ſpace which falls to the glottis can exceed its own muſcular force and the weight of the atmoſphere. It is this diffuſed preſſure of fluids that produces ſuch ſtriking wonders in hydraulics; and which explains how the droppings of the ureters ſhould expand the bladder even to a palſy, and overcome the abdominal muſcles.

86 Opinions concerning the organs of reſpition.

To account for the action of theſe organs which ſerve as auxiliaries in reſpiration, there have been ſuppoſed an appetite for air which prompts as a ſtimulus; an influence of the will, though we breathe while aſleep; and a natural inſtinct, which indeed may exiſt, but explains nothing. In ſpecifying the ſeveral organs concerned, we have heard of an expanſile power of the lungs, of a certain preſſure of the phrenic nerve, of a muſcular diaphragm, and of the action of oblique intercoſtals. But theſe explanations are from a limited view of the ſubject. The expreſſions uſed may indeed be general; but their meaning is particular, narrow, and confined; and their alluſion is only to man, or perhaps to a few of the warm-blooded quadrupeds: for where are the intercoſtals of the frog? where is the muſcular diaphragm of birds? where the preſſure of their phrenic nerve? and where the expanſile power of their lungs?

87 What organs form articulate ſounds.

It is fortunate for man that theſe aſſiſting reſpiratory organs are in ſome meaſure ſubject to his will. By this ſubjection he produces vocal ſound when he pleaſes, divides it into parts, varies it by tones, forms it into words, and enjoys the diſtinguiſhed and numerous advantages that may be derived from a ſpoken language.

Sect. II. *Digeſtion.*

88 Digeſtion.

As reſpiration ſucceeded the placenta in one of its offices by maintaining life, the function of digeſtion ſucceeds it in another by either continuing or ſupporting the growth of the living body. It depends on reſpiration for a portion of heat, and is that function by which the liquid and ſolid food undergoes its firſt preparation in the ſyſtem.

89 Gaſeous fluids compoſe the ſubſtance of all living bodies, and two of the gaſes form WATER.

Though gaſeous fluids, including the principles of heat and light, may be proved to nouriſh and compoſe the ſubſtances of all living bodies, yet a part only can enter the ſyſtem in a gaſeous ſtate. This part is changed by the lungs, or by thoſe fluids which they contain. The organs of digeſtion, before they can act on aerial bodies, muſt have them reduced to ſome new form. For the food of vegetables, this form requires to be water, whoſe 100 parts are found to conſiſt of $84\frac{4}{5}$ of oxygene and $15\frac{1}{5}$ of hydrogene. See Water.

(x) Suppoſing that there be any in the thorax.

When the gaſes have paſſed through both the watery and vegetable ſtates, they, as juices or ſolids, become the food of a great many animals. Theſe animals produce new changes, and by their preparation the gaſes become the food of others which are called carnivorous; and then the carnivorous and all living bodies, when the vivifying principle has ceaſed within them, and when they are haſtening to a ſtate of diſſolution, are devoured by others who feed on corruption, are partly converted into water and gas, and become in their turn the food of the kinds on which they had fed.

As theſe effects of the digeſting and aſſimilating powers are more ſurpriſing than any chemical proceſs of art, it may not be unpleaſing to take a more particular view of them. It has long been obſerved, that thoſe animals which are not carnivorous feed upon plants; and, ſince the days of Van Helmont and Boyle, it has been ſuſpected that plants live upon water and air. This ſuſpicion has now been confirmed by numerous experiments. Plants have been raiſed from diſtilled water without earth, and, inſtead of requiring a vegetable mould, have ſpread their roots in moſs, in paper, in cotton, in pieces of cloth, in pounded glaſs, and powder of quartz. From theſe facts, the ingenious Chaptal has been led to ſuppoſe that ſoils act but as ſo many ſponges, affording water in different proportions, and in different ways; and that all that the plant wants from the ſoil is a firm ſupport, a permiſſion to extend its roots where it chooſes, and that proportioned ſupply of humidity which will ſecure it againſt the alternatives of being inundated or dried up. To anſwer, however, theſe ſeveral conditions, he allows it to be neceſſary in many caſes "to make a proper mixture of the primitive earths, as no one in particular poſſeſſes them. Siliceous and calcareous earths (he ſays) may be conſidered as hot and drying, the argillaceous as moiſt and cold, and the magneſian as poſſeſſing intermediate properties. Each, in particular, has its faults, which render it unfit for culture. Clay abſorbs water but does not communicate it; calcareous earth receives and gives it too quickly; but the properties of theſe earths are ſo happily oppoſed that they correct each other by mixture. Accordingly we find, that by adding lime to an argillaceous earth, this laſt is divided, and the drying property of the lime mitigated, at the ſame time that the ſtiffneſs of the clay is diminiſhed. On theſe accounts it is that a ſingle earth cannot conſtitute manure, and that the character of the earth intended to be meliorated ought to be ſtudied before the choice of any addition is decided on. The beſt proportions of a fertile earth for corn are three eighths of clay, two eighths of ſand, and three eighths of the fragments of hard ſtone.

90 Vegetables live on pure water.

91 Uſe of ſoil to vegetables.

92 Uſe of agriculture to vegetables.

The advantages of labour conſiſt in dividing the earth, aerating it, deſtroying uſeleſs or noxious plants, and converting them into manure by facilitating their decompoſition."

So far is vegetable mould from communicating any thing new to plants, that it rather owes its formation to them*, and if ſea ſalt ſhould at times be requiſite to marine vegetations, it is to be remembered that ſalts, ſulphur, and lime, are all products of organized bodies; that iron (Y) itſelf has been diſcovered in plants and animals; and that even diamonds, quartz, cryſtals, ſpars, gypſum, &c. are found only in thoſe earths that are partly compoſed of an impoveriſhed vegetable reſidue, which provident nature ſeems to have reſerved for the reproduction or reparation of the earthy and metallic ſubſtances of the globe; while the vegetable mould on theſe organic parts that remain are made to ſerve as nouriſhment for the growth of ſucceeding plants (Z.)

* Chaptal's Elem. of Chem. vol. iii. part 4. § 2. in the beiginning, and § 5, art. 3.

93 Earths and metals vegetable productions.

If thoſe earths in which plants are reared, and which contain no vegetable mould, ſhould ever be ſenſibly diminiſhed in weight, a circumſtance, we believe, which ſeldom takes place if proper precaution be uſed to prevent it; yet if it ſhould happen, it ſhould not in that caſe be forgotten that gaſes are the general cements in nature; that they mix intimately with the hardeſt bodies; and that this ſenſible diminution of weight

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(Y) Whether iron exiſts formally in organized bodies, or is the reſult of decompoſition, it derives its origin ultimately from gaſes. Blood gradually decompoſed by putrefaction yielded not only more ſalts and lime, but much more iron than blood, ſuddenly decompoſed by lime. Though the greater part of an animal or vegetable, therefore, be without ſuch ſubſtances as ſalt, lime, iron; yet when decompoſed its parts may recombine, and thus produce them. See *Surgical and Phyſical Eſſays*, by Mr John Abernethy,

(Z) "Vegetables in their analyſis preſent us with certain metals, ſuch as iron, gold, and mangaueſe. The iron forms near one-twelfth of the weight of the aſhes of hard wood, ſuch as oak. It may be extracted by the magnet. We read in the *Journaux de Phyſique* an obſervation, in which it is affirmed that it was found in metallic grains in fruits. Vegetables watered with diſtilled water afford it as well as others.

"Becher and Kunckel aſcertained the preſence of gold in plants. M. Sage was invited to repeat the proceſſes by way of aſcertaining the fact. He found gold in the aſhes of vine twigs, and announced it to the public. After this chemiſt, moſt perſons who have attended to this object have found gold, but in much leſs quantity than M. Sage announced. The moſt accurate analyſes have ſhown no more than two grains, whereas M. Sage had ſpoken of ſeveral ounces in the quintal. The proceſs for extracting gold from the aſhes conſiſts in fuſing them with black flux and minium.

"Scheele obtained mangaueſe in the analyſis of vegetable aſhes.

"Lime conſtantly enough forms ſeven-tenths of the fixed reſidue of vegetable incineration. Next to lime, alumine is the moſt abundant earth in vegetables, and next magneſia. Siliceous earth likewiſe exiſts, but leſs abundantly; the leaſt common of all is the barytes. *Chaptal's Elements of Chemiſtry*, Part iv. § 3. art. 15.

See Salts, Sulphur, Iron, Lime, in *Elements of Chemiſtry*. See the *Matrix of Diamonds*; ſee *Chaptal*, vol. iii. Part 4. § 5. art. 3.

weight may be owing entirely to ſome diſſolution of the ſolid parts, and the conſequent extrication of the gaſeous fluids (A).

"Before we had acquired a knowledge of the conſtituent principles of water," reſumes Chaptal, "it was impoſſible to explain or even to conceive the growth of plants by this ſingle aliment. In fact, if the water were an element, or indecompoſable principle, it would afford nothing but water in entering into the nutrition of the plant, and the vegetable would of courſe exhibit that fluid only; but when we conſider water as formed by the combination of the oxygenous and hydrogenous gaſes, it is eaſily underſtood that this compound is reduced to its principles, and that the hydrogenous gas becomes a principle of the vegetable, while the oxygene is thrown off by the vital forces. Accordingly we ſee the vegetable almoſt entirely formed of hydrogene. Oils, reſins, and mucilage, conſiſt of ſcarcely any thing but this ſubſtance; and we perceive the oxygenous gas eſcape by the pores where the action of light cauſes its diſengagement."

94
Some animals live on water alone.

But though water conſtitute the aliment of plants, we muſt not ſuppoſe that it is the aliment of theſe alone: the leech and the tadpole* are nouriſhed by water, and many animals have no other food. "Rondelet§ cites a great number of examples of marine animals which cannot ſubſiſt but by means of water by the very conſtitution of their organs. He affirms, that he kept during three years a fiſh in a veſſel conſtantly maintained full of very pure water. It grew to ſuch a ſize, that at the end of that time the veſſel could no longer contain it. He relates this as a very common fact. We likewiſe obſerve the red fiſhes which are kept in glaſs veſſels, are nouriſhed, and grow, without any other aſſiſtance than that of water properly renewed †."

95
Some animals ſuppoſed to live upon ſand, and why.

The ingenious Borelli, who knew that plants and ſeveral animals ſubſiſted wholly by water and air, was likewiſe of opinion that ſome animals lived upon ſand. He could diſcover nothing but ſand in the ſtomachs of many teſtaceous animals that live in the water, and particularly in the ſtomachs of the ſmaller kinds that live buried in the ſand of the ſea. He could not conceive what elſe could be the food of thoſe ſmall fiſhes or worms which penetrate the ſubſtance of the hardeſt rocks, and form excavations that always bear a proportion to their bulk. He had regularly found that the ſtomachs of ſwans which he had examined were full of ſand; and, recollecting the pebbles in the gizzards of fowls, he was led to infer that theſe ſubſtances were ſomehow diſſolved in a gaſtric juice, and ſerved to nouriſh the harder parts, as the ſhells, the feathers, and the bones (B). Theſe ſentiments, on a ſlight view, might not be unnatural. From obſerving children of depraved appetites ſwallowing ſand, aſhes, and cinders; from having ſometimes met with ſand in the ſtomachs of wild ducks; from the uſual fæces of the earth-worm; and from the diſſection of ſeveral toads dug up in a garden, in whoſe ſtomachs we could ſee nothing but a quantity of earth, with pieces of coal, ſtone, and of ſlate, that had accidentally happened to be mixed with it (C), we long entertained a ſimilar opinion with this celebrated author: but on recollecting

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* Surgical and Phyſiological Eſſays by Mr Abernethy.

§ Lib. de Piſc. lib i. cap. 12.

† Chaptal's Elem. of Chem. vol. iii. part 4. § 2. art. 2.

(A) What follows is from the 33d additional note of Dr Darwin's *Botanic Garden*.

"Dr Prieſtley obtained air of greater or leſs purity, both vital and azotic, from almoſt all the foſſil ſubſtances he ſubjected to experiment. Four ounce weight of lava from Iceland, heated in an earthen retort, yielded twenty ounce meaſures of air.

4	ounce weight of	Lava	gave	20	ounce meaſures of air.
7	———	Baſaltes		104	———
2	———	Toadſtone	——	40	———
1½	———	Granite	——	20	———
1	———	Elvain	——	30	———
7	———	Gypſum	——	230	———
4	———	Blue ſlate	——	230	———
4	———	Clay	——	20	———
4	———	Limeſtone ſpar	——	830	———
5	———	Limeſtone	——	1160	———
3	———	Chalk	——	630	———
3½	———	White iron ore	——	560	———
4	———	Dark iron ore	——	410	———
½	———	Molybdena	——	25	———
¼	———	Stream tin	——	20	———
2	———	Steatites	——	40	———
2	———	Barytes	——	26	———
2	———	Black wad	——	80	———
4	———	Sand ſtone	——	75	———
3	———	Coal	——	700	———

"In this account the fixed air was previouſly extracted from the limeſtones by acids, and the heat applied was much leſs than was neceſſary to extract all the air from the bodies employed."

(B) A ſimilar inference was made by Mr Burt upon opening the ſtomach of the pangolin of Hindoſtan. See PANGOLIN.

(C) The third ventricle had a ſtrange body faſtened to its interior membrane. This body was compoſed of a hard membrane, in which there was gravel incloſed. Geſner ſays the chamois is accuſtomed to ſwallow gravel to clear his tongue and throat from the phlegm, which is apt to cover them, and deſtroy the appetite. *Anat. Deſcription of the Chamois or Gemp*, by the French Academy.

ing that many ſubſtances which enter the ſtomach are not nutritious; conſidering the balls of hair and of feathers which the carnivorous animals return, and that quantity of fæcal matter which is diſcharged by the inteſtines; having frequently experienced that a ſenſe of fulneſs removes hunger, and obſerved perſons as it were by inſtinct preſſing on the empty ſtomach with their hand—we began to ſuſpect that the ſwallowing of ſand, and a number of other indigeſtible ſubſtances, might not be to nouriſh but to prevent ſome cravings of the ſtomach, and that theſe cravings were in part occaſioned by a deficiency of the uſual preſſure which it receives from the neighbouring parts. In this opinion we were more confirmed, by hearing it was cuſtomary among ſome of the tribes of the north of Aſia to repel or mitigate the attacks of hunger by placing a board over the region which is called epigaſtric, and compreſſing it gradually by means of cords as the ſtomach collapſes; and by learning afterwards, on a further inquiry, that a ſimilar practice, and from ſimilar motives, was likewiſe common with ſome individuals in this country; who to alleviate the ſenſation of hunger, ſtraiten the epigaſtric region with their handkerchief. This practice, however, being often impoſſible with the brute kind, inſtead of bringing the neighbouring parts to preſs on the ſtomach, they are obliged to diſtend the ſtomach, and to bring it to preſs on the neighbouring parts. Of the two ways of producing this preſſure, the laſt is certainly the moſt natural. Senebier has ſuppoſed that diſtenſion of the ſtomach is the cauſe of the ſecretion of the gaſtric liquor; but how well or ill his opinion may be founded, daily experience permits not a doubt, that in order to ſatisfy the calls of hunger, the ſtomach requires not only to be nouriſhed, but to be filled, or at leaſt to have ſomething like a ſenſe of fulneſs; and this may probably be one reaſon for thoſe balls which are found in the ſtomachs of the chamois, which likewiſe ſwallows ſand, and in the ſtomachs of the cow, the ſheep, and of the horſe, "when they do paſs away the winter in ſnowy mountains, where they can find no graſs" (D).

96
Uſe of balls or ſand in the ſtomach.

97
The organs of digeſtion in the vegetable.

From this general view of the food, the natural tranſition is to thoſe organs by which it is prepared. As all plants are fed on nothing groſſer than liquids, we ſee the reaſon why they are all nouriſhed by abſorbents, and why, inſtead of one common alimentary canal, they are furniſhed with a number of capillary veſſels, which by their action aſſiſt the living power in moving the fluids along the trunk, the branches, and the leaves. Theſe fluids are obſerved to move between the different ligneous circles, and the more copiouſly as the wood is younger or the nearer the circles are to the bark. In the circles themſelves, it has been remarked that the ſap veſſels, from being empty during a great part of the growing ſeaſon, have been called air veſſels; that they are formed of ſpiral fibres, adapted to ſome periſtaltic motion (E): and it is plain, that by this ſtructure they are well fitted to propel their contents, whether water or air, upwards or downwards, backwards or forwards, according to the different poſitions of the plant.

98
Their action how promoted.

Beſides the particular action of the veſſels, a general concuſſion is received from the movement of the waters or winds, which ſerves as an exerciſe; a general dilatation is occaſioned by both moiſture and heat; and a general contraction by dryneſs and cold, which produce a motion ſomething ſimilar to that of the thorax ‡.

‡ Borelli de Generat. et Vegetat. Plantarum, prop. 132.

In the ſpringing ſeaſon the ſap aſcends through the empty veſſels before the leaves begin to appear. When the veſſels are filled through their whole extent, the buds ſwell, the leaves ſpread, and the flowers blow; the evaporation from the ſurface is increaſed; the ſap is diminiſhed by the abſorption; the ſucciferous veſſels now ceaſe to bleed (F); and the roots being unable to ſupply the waſte, the rains and the dews enter by the trunk, the branches, the leaves, and the petals of the flowers. When the evacuations are immoderately increaſed by exceſſive heat, or preternaturally obſtructed by the plucking of the leaves, by too much humidity, or other cauſes which prevent perſpiration, the plant ſoon either ſickens or dies. The chyle, which is formed in the ſap veſſels, has generally ſomething of a ſaccharine taſte.

99
Abſorption of moiſture in the vegetable.

100
In the animal.

Conſidering the forms of animal food, we may naturally expect in the animal kingdom a greater variety of thoſe organs employed in digeſtion. Moſt animals have indeed, like the vegetable, both inhaling and exhaling veſſels, by which ſome of their fluids are abſorbed, and evacuations regularly carried on. Except, however, in thoſe animals which ſubſiſt by liquids, theſe veſſels are of little importance in receiving food or ejecting what is fæcal from the ſyſtem. In theſe animals the abſorbents terminate in a hollow viſcus, which is called the alimentary canal, where the fluids undergo a preparatory change, and are partly reabſorbed for aſſimilation. In all others the food enters by a proboſcis (G), or by an aperture which is called the

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(D) Bartholine, quoted by the French Academy, thought that theſe balls were compoſed of the hair which the cows lick from their ſkin, or of the wool which the ſheep eat. But the horſe does not lick himſelf, and many of theſe balls ſeem to be compoſed of ligneous fibres. The balls which are found in the chamois are called by Velſchius *German bezoar*. See *Anat. Deſcription of Chamois or Gemp*, by the French Academy.

(E) "The ſuperior part of the inteſtine, which contained about thirteen inches, had a very particular ſtructure; for, inſtead of the ordinary circumvolutions of the inteſtines, the cavity of this was tranſverſely interrupted with ſeveral ſeparations, compoſed of the membranes of the inteſtine folded inwards. Theſe ſeparations were near half an inch diſtant from each other, and turned round like the ſhell of a ſnail or of a ſtaircaſe with an open newel." *Anat. Deſcription of the Sea-fox*, ibid. Theſe membranous folds running ſpirally, are not uncommon in the alimentary canals of animals.

(F) This happens in a great many plants.

(G) Every perſon may have an opportunity of ſeeing a proboſcis in a number of thoſe winged inſects which extract juices from plants. It is very eaſily diſcernable in the butterfly. In this inſect it is a fine moveable tube, 101 Food triturated in the mouth or ſtomach.

the *mouth*: this mouth is properly the entrance of the alimentary duct. It is very generally furniſhed with a tongue (H), which is uſually aſſiſting in deglutition; and if the food be of that nature to require cutting, tearing, or grinding, it is likewiſe furniſhed with the proper inſtruments (I) for theſe operations. When the food is teſtaceous or ſome hard vegetable ſubſtance, and theſe inſtruments not in the mouth, ſomething ſimilar may generally be expected in a more remote part of the canal. The crab and the lobſter have accordingly grinding teeth in their ſtomach, and granivorous fowls have a powerful gizzard lined with a thick corneous ſubſtance. It poſſeſſes the compreſſing force of the jaws; and ſmall pebbles which the animals ſwallow ſerve it for teeth.

102 In what manner diluted.

103 In different animals.

104 Rumination of birds.

Beſides mere trituration or grinding, the ſolid food will often require to be mixed with ſome additional liquid (K). In thoſe carniverous animals which chew, this liquid during the time of maſtication flows into the mouth from certain glands placed in the neighbourhood. In ſome ſpecies of the ape kind a previous dilution takes place in two pouches ſituated on the ſides of the lower jaw. In granivorous birds this dilution is very uſually performed in a ſac (L), which is a dilatation of the canal; and the food being macerated there by the glands or exhaling veſſels, gradually paſſes down (M), as is needed, to be triturated and farther prepared in the ſtomach. In the ruminating kind the dilution is performed in a ſimilar manner: but theſe having no muſcular ſtomach fitted for grinding inſtead of deſcending the food is brought up again into the mouth, and is then after the proper maſtication ſent to the ſtomach. If the food require no maſtication, it is ſent directly that way at firſt: a circumſtance which ſhows a curious diſcernment with reſpect to foods, and proves that their alimentary canal is ſubject to the action of voluntary muſcles as far as the ſtomach. Some of thoſe birds which have a diluting ſac or ingluvies ſeem likewiſe to ruminate. This in the parrot was obſerved by the gentlemen of the French academy. It has ſince been obſerved in rooks, macaws, cockatoos, and others; and Mr Hunter, to whom phyſiology is ſo much indebted, diſcovered, that the male and the female pigeon ſecrete in their ingluvies a certain liquor for feeding their young; and that moſt kinds of what have been thought ruminating birds do very often in expreſſing their fondneſs regurgitate their food. Yet both this and another ſpecies of regurgitation which is very common with thoſe animals that ſwallow indigeſtible ſubſtances with their food, ſhould be carefully diſtinguiſhed from rumination.

105 Part of the ſtomach ſerves as a reſervoir.

To the ruminating kinds the diluting ſac is by no means peculiar. The porpoiſe has one, though it does not ruminate; and many of thoſe animals which have none, as the rat, the hog, and the horſe, have a part of the ſtomach covered with a cuticle, and which muſt therefore principally ſerve as a reſervoir. The gullets of ſeveral fiſhes and ſerpents are ſacs of this kind. It frequently happens that a part of their prey is projecting from the mouth, while another part fills up the gullet and gradually deſcends, to be reduced in the ſolvent below. So very dilatable are the ſtomachs and gullets of ſome animals, that ſerpents have been often ſeen to ſwallow whole animals which, prior in the gorging, were larger than themſelves; and many polypes, and even ſome of the louſe kind will, by ſwallowing food, more than double their own bulk.

106 Number of ſtomachs.

Applying *ſtomach* as a general word to the different ventricles of the canal, we may here obſerve that every ſpecies of animals which ruminate have two ſtomachs, or at leaſt two diviſions in one; that ſome have three, as the gazella; and ſome four, as the cow, the dromedary, and the ſheep: but it muſt not be ſuppoſed that the number of ſtomachs is any proof of a ruminating power. It was ſaid already that the porpoiſe has two; the porcupine has three diviſions in one; and the ſingular caſſowar, although it be found to have four ſtomachs, does not rumi-

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tube, poſſeſſing a great variety of action. It ſerves for a hand, a mouth, and a gullet; and when not extended in ſearch of food, it is coiled up in circular folds. The elephant has both a mouth and proboſcis, and this proboſcis is one of the moſt ſingular of living organs.

(H) The crocodile has no tongue; the oſtrich, the ſeal, and ſome others have forked tongues; the cormorant has a double tongue; ſome, like the eagle, have a cartilaginous tongue; ſome, like the porcupine, have it toothed. We have found a bone in the tongue of a gooſe; the tongue of the cameleon, is a hollow trunk like a proboſcis; the tongue of the frog is forked and long—it is rolled up in the mouth, and originates from the fore-part of the lower-jaw. In ſome the tongue is the organ of taſte; in others, the inſtrument for ſeizing their prey. In diſtinguiſhing foods moſt animals rely chiefly on ſmell.

(I) Theſe inſtruments are corneous, bony, or calcareous; they are teeth or bills; their ſituation is the tongue, the jaws, the palate, or the ſtomach. Many teeth ſeem intended only for attack or defence, for ſeizing, killing, or retaining the prey. This is remarkable in the fangs of ſerpents, and in the large tuſks of the elephant, the barbirouſſa, and ſome other animals, where they have ſome reſemblance to horns, and project from the mouth. The philodotus and ant-eater have no teeth; the larvæ of inſects have generally two, which are placed externally, and cut like a forceps.

(K) There are many perſons whoſe tongues and months are naturally dry, and when they ſwallow a piece of bread muſt call for water or ſome other moiſtener. This complaint is even ſometimes general in a family, and is propagated like an hereditary evil through its different branches. Cockatoos and parrots have likewiſe dry mouths.

(L) The buſtard has no ſac of this kind; but the œſophagus is remarkable for the largeneſs of its glands.

(M) In the oſtrich the œſophagus paſſes down and returns, and the crop opens from below upwards into the gizzard.

ruminate; nor, although granivorous, is any one of the four a gizzard.

107 Reſervoirs of water in the Pelican and camel.

Somewhat different from theſe expanſions which we have been mentioning as exiſting in the firſt part of the alimentary canal, is a ſort of pouch (N) which hangs from the neck and the lower mandible of ſeveral birds, and which, like the two pouches of apes, may be uſed either to macerate the food or to carry proviſions from a diſtance to their young. The pelican, a native of warm countries, employs this pouch ſometimes to carry a quantity of water; and another native of the ſame countries, we mean the dromedary, was obſerved to have at the top of the ſecond of the four ventricles a number of ſquare holes, which being the orifices of as many cavities between the membranes which compoſe the ventricle, reminded the gentlemen of the French academy of thoſe large reſervoirs of water which Pliny mentions to be in camels; and for which, according to his ſtory, their guides have opened them ſometimes in caſes of extreme thirſt.

108 The gaſtric juice.

We come now to one of the principal agents in digeſtion. Independent of the fluids which mingle with the food in the mouth, the gullet, or macerating ſacs, there is one denominated the *gaſtric juice*, and which, either by itſelf or along with others from the aliments or ſyſtem, acts in ſome meaſure as a ſolvent. It is ſecreted from large glands at the entrance of the gizzard, from veſſels or glands in the coats of the ſtomach, and perhaps moſt plentifully near the pylorus: it powerfully reſiſts the putrefactive fermentation; it coagulates milk and the white of an egg; it diſſolves food even when incloſed in metallic tubes; and when life ceaſes, it acts frequently on the very ſtomach from which it was ſecreted. Its taſte, its colour, and its ſolvent powers, are different in different claſſes of animals. It ſeems to be modified according to the age, the health, the habit, and the different aliments on which they live. The ſick and the child are incapable of digeſting the food that is proper for a healthy man. The hawk kind, after loathing bread and throwing it up without any change, can be gradually brought to take it for food; and Gaſſendi has mentioned a certain lamb which, being fed on bread, cheeſe, and on fleſh, refuſed afterwards to taſte graſs*. But what is moſt ſurpriſing in the gaſtric juice, is, that it ſpares all living bodies, as thoſe worms which exiſt in the ſtomach, and the ſtomach itſelf while it is alive; and it differs otherwiſe from a chemical ſolvent, in that it has an aſſimilating power, and reduces all ſubſtances, whether animal or vegetable, on which it acts, to a certain fluid of determinate properties, which is called *chyle*.

* Borelli de Nutritione Animal. prop. 194.

109 The bile and pancreatic juice.

Beſides the gaſtric, the food again, after paſſing through the ſtomach, is mingled with a greeniſh ſaponaceous liquor, which is called *bile*, and which flows either immediately from the liver or from a veſicle into which it had regurgitated as into a blind gut; at the ſame time nearly it is mingled with another reſembling the ſaliva from the pancreas or ſweet-bread; a gland or glands whoſe place is ſupplied in a great many fiſhes by a number of vermicular appendages to the ſtomach.

110 Other juices.

111 The cœca of the alimentary canal.

In ſhort, from one extremity of the alimentary canal to the other, fluids are perpetually flowing into its cavity from glands. veſſels, or organic pores; and the membranes conſtantly ſecreting a mucus to protect themſelves from the acrimony of their contents. This acrimony muſt often be conſiderable near to that end of the canal where the fæces are diſcharged; for as the firſt part of the canal has generally one or more dilatations which are called *ſtomachs*, and ſecretes at leaſt one fluid which is ſtrongly antiſeptic, ſo the laſt part has generally appendages which are called *cœca*, where the food always remains for ſome time, and where, from the quantity of animal matter that happens to be mixed with it, it becomes putreſcent. The office of the cœca is ſometimes ſupplied by the largeneſs and convolutions of the colon (O); to which gut the ileum cannot, when it enters laterally, ſo eaſily communicate its periſtaltic motion. As the ſtomachs were the receptacles of the food when it entered, the cœca are receptacles of the fœcal matter before it be diſcharged. They are of various forms and capacities; they are often larger than the ſtomach itſelf; are often compoſed of proportionally thin and tranſparent membranes; and from their contents have often a colour ſomewhat reſembling that of the gall-bladder. Their number is different in different animals. Some have but one. The birds which have them have generally two; the buſtard has three; and Swammerdam has diſſected inſects which had four. As ſome ſtomachs have a number of folds which hang pendulous within their cavity, and increaſe their ſurface, ſo have often the cœca as well as ſome portions of the canal. The cœcum of both the rabbit and the hare is curiouſly formed. It is large and beautiful; it is rolled up like a cornu ammonis; it has the like outward appearance; and a fold running ſpirally is obſerved within. The animals which live on vegetable food have uſually the greateſt length of the canal, and the greateſt number of ſtomachs and of cœca: yet the caſſowar, which has no gizzard, has no cœcum; and the polype, which is ſaid to be all ſtomach, is properly ſpeaking rather all cœcum.

112 Action of the alimentary canal.

113 Strength of muſcular ſtomachs firſt eſtimated by Borelli.

To ſee more fully the proceſs of digeſtion, we muſt not overlook that general and organic action which takes place through the whole alimentary canal. The power of maſtication exerted in the mouth is obvious to all. But the force of ſome ſtomachs has till very lately been known to few; we allude here to that of the muſcular or gizzard kind: for Abbé Spallanzani has divided ſtomachs into three ſorts; the muſcular, the membranous, and intermediate. The immortal Borelli, who was probably the firſt that tried the force of the muſcular ſtomachs by throwing into them nuts of filberds, hollow ſpheres of glaſs, hollow cubes of lead, ſmall pyramids of wood, and ſeveral other very hard ſubſtances, ſuppoſed that the power exerted by the ſtomach of the Indian cock (P) was equal to 1350 pounds

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(N) A pouch of this kind is obſerved in the common rook.

(O) The bear, whoſe inteſtines are 40 feet long, has nothing reſembling a colon or a cœcum.

(P) The original is *gallus Indicus*, which in the writings of Longalius, Geſner, and Aldrovandus, means a bird pounds weight. The force of an intermediate ſtomach cannot be ſo great, and that of a membranous one muſt be ſtill leſs. Each ſeems to have more of the ſolvent as it has leſs of the muſcular power. The moſt membranous are aſſiſted by the action of the neighbouring parts, and expel their contents as readily as the ſtrongeſt. The muſcular ſort is either wholly of principally confined to certain kinds of birds and of fiſhes, as nature has meant that the grain or the ſhells which they uſe as food ſhould firſt be triturated before it be ſubjected to the gaſtric juice. This comminution takes place in their ſtomach, becauſe it is plain that had bones or muſcles, fully equal to all theſe effects, been placed in the head, the form of the animal muſt have been altered, or that equilibrium which it preſerves in thoſe fluid elements through which it moves been completely overturned.

114
Motions of the alimentary canal.

As to the movements of the alimentary canal, the direction of hairs found in the ſtomachs, and the balls of hair which are thrown up, would appear to indicate a circular motion. The inteſtinal part has a motion ſimilar to that of a worm, and is called the *vermicular* or *periſtaltic*. Here every portion retains its own motion, although it be ſeparated from the reſt by ligatures. The ſtomach of the polype, the gullets of the ruminating kinds, and the cœca, have this motion in different directions at different times; and that obſerved in the alimentary canal of a louſe is, when viewed through a microſcope in the time of action, amazingly rapid: the ſtimulating cauſes employed are the food, the different liquors with which it is mixed, the air, the nerves where they exiſt, and a portion of heat. Some degree of heat is neceſſary to every proceſs of digeſtion both in the animal and vegetable kingdom: what that degree is depends on the nature of the living body; and is various according to its age, its health, its employments, and habits. The ingenious Hunter has mentioned the digeſtive and generative heats; and thoſe gardeners who are verſant in the operations of hot-houſes, have on their thermometers the ſwelling, flowering, and the ripening heats, with a great many others for the ſeveral plants which they mean to raiſe.

115
The kinds of ſtimuli employed.

116
The vinous, acetous, and putrefactive fermentations

Among the other cauſes of digeſtion ſome authors have ranked fermentation: and it muſt be allowed, that ſomething ſimilar to the putrefactive fermentation takes place in the cœca and the lower extremity of the inteſtine, and that the vinous and acetous fermetations but too frequently occur in our ſtomach when that viſcus is morbidly affected (Q).

117
Heat neceſſary to digeſtion.

Much of the hiſtory of living bodies relates to the different degrees of heat, the varieties of ſoil, and the kinds of food concerned in digeſtion. The plants grow where the ſoil and the heat are congenial to their nature; and thoſe which admit of the greateſt variety with reſpect to ſoil, and the largeſt range on the

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bird different from the *cocq d' Inde* or Turkey cock. Johnſton has called it *gallus Perſicus*. See *The Anatomical Deſcription of two Indian cocks* by the French Academy. *Gallina Indica* is Ainſworth's Latin for the Guinea hen. See *Borelli de Nutrit. Animal.* Prop. 189, 190, 191.

(Q) "It may be admitted as an axiom (ſays Mr Hunter), that two proceſſes cannot go on at the ſame time in the ſame part of any ſubſtance; therefore neither vegetable nor animal ſubſtances can undergo their ſpontaneous changes while digeſtion is going on in them; a proceſs ſuperior in power to that of fermentation. But if the digeſtive power is not perfect, then the vinous and acetous fermentation will take place in the vegetable and the putrefactive in the food of thoſe animals which live wholly on fleſh. The gaſtric juice therefore preſerves vegetables from running into fermentation and animal ſubſtances from putrefaction; not from any antiſeptic quality in the juice, but by making them go through another proceſs, prevents the ſpontaneous change from taking place.

"In moſt ſtomachs there is an acid, even although the animal has lived upon meat for many weeks: this, however, is not always the caſe; therefore we muſt ſuppoſe it is only formed occaſionally. Whether the ſtomach has a power of immediately ſecreting this acid, or firſt ſecretes a ſugar which afterwards becomes acid, is not eaſily aſcertained: but we ſhould be inclined to ſuppoſe from analogy the laſt to be the caſe; for animals in health ſeem to have the power of ſecreting ſugar, as I find in the milk, and ſometimes in the urine from diſeaſe. The acid prevails ſometimes to ſo great a degree as to become a diſeaſe, attended with very diſagreeable ſymptoms; the ſtomach converting all ſubſtances which have a tendency to become acid into that form: the ſugar of vegetables, and even ſometimes vinous ſpirits turning directly into acid.

"To aſcertain whether there is an acid naturally in the ſtomach, it will be proper to examine the contents before the birth when the digeſtive organs are perfect, and when no acid can have been produced by diſeaſe or any thing that has been ſwallowed. In the ſlink calf, near the full time, there is acid found in the ſtomach, although the contents have the ſame coagulating powers with thoſe of animals who have ſucked.

"Spallanzani gives the opinion of authors reſpecting digeſtion; and ſo anxious is he to combat the idea of its being fermentation, that he will hardly allow that fermentation ever takes place in the ſtomach. That fermentation can go on in the ſtomach, there is no doubt. It is often found that milk, vegetables of all kinds, wine, and whatever has ſugar in its compoſition, become much ſooner ſour in ſome ſtomachs than they would if left to undergo a ſpontaneous change out of the body; and even ſpirits in certain ſtomachs almoſt immediately degenerate into a very ſtrong acid. All oily ſubſtances, particularly butter, very ſoon become rancid after being taken into the ſtomach; and this rancidity is the effect of the firſt proceſs of the fermentation of oil. Mr Sieffert has been able to reſtore rancid oils to their original ſweetneſs, by adding to them their due quantity of fixed air; the loſs of which I conſider as the firſt proceſs in this fermentation, ſimilar to what happens in the fermentation of animal and vegetable ſubſtances." *Obſervations on Digeſtion by Mr Hunter.*

the ſcale of heat, are the fartheſt diſperſed over the globe. 118 One intention of the locomotive power in living bodies to procure food. As every ſoil has uſually ſome regular ſupply of moiſture, the plants that can live upon that ſupply extend their roots under the ſurface where their liquid food is the leaſt expoſed to evaporation, and meeting there with the conſtant nouriſhment which they require, they remain in that ſituation for life (r). If their trunks be ſo feeble as to need a ſupport, they creep on the ground, they climb the face of a neighbouring rock, or cling to the body of ſome of the ſtatelier children of the foreſt. Their range for food is extremely limited: it is chiefly confined to the ſmall ſpace which happens to be occupied by their roots and branches; yet if any uncommon exertion be neceſſary, the branches will bend, and the leaves turn to drink of the water that is paſſing by. If the roots be laid bare they will again plunge into the earth; if a ſtone or a ditch be thrown in the way, they will move round or will dip downwards, and ſpread into the ſoil on the 119 Exerted by plants. other ſide: if there they arrive at one that is unfriendly they will not enter; but if a favourite earth ſhould be near, though not in their direction, they will twiſt about, advance as they grow, and at laſt meet it. In all theſe caſes the prop, the water, and ſoil, muſt be neceſſary; they muſt alſo be within a very ſmall diſtance, otherwiſe the plants cannot perceive them, or will fail in their languid attempts to approach them.

It may be conſidered as a general fact, that whereever food is liberally ſupplied for a whole lifetime in one place, the creatures which uſe it have ſeldom much locomotive power, or much inclination to exerciſe it in 120 Farther obſervations on the locomotive power. a long continued and progreſſive line. The curious inſect is therefore obſerved to depoſit its offspring in thoſe places where the proſpect of genial warmth and of plenty ſeem to preclude the future neceſſity of wandering or reſearch; and when this offspring is about to paſs into a new ſtate, and the organs foretel that a change or perhaps a variety of food will ſoon be required, the appearance either of wings or of legs do likewiſe foreſhow that the power of locomotion is to be increaſed. Even nobler animals in their fœtal ſtate, where they live upon one ſpecies of food, and where that is afforded in regular plenty do ſpread out their roots, adhere to their ſoil, and become as ſtationary as the plant itſelf; and even when that ſupply is withdrawn, and they are expelled, yet if the ſtate into which they emerge be helpleſs and feeble, if their organs of digeſtion have a weak ſolvent or maſticating power, particularly adapted to ſome eaſily aſſimilated food, and if that food be preſented either by their parent or nature without their exertion, their power of locomotion is not great, nor is it exerciſed in wandering afar. It is when the organs of digeſtion are ſtrong, and the appetite inclines to variety of aliment, and they are diſpoſed and feel themſelves able to wander in ſearch of it; and that then they may be ready to move at intervals from place to place, when the enemy comes or the ſpirit prompts them, nature has directed them to ſolid food, and has given them a large alimentary canal with ſtomachs, with convolutions, and cœca, where they may lay up proviſions for a journey; but afraid to entruſt them with too much freedom, leſt in their excurſions they might wander from the places where ſubſiſtence is found, there are two appetites, hunger and thirſt, which never fail in a ſtate of health to remind them of their duty.

This variety of food, and the manner in which it is affected by climate are the cauſe of the many and ſingular migrations from ſpot to ſpot, from country to country, and from ſea to ſea: 121 Some final cauſes of the torpid ſtate. they are the cauſe of a ſtate of torpor in the hedgehog and the bear; and they partly explain the provident foreſight of the ant and of the bee. Animals of great locomotive power, in order to provide for themſelves and their offspring, remove to a diſtant country or climate when they ſee the ſigns of approaching famine. Thoſe of leſs locomotive power, and who are incapable of migrating far, as if warned by heaven, lay up a ſtore for the ſcarcity to come; or ſhould their food be of that kind as not to be eaſily preſerved for a ſeaſon, they require no ſecret warning to hoard it at the time when it fails, their ſyſtem becomes ſuſceptible of torpor, and they are enabled to ſleep through the ſtorm of trouble and of want. The ſource of this want is in moſt inſtances to be traced to the nature of the plant and inſect. The plant which has little heat of its own depends on the ſun or ſome other agent for one of the great cauſes of digeſtion. When this agent refuſes the neceſſary heat, the plant muſt decline; its leaves, its juices, and its fruits muſt fail. The inſect tribe, which had no other food, or which like the plant could not maintain their vivifying warmth, muſt likewiſe ſubmit to the ſame fate. The various animals which live on either the one or the other, according to their ſeveral diſpoſitions and characters, retire to their ſtores, to their dens of torpor, or migrate to a country to which they are led by unſeen guides to ſhare in its abundance. Of theſe laſt the rail (s) and the ſwallow are the only two which are ſometimes arreſted, and which, with the bear, the hedgehog, and the toad, are obliged to remain in the dwellings of torpor till the genial ſeaſon of warmth and of plenty.

Sect. III. *Abſorption.*

When the food has undergone the firſt preparation, which is called *digeſtion*, and the chyle (t) is formed in the

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(r) Many of the fat plants live chiefly by the abſorption of moiſture from the air; and many ſea-plants float through the ocean, and having plenty of food wherever they go, they ſend out no roots in order to ſearch for it.

(s) All the birds on the lakes of Siberia are ſaid by Profeſſor Gmelin to retreat ſouthward on the commencement of froſt, except the rail, which ſleeps buried in the ſnow. Account of Siberia quoted by Dr Darwin in his *The Loves of the Plants.*

(t) the chyle of different living bodies has not yet been analyſed; in man it is generally a whitiſh fluid reſembling milk, and yielding water, oil, ſugar, and a coagulable lymph.

122
Farther progreſs of the food in plants,

the alimentary canal or ſap-veſſels, it is thence taken up by means of abſorption for the uſe of the ſyſtem. From the veſſels it paſſes into the whole cellular tiſſue, compoſed of veſicles, and cloſely interwoven with all the vaſcular part of the plant. From the veſicles or utricles of the cellular tiſſue it enters the vaſa propria and glands, which contain and prepare the fluids and ſecretions peculiar to the ſpecies.

123
In animals.

124
The lacteals diſcovered in 1622.

125
Thoracic duct diſcovered in 1651.

126
Lymphatics diſcovered before 1653.

127
Uſe of the lymphatics diſcovered before 1654.

In the animal economy it was always ſuppoſed that the chyle was abſorbed by the ramifications of the red veins ſpreading on the gut, till the 1622, when Aſellius an Italian diſcovered the lacteals (U) running on the meſentery of a living dog, and printed his account of them in 1627. As he had not traced their courſe very far, he naturally thought that they went to the liver, which was then imagined to be the organ of ſanguification. This opinion, with reſpect to the place where they entered the veins, continued to be general till 1651, when Pacquet in France publiſhed his account of the thoracic duct (X). With great candour this author acknowledged, that he had been led to make the diſcovery by obſerving a whitiſh fluid mixed with the blood in the right auricle of the heart of a dog, which kind of animal it had been cuſtomary to diſſect alive ſince the time of Aſellius. "This practice of opening living animals furniſhed likewiſe occaſions (ſays Dr Hunter) of diſcovering the lymphatics. This good fortune fell to the lot of Rudbec firſt, a young Swediſh anatomiſt, and then to Thomas Bartholine (Y) a Daniſh anatomiſt, who was the firſt who appeared in print upon the lymphatics. His book came out in 1653, that is, two years after that of Pecquet; and then it was evident that they had been ſeen before by Dr Highmore and others, who had miſtaken them for lacteals; but (adds Dr Hunter) none of the anatomiſts of thoſe times could make out the origin of the lymphatics, and none of the phyſiologiſts could give a ſatiſfactory account of their uſe (Z)." He had not known that Gliſſon, who wrote in 1654, has aſcribed to theſe veſſels the office of carrying the lubricating lymph from the ſeveral cavities back into the blood; and that Frederic Hoffman has expreſſed the doctrine of their being abſorbents very explicitly*.

128
Their valves diſcovered in 1664.

It was on the 19th of June 1664 that Swammerdam diſcovered the valves of theſe veſſels; and Ruyſch, who had ſeen them, perhaps very nearly about that time, firſt gave an account of them in a ſmall treatiſe which he publiſhed at the Hague in 1665.

129
Injected with mercury before 1691.

The beſt mode of demonſtrating the lymphatics we probably owe to the celebrated Nuck, who, as a ſpecimen of that complete ſyſtem of Lymphography which he meant to publiſh (A), printed in 1691 his adenography, or deſcription of the glands. In this treatiſe he not only tells us how he brought them into view, but in his plates repreſents many of them as filled with his new mercurial injections; a happy invention, which perhaps was ſuggeſted by remarking the extreme ſubtility of mercury when employed in the cure of venereal infection.

A method by which he inflated theſe veſſels led him to ſuppoſe that they took their origin from veins or arteries, either immediately or through the intervention of ſome follicles (B.) The celebrity of his name procured credit to this miſtake; and notwithſtanding the

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* Medic. Ration. Syſtem. lib. i. § 2. cap. 3.

(U) We learn from Galen, that the lacteals in kids had long before been ſeen by Eraſiſtratus, who called them *arteries*.

(X) This duct had been ſeen before by Euſtachius. See *Euſtach. de Vena ſine pari.*

(Y) The diſcoveries of Rudbec and Bartholine were made in the years 1651 and 1652, about which time Jolyffe an Engliſhman ſaw alſo the lymphatics.

(Z) Drs Hunter and Monro claim the merit of having found out the true uſe of the lymphatics. The former ſays that he taught it in his lectures ſo early as 1746, and appeals to his pupils for the truth of the aſſertion. The latter ſeems to have made the diſcovery in 1753; and in 1755 publiſhed an account of it in a theſis *De Teſtibus in variis Animalibus*. Before the printing of this theſis, Dr Black told him that the ſame opinions concerning the valvular lymphatics had been long entertained by Dr Hunter. In 1756 Dr Monro attended Dr Hunter's lectures in London; heard the whole doctrine of the lymphatics very fully explained; and in 1757 reprinted his opinion at Berlin without taking notice of Dr Hunter's, who charges him with plagiariſm; and the charge is retorted by Dr Monro.

(A) Lymphographiæ, quod offertur ſpecimen, ubi lectori non ingratum percepero ad alias tranſiturus tum partes, non minus quam hæ, lymphaticus ductibus ſuperbientes. *Præfatio ad Adenographiam.*

Nuck had traced lymphatics on the exterior parts of the head and neck, on the membrane of the lungs, on the ſpaces between the ribs, in the loins, on the diaphragm, on the heart, the ſpleen, on the liver, the gall-bladder, on the ſtomach, on the meſentery, on the tunica albuginea of the teſtes, in the feet, and in the hands. Ita (continues he), ut multiplici experientia et variis partium præparationibus eo uſque pervenerim ut *integrum lymphaticorum ſyſtema* a capite ad calcem mihi compoſuerim, cujus delineationem libenter tecum communicabo, ubi partium nonnullarum hactenus nondum ſatis examinatarum, Lymphographiam abſolverimus. *Anton. Nuck de Inventis novis Epiſtola Anatomica ad D. D. B. G. Med. Doct.*

(B) Quidam nervos conſtituunt vaſorum lymphaticorum principia; alii glandulas minores; alii membranas: nec deficiunt qui a tendinoſa muſculorum parte eadem deducunt. Sed miſſis aliorum ſententiis, dicam modo; varia me hanc circa ſpeculationem molitum fuiſſe, variis experimentis (irrito licet ordinario conatu) varia tentaſſe, caſuque tandem nonnulla detexiſſe quæ lucem, hic adferre poſſunt.

Ante triennium, mundando lieni vitulino intentus, omnique ſanguine, aquæ tepidæ ope, jam eloto, copioſum in arteriam ſplenicam infudi aërem, et, ſpiritu fortius adacto, non tantum plurimas exiguas in ſuperficie lienis vidi elevari veſiculas, ſed ex iiſdem veſiculis vaſa prodire lymphatica, flatu etiam turgida et lienem perreptantia vidi, et quo diutius arteria fuit inflata, eo majorem notavi vaſorum numerum, ita ut, hac arte per inflictum

the ſounder opinion of Gliſſon, of Hoffman, and ſome others, the old notion that the veins performed the office of abſorbents came ſo far down as the great names of Haller and of Meckel. The arguments, however, by which it was ſupported are ſhown now, and particularly by thoſe of the Hunterian ſchool, to have been injections that were not ſkilful, obſervations that were not accurate, and concluſions that were not logical; while the boaſted aſſertion that birds and fiſhes were without lacteals and without lymphatics, has been diſproved by the fortunate diſcoveries of Mr Hewſon and Dr Monro. Excepting, therefore, in the penis and placenta, and in thoſe animals whoſe veins may be injected from the gravid uterus, the lymphatics ſeem to perform the whole buſineſs of abſorption. They contain a fluid that is coagulable like the lymph of the blood, and are called valvular to diſtinguiſh them from the arteries that do not admit the red globules. They derive their origin from the cellular membrane, from the different cavities, and from the ſurface. Some authors ſay that they have ſeen them in the brain (c), and theſe Maſcagni has ventured even to deſcribe in prints. That ſome indeed may exiſt in the brain, has not been denied; but to believe that they have been found, and to truſt aſſertions which are not countenanced by the obſervations of ſkilful anatomiſts, requires a faith which for our part we do not pretend to. Both they and the lacteals derive their name from the colour of the fluids which they contain. They both empty themſelves into the veins; but moſt of the lymphatics in the human ſubject, and all the lacteals, firſt unite in the thoracic duct, which near the heart leads into the courſe of the circulation.

130 Diſcovered in birds and fiſhes.

131 Have been ſeen in the brain.

Sect. IV. *Circulation.*

After part of the food is converted into chyle, and this chyle abſorbed by the lacteals, and brought into the courſe of the circulation, it remains to be diſtributed to all the different parts of the ſyſtem. On this account, Hippocrates ſpeaks of the uſual and conſtant motion of the blood [‡], of the veins and arteries as the fountains of human nature, as the rivers that water the whole body, and which if they be dried up man dies [§]. He ſays that the blood veſſels are for this reaſon everywhere diſperſed through the whole body; that they give ſpirits, moiſture, and motion; that they all ſpring from one; and that this one has no beginning and no end, for where there is a circle there is no beginning (d). In ſuch language was the prince of phyſicians accuſtomed to expreſs his vague ideas of a circulation; for ſo far was he from having acquired accurate conceptions on this ſubject, that when he ſaw the motions of the heart, he believed that the auricles were two bellowſes to draw in air, and to ventilate the blood.

132 Hippocrates ſpoke of the circulation of the blood, but his language is vague.

When after his time anatomy came to be more ſtudied, the notions of the ancients reſpecting the blood were better defined; and, however chimerical they may ſeem to us, they were partly derived from diſſection and experiment. On opening dead bodies, they found that the arteries were almoſt empty (e), and that very nearly the whole of the blood was collected in the veins, and in the right auricle and ventricle of the heart. They therefore concluded that the right ventricle was a ſort of laboratory; that it attracted the blood from the Cavæ; by ſome operation rendered it fit for the purpoſe of nutrition, and then returned it by the way that it came. From the almoſt empty ſtate of the arteries, they were led to ſuppoſe that the right ventricle prepared air, and that this air was conveyed by the arteries to temper the heat of the ſeveral parts to which the branches of the veins were diſtributed.

133 Arteries diſcovered to be almoſt without blood in dead bodies.

To this laſt notion entertained by Eraſiſtratus, Galen added an important diſcovery. By certain experiments, he proved that the arteries contained blood as well as the veins. But this diſcovery was the occaſion of

134 Proved by Galen to contain blood in living bodies.

[‡] Hippocrat. de Morbis, p. 127.

[§] Hippocrat De Corde.

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flictum vaſis lymphaticis vulnus aer immiſſus membrana linealis fere tota lymphaticis ductibus obſeſſa fuerit viſa.

Ab eo tempore conjicere cæpi vaſorum lymphaticorum principia ab arteriarum ſurculis emanare, idque aliquando intermedia veſicula, aliquando deficiente veſicula, immediate ab ipſa arteria venave. *Adenographia curioſa*, cap. 4.

(c) Sed rogare videris, utrum in cerebro etiam vaſa occurrant lymphatica? Quamvis ex recentioribus, nonnulli in eorum deſcriptione ſatis liberales, eadem concedant et facile admittant: Verum, quod paſſim obſervo, ſyſtemata in proprio cerebro formant et viſcera ex ſuo placito componunt: ad experimenta enim provocati nihil egregii præſtare valent. Nunquam hac in parte, ut ingenue loquar, hactenus Scopum attingere potui. Interim non negandum cenſeo aliquando cerebri lymphatica in una aut altera parte fuiſſe viſa; et non ita pridem, anatomicus quidam mihi amiciſſimus, inter alia inventa, hæc nobiſcum, communicat. "Vidi, inquit, lymphaticum in cerebro Bovino, quod examine tuo (ut originem ſcias et inſertionem) erit digniſſimum. Non longe a glandula pineali, a qua ramos forte habet, incumbit plexui choroideo, ad infundibuli latera ſeſe extendens." Ante biennium ductum lymphaticum ex pini glandula eodem modo ut aliis glandulis, exeuntem vidi. Ita ut quidem certiſſimum, et cerebrum ſuos habere rivulos aquoſos, ſed nondum diſtincte, in lucem protractos. *Epiſt. Anat.*

(d) *Hippocrat de Venis.* "Plato, in his Timæus, ſpeaks of the heart as a watch-tower completely fortified, as the knot of the veins, and the fountain from whence the blood ariſes, and briſkly circulates through all the members. The blood he calls the paſture of the fleſh; and adds, that for the ſake of nouriſhing the remoteſt parts, the gods have opened the body into a number of rivulets like a garden well ſtocked with plenty of canals, that the veins might by this means receive their ſupply of moiſture from the heart as the common ſource, and convey it through all the ſluices of the body." The reſt of the paſſage cited by Longinus is as full of nonſenſe as it well can hold: and indeed Longinus ſeems chiefly to have admired it for ſomething which had ſtruck him as divine and unparalleled in its tropes, as making the head a citadel, the neck an iſthmus, the vertebræ hinges, and the fleſh a rampart. See *Longinus on the Sublime*, § 32.

(e) Eraſiſtratus opened dead bodies at Alexandria.

135 How Galen ſuppoſed the blood to paſs between the right and left ventricle of the heart.

of ſome embarraſſment. How was the blood to get from the right to the left ventricle? To ſolve the difficulty in which his new diſcovery had involved him, he ſuppoſed that the branches of the veins and arteries anaſtomoſed (F); that when the blood was carried to the lungs by the pulmonary vein, it was partly prevented by the valves from returning; that therefore during the contraction of the thorax it paſſed through the ſmall inoſculating branches to the pulmonary vein, and was thence conveyed along with the air to the left ventricle to flow in the aorta (G). This opinion, ſo agreeable to fact, unfortunately afterwards gave place to another that was the reſult of mere ſpeculation.—This notion was, that the left ventricle received air by the pulmonary vein, and that all its blood was derived through pores in the ſeptum of the heart.

136 Another opinion, ſuppoſed to be Galen's, refuted by Veſalius.

137 Veſalius rouſed the attention of anatomiſts to diſcover the true paſſage of the blood between the ventricles.

138 The paſſage diſcovered, and Galen's opinion revived, by Michael Servede and others.

139 The whole circulation very nearly diſcovered by Cæſalpinus.

The paſſage thro' the ſeptum being once ſuggeſted, and happening to be more eaſily conceived than one thro' the lungs, it was generally ſuppoſed the only one for a number of centuries; and ſupported likewiſe, as it was thought, by Galen's authority, it was deemed blaſphemy in the ſchools of medicine to talk of another. In 1543, however, Veſalius having publiſhed his immortal work upon the ſtructure of the human body, and given his reaſons in the ſixth book why he ventured to diſſent from Galen, he particularly ſhewed how it was impoſſible that the blood could paſs through the ſeptum of the heart. His reaſoning rouſed the attention of anatomiſts; and every one grew eager to diſcover the real paſſage which the blood muſt take in going from the right to the left ventricle. The diſcovery of this fell firſt to the lot of Michael Servede, a Spaniſh phyſician, who publiſhed his opinion, and revived the old doctrine of Galen, in 1553 (H). But his opinion did not ſpread at the time; the book in which it made its appearance contained hereſy, and was therefore deſtroyed by public authority. Fortunately, however, the ſame diſcovery was again made by Realdus Columbus, profeſſor of anatomy firſt at Padua and afterwards at Rome, who printed his account of it in 1559. Many others who were engaged in the ſame reſearch were equally ſucceſsful, and Andreas Cæſalpinus even ſingularly lucky. It appears by his peripatetic queſtions printed at Venice in 1571, and reprinted there with his medical queſtions in 1593, that he knew not only the leſſer circulation, but had obſerved that there were times when the blood flowed from the branches of the veins towards their trunks, and that veins ſwelled between their ligature and the extremities, and not between the ligature and the heart. From theſe obſervations, he neceſſarily inferred that the veins and arteries anaſtomoſed; and having alſo contemplated the nature of all the valves which were then known, and had been known ſince the days of Galen, he ventured to aſſert that the blood could not return by the arteries to the left ventricle. One ſhould imagine that from ſuch concluſions he muſt have diſcovered the true circulation; but he did not. Being a zealous peripatetic, he thought himſelf bound to maintain with Ariſtotle that the blood flowed, like the tides of Euripus, backwards and forwards in the ſame channel; and therefore ſuppoſed that it flowed from the arteries into the veins in the time of ſleep, and from the veins back into the arteries in the time of waking. The greater circulation, ſo far as we can learn, was not even dreamed of by this writer. A farther ſtep was yet to be made towards its diſcovery; and this was reſerved for another profeſſor of the Paduan ſchool.

140 Had almoſt forced itſelf upon Fabricius ab Aquapendente.

In 1574, Hieronymus Fabricius ab Aquapendente, while he was ſeeking for a cauſe to explain the varicoſe ſwellings of ſome veins which had ariſen from friction and ligature, he to his great joy and aſtoniſhment diſcovered their valves in one of his diſſections: and here again the true theory of circulation ſeemed almoſt unavoidable. Yet whoever reads the ſmall treatiſe *De Venarum Oſtiolis*, firſt printed by Fabricius in 1603, will ſoon perceive that he was as far from entertaining a juſt notion of the circulation as his predeceſſors. Notwithſtanding all that he ſaw, he ſtill was of opinion that the blood flowed from the heart to the extremities even in the veins. He thought that the valves were intended by nature only to check and moderate its force. He calls them an inſtance of admirable wiſdom, and miſtakes his own aukward conjecture for one of the deſigns of infinite intelligence. In another reſpect it muſt be confeſſed that he bore no inconſiderable ſhare in promoting the diſcovery of the circulation (I). By writing on the valves, the formation of the fœtus, and the chick in ovo, he directed the attention of his pupil Harvey to thoſe ſubjects where it was likely that the motion of the blood would frequently occur.

141 At laſt diſcovered and fully demonſtrated by his pupil Harvey.

Harvey was born at Folkſton in Kent in 1578, completed his ſtudies at the Univerſity of Cambridge, went to Padua, and was there admitted to the degree of doctor, with unuſual marks of approbation, in 1602. He examined the valves with more accuracy than

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(F) In toto eſt mutua anaſtomoſis atque oſculorum apertio arteriis ſimul cum venis. *De Uſu*, part 6. cap. 10.

(G) It was the opinion of Galen, that the motion of the lungs and the pulſe of the arteries was to cool the blood, and to expel the fuliginous vapour. That he had juſt ideas of the leſſer circulation through the lungs, and of the true nature of the valves, is evident from the paſſages cited by Harvey, *De Motu Cordis*, Exercitat. 1. cap. 7.

(H) The words in which he mentions this diſcovery are theſe: "Non per parietem cordis, uti vulgo creditur, ſed magno artificio a dextro cordis ventriculo, longo per pulmones ductu agitatur ſanguis ſubtilis." Being born at Villa Nuova, in the kingdom of Arragon, he ſometimes called himſelf Michael Villanovanus, or ſimply Villanovanus. In the title of all his books he takes the name of *Reves*, which is formed from Servede, by throwing out the *de* and tranſpoſing the five letters that remain. The book in which his diſcovery was mentioned was printed clandeſtinely, and intitled *Chriſtianity Reſtored*. Being firſt impriſoned at Vienne in Dauphiny, and afterwards allured to Geneva by the treachery of his correſpondent and confident John Calvin, he was, by a ſervant of that reformer's, accuſed of blaſphemy, and condemned to the flames in 1553.

(I) Almoſt the whole merit of his diſcovery is due to the Paduan ſchool, of which Cæſalpinus as well as Columbus was once a profeſſor.

142 The merit of Harvey in this diſcovery.

than his maſter Fabricius; and explained their uſe in a treatiſe which he publiſhed ſome time after. It is uncertain when he firſt conceived his celebrated doctrine of the circulation; but about the 1616 he taught it in his lectures, and printed it in 1628. He was the firſt author who ſpoke conſiſtently of the motion of the blood, and who, unbiaſſed by the doctrine of the ancients, drew rational concluſions from his experiments and obſervations. His books preſent us with many indications of a great mind, acute diſcernment, unwearied application, original remark, bold inquiry, and a clear, forcible, and manly reaſoning (K); and every one who conſiders the ſurpriſe which his doctrine occaſioned among the anatomiſts of thoſe days, the ſtrong oppoſition that it met with from ſome, and thoſe numerous and powerful prejudices which it had to encounter from the ſanction of time and of great names, muſt allow it was new, and that the author has from its importance a title to rank in the firſt claſs of eminent diſcoverers ancient or modern.

143 How the blood is circulated.

His diſcovery ſhowed, that in moſt animals the blood circulates in arteries and veins, and through the medium of one, two, or of more hearts: that in arteries it moves from the trunk to the branches; and that, meeting there with the branches of veins, it returns in a languid ſtream to the heart; that the heart communicates a new impulſe; that it drives it on to the trunk of the arteries; and that the arteries, by the thickneſs of their coats, exerting a force, do puſh it onwards again into the veins.

In every part of this circulating courſe, there are valves ſituated where it is neceſſary; they are meant to prevent the return of the blood; they are at the beginning of the great arteries, and are found in different places of the veins where their feeble action requires to be aſſiſted.

The veins, before they enter the heart, generally expand into a thin muſcular ſac, which is called the *auricle*. It receives the blood while the heart is contracting; and when the heart admits of dilatation, contracts itſelf, and throws the blood into the ventricle.

We have here called the ventricle a heart; though what is uſually meant by the heart be a ventricle and auricle; or ſometimes a ventricle and two auricles, where the veins approach in different directions, and, without bending to meet one another, expand at two different places. Two hearts are ſometimes united, ſo as in appearance to form but one.

144 In different animals.

From our having mentioned more than one heart, it will be ſuppoſed that the modes of circulation are various. In ſome animals the heart throws its blood to the remoteſt parts of the ſyſtem (L); in other animals it throws its blood only into the reſpiratory organs: from theſe organs it is collected by the branches of veins; and theſe branches, uniting in a trunk, convey it to an artery, which renews the impulſe, and acts as a heart. In a third ſet of animals, the blood from the reſpiratory organs is carried by the veins to another heart; and this ſecond heart, united in the ſame capſule with the firſt diſtributes the blood by the channel of its arteries to the ſeveral parts. In the human fœtus, and the fœtus of thoſe animals which have two hearts, a part of the blood, without taking the paſſage through the lungs, proceeds directly from auricle to auricle. In amphibious animals, the auricular paſſage continues open during their life, and is employed, when the breathing ceaſes, under the water. In many inſects, a number of hearts, or expanſions which anſwer the purpoſe of hearts, are placed at intervals on the circulating courſe; and each renews the impulſe of the former, where the momentum of the blood fails. In the *Sepia Loligo* the two ſeparate parts of the gills are each ſupplied by a heart of its own: the blood from both is collected into one; which, by two arteries opening at two different parts, ſend it at once to the oppoſite extremities. In numbers of animals, the heart, like the ſtomach, is in the extremity oppoſite to the head.

145 How the circulation is demonſtrated in dead bodies.

After the diſcovery of the circulation, the moſt intereſting object with anatomiſts was to demonſtrate it in a clear, ſatisfactory, and eaſy manner. Harvey, to ſhow it with every advantage that he could think of, was obliged to open animals alive: but whether the animals were dead or alive, the larger branches of the veins and arteries were only to be ſeen, and even theſe but in certain caſes, when they happened occaſionally to be full of blood. That admirable method, which is now obſerved in demonſtrating the courſe of the circulation, we owe to the great anatomiſts of Holland who flouriſhed in the laſt century.

146 Diſcovery of De Graaf,

About 1664, Regnier de Graaf invented the ſyringe, which is now uſed; and, accompanied with a print, publiſhed an account of it in 1669. His injection was uſually a thin fluid of a blue green or ſome other colour; this injection tranſuded through the veſſels, allowed them to collapſe by its general diffuſion, and broke out through the firſt opening that happened in its way. A fluid which hardened after being injected, and which preſerved the veſſels diſtended, was a happier contrivance. This at firſt was either melted tallow or wax, of a colour ſuiting the taſte of the anatomiſt.

147 Of Swammerdam.

So early as the year 1667, the celebrated Swammerdam injected the veſſels running on the uterus with ceraceous matter; and, jealous

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(K) Dr Hunter ſays, that "none of his writings ſhow him to have been a man of uncommon abilities. It were eaſy to quote (he ſays) many paſſages which bring him nearly to a level with the reſt of mankind. He lived almoſt 30 years after Aſellius publiſhed the lacteals, yet to the laſt ſeemed moſt inclined to think that no ſuch veſſels exiſted. Thirty hours at any time ſhould have been ſufficient to remove all his doubts; but this ſubject taken up in ſelf-defence (continues the Doctor) grows unpleaſant." Dr Hunter was here thinking of his own diſcovery when brought in compariſon with that of Harvey's. When this compariſon was leſs immediately in view, he ſays that "Dr Harvey, as appears by his writings, was certainly a firſt rate genius for ſagacity and application; and his name is deſervedly immortal on account of the many obſervations and improvements he made in anatomy and phyſiology." *Dr Hunter's Firſt Introductory Lecture.*

(L) We never exclude the action of the arteries.

jealous leſt another ſhould claim the merit of ſuch an invention, he tranſmitted preparations, accompanied with plates, and with a full account of his method, to the Royal Society of London in 1672.

148 Of Ruyſch.

Soon after, his friend Ruyſch acquired ſuch ſkill in the art of injecting, that he has not been ſurpaſſed by any ſince his time. He diſcovered veſſels in many parts where they were not ſuppoſed to have had an exiſtence; and, contrary to the opinion of the great Malpighi, he ſhowed that even many of the glands were entirely vaſcular; and that what had been ſuppoſed excretory ducts, deriving their origin from ſome follicle, were but terminations of arteries continued: yet even Ruyſch could not exhibit in all caſes the courſe of the veſſels ſo well as we do now. Another diſcovery was yet to be made for demonſtrating their ſmall capillary branches running through a part.

149 Of Dr Nicholls.

This was reſerved for the very ingenious Dr Nicholls of London; who invented the method of corroding the fleſhy parts with a menſtruum, and leaving the wax, as it was moulded by the veſſels, entire.

150 Circulation not univerſal in living bodies.

From theſe reſearches, which evince circulation to be a function ſo general among animals, ſome are diſpoſed to think it takes place in all living bodies. But notwithſtanding the faſhionable language of circulating fluids, of veins, arteries, and even of valves in the vegetable ſtructure; yet nothing performing the office of a heart, and nothing that ſeems to conduct fluids in a circular courſe, has been found in plants.

151 None in plants nor in ſome animals.

In the vegetable kingdom, the chyle is diſtributed to all the parts from the numerous veſſels which convey the ſap; and theſe veſſels, being fitted by their ſtructure to carry the ſap either downwards or upwards, from the branches to the roots, or from roots to the branches; is the reaſon why plants inverted in the ground will ſend forth roots from the place of their branches, and ſend forth branches from the place of their roots. Even a ſimilar diſtribution of the chyle takes place in ſome animals. In the human tœnia, in the faſciola hepatica of ſheep, and in moſt polypes, the chyle, without a circulating ſyſtem, is conveyed directly to the different parts from the alimentary canal.

152 A ſuppoſed circulation of the bile.

The taſte for circulation may at laſt ſubſide. Till the buſineſs of abſorption from the inteſtines was, of late, fully ſecured to the lacteals, we were wont to have alſo learned diſſertations upon a circular motion of the bile. The jaunt which it took was not very cleanly; but it was ſocial: it went with the fœces down the inteſtines, and returned with the blood in the meſeraic veins.

153 Opinions concerning the red colour of the blood.

Beſides the circulation, another circumſtance reſpecting the blood, which ſometimes has engaged the thoughts of phyſiologiſts, is the colour which it has in moſt animals. The late Mr Hewſon was of opinion, that the lymphatics, with the ſpleen (M) and the thymus, contributed greatly to the formation of the red globules. He was ſeemingly led to entertain this opinion from that attention to the lymphatics which made him aſcribe much to their power, and from ſeeing red particles in the abſorbents which riſe from the ſplenic and the thymic gland. His reaſoning, however, though very ingenious, is not concluſive. The celebrated Nuck, who had often obſerved a reddiſh fluid in the lymphatics, aſſures us, without any hypotheſis, that ſuch an appearance was always preternatural; and was either occaſioned by a ſcarcity of lymph, or by ſome irregular and too much accelerated motion of the blood (N).

154 Reſpiration changes the colour of the blood.

It is well known that the blood receives its vermilion colour in paſſing through the lungs; that animals with lungs have the blood redder than thoſe which are ſeemingly without that organ; and that the colour, as well as the heat, is in proportion to the extent and perfection of the lungs. It has alſo been obſerved, that oxygenous gas is abſorbed in reſpiration; and been proved by experiment, that the red globules of the blood, and the red only, contain iron. It thence would appear, that the colour is owing to iron calcined by the pure air, and reduced to the ſtate of a red oxid From this manner of conceiving the phenomena, ſays Chaptal, we may perceive why animal ſubſtances are ſo advantageous in aſſiſting and facilitating the red dye (O).

A great variety of experiments have ſhewn how much the colour and conſiſtence of the blood is altered by

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(M) Before we can expect to arrive at a proper knowledge of the ſpleen, we have firſt to examine its form, its proportion, its ſituation, its numbers, and its different circumſtances in different animals; and as yet this has been done only in a few caſes. The gentlemen of the French Academy found, that in the demoiſelle it was like the liver, in the buſtard like the kidney of a quadruped, in the chamois round and flat, in the lynx narrow and long, in ſome animals proportionally large, in others proportionally ſmall; that in the gazella it was joined immediately to the ſtomach, without a vas breve; that in the caſtor, again, it was attached to the left ſide of the ſtomach by eight veins and arteries, and as many vaſa brevia; that in the otter it was faſtened to the epiploon, in the Canada ſtag to the great ventricle; and they found that in the porcupine and ſea-fox it was double. Since their time Dr Monro has obſerved two large ſpleens, one attached to the ſmall and the other to the large curvature of the ſtomach of the ſqualus ſquatina or angel-fiſh, whoſe blood contains few red particles; and the ſame eminent phyſiologiſt found in a ſturgeon no fewer than ſeven, one of the ſize of a dried horſe-bean, and the reſt about the bulk of a dried garden-pea.

(N) Interim non diffiteor vaſa illa lymphatica lympham ſubinde vehere rubicundo colore tinctam, loturæ carnis ad inſtar ſe habentem. Hoc autem nunquam contingit in ſtatu naturali, verum poſt nimium et irregularem ſanguinis motum. Vel in quibus humidum (ob defectum alimenti) deficit, qua occaſione plerique humores vitiantur, et colore preternaturali tinguntur. Quid mirum itaque hiſce in caſibus et lympham reddi ſanguineam. *Adenographia*, cap. 5.

(O) *Chaptal's Chemiſtry on the Properties of the Blood.* The phyſiologiſts of laſt century accounted for the red colour in another way. Rubedo ſanguinis (ſays Verheyen) pro magna parte procedere videtur ab alimentorum particulis ſalinis ac ſulphureis ſeu oleoſis exaltatis. Cujus non leve indicium eſt, quod lixivium ex cineribus vulgari modo paratum notabiliter rubeat, in quo, præter aquam, vix aliud quam ſal et ſulphur reperibile eſt:—et lac (quod

155 Action of the veſſels changes the colour and qualities of the blood.

by the mere action of the veſſels; and this diſcovery has enabled us to conjecture with more certainty than we did formerly, why in infants and phlegmatic perſons the blood is paler, in the choleric more yellow, and in the ſanguine of vermilion red. It explains likewiſe, in ſome meaſure, why the blood varies in the ſame individual, not only with regard to the ſtate of health, but likewiſe at the ſame inſtant; and why the blood which circulates through the veins has not the ſame intenſity of colour, nor the ſame conſiſtence, as that of the arteries; and why the blood which flows through the organs of the breaſt differs from that which paſſes languidly through the viſcera of the lower belly. This power of the veſſels over the blood will bring us alſo to the true cauſe why the veſſels vary in the denſity of their coats and in their diameters; why they are ſometimes convoluted in a gland; why they ſometimes depoſite their contents in a follicle; why they are ſometimes of a ſpiral form; why the branches ſtrike off at various angles; why they are variouſly anaſtomoſed; why they ſometimes carry the blood with diſpatch and ſometimes ſlowly through a thouſand windings. By thoſe means their action is varied, and the blood prepared in numerous ways to anſwer the ends of nutrition and ſecretion.

156 Great variety of this action.

Sect. V. *Nutrition.*

157 Food changed by different organs.

Nutrition is the function which aſſimilates the food in the ſeveral parts, and which finiſhes the proceſs already begun in the ſtomach, in the lungs, and the vaſcular ſyſtems. In perfect animals ſome of the ſtages of this proceſs are diſtinctly marked. The chyle, which has ſome reſemblance to milk, is the work of the alimentary canal: it undergoes ſome new changes by the action of the lacteals and of their glands, when they exiſt. In the courſe of circulation it paſſes along the reſpiratory organs, and is mixed with oxygene or ſome other gas: by this mixture, the conſequent heat, and the action of the veſſels, it is turned into blood. The blood, when examined, ſpontaneouſly ſeparates into three parts; an albuminous part or a ſerum, a coagulable lymph (p), and red globules. The two firſt are analogous to the white parts of an egg, by which the chick in ovo is nouriſhed; the globules have ſome reſemblance to the yolk, which ſerves afterwards as food to the chick in the more advanced period of life. The three parts contain each a variety of principles which are originally compoſed of gaſes: theſe principles, conveyed through veſſels of various forms, of various diagonals, and with various degrees of motion and of heat, and all along varying as they paſs, arrive at laſt on the confines of the parts which are wrapt up in a cellular tiſſue or ſome other membrane. The tiſſue or membrane gives a new change; the parts nouriſhed perform the office of ſecreting organs; and as the action of the veſſels is varied according to the place to which they are tending and the parts which they enter, we partly ſee the manner in which bone, muſcle, cartilage, and nerve, are all ſecreted from a common maſs.

158 Aſſimilated by the cellular tiſſue and the parts which are nouriſhed.

In worms and polypes, the function of nutrition is after digeſtion carried on almoſt entirely by the cellular tiſſue; and in plants by a tiſſue cellular and veſicular. In all living bodies the cellular tiſſue, beſides giving a form to the parts, and beſides preventing friction and coheſion, certainly performs ſome important office. Many have thought it the organ of nutrition; and it ſurely is one of the organs employed in aſſiſting to aſſimilate the nutritious fluid. But it ſhould be remembered, that all the parts of the living body are aſſimilating organs; that each part aſſimilates for itſelf; and that the ſtomach, the reſpiratory organs, the veſſels, and nerves where they exiſt, are aſſiſtant to the whole and to one another.

159 Opinions concerning nutrition and the organs concerned.

It is ſingular how any ſhould have imagined that the nerves are peculiarly the organs of nutrition, or that growth ſhould be owing to the addition of ſome organic and vivifying particles pre-exiſting in the food. Theſe phyſiologiſts have not demonſtrated the exiſtence of nerves in all living bodies; and theſe organic and vivifying particles have as yet been diſcovered but in their fancy. Dr Monro has condeſcended to prove, that the limb of a frog can live and be nouriſhed, and its wounds heal, without any nerves: and Mr Hunter has given many curious inſtances of a living and nutritious power in the blood.

160 The rapidity and ſlowneſs of aſſimilation in different circumſtances.

In plants and animals, the aſſimilating power has always certain limits preſcribed to it: its influence is very generally confined to the ſort of food congenial to the ſpecies: and its ſtrength is varied according to circumſtances; as the age, the habits, and the ſtate of health. Thoſe which are young aſſimilate faſter than thoſe which are old; and one ſpecies, which may partly be owing to the nature of their food, will aſſimilate much faſter than another. Certain worms that feed on animal and vegetable ſubſtances will, in 24 hours after their eſcape from the egg, become not only double their former ſize, but will weigh, according to Redi, from 155 to 210 times more than before. Moſt oils are of very difficult aſſimilation; and thoſe which are eſſential will often reſiſt the long continued and the varied action of the living organs; will mingle with

161 Eſſential oils difficultly aſſimilated.

(quod ſulphure abundare probat butyri inflammabilitas), ſi coquatur cum ſale lixivioſo, colorem plane ſanguineum contrahat; quod ſimiliter decoctum ex aqua, ſulphure vulgari, et ſale tartari ad confectionem lactis ſulphuris paratum rubeſcat; quod cerviſia et quædam alia diuturniori coctione ruborem contrahentia, iiſdem principiis ſcateant, &c.

Ad intenſiorem ſanguinis rubedinem multum quoque contribuunt particulæ nitroſæ, quæ beneficio reſpirationis ex aëre in ſanguinis maſſam jugiter tranſmittuntur; ſiquidem color ille coccineus magiſque ſplendens quo paſſim ſanguis arterioſus a venoſo diſtinguitur, in pulmonibus jugiter alitur ac renovatur.

Rubedinem autem hoc modo facile excitari poſſe amplius confirmatur ex eo, quod vitrum, etiam centrum librarum capax per unicam unciam ſpiritus nitri rarefacti, omnino repletum appareat materia rubeſcente. *Verheyen de Sanguificatione.* Verheyen uſes the word ſulphur for any inflammable ſubſtance.

(p) Senac was the firſt who diſcovered this lymph.

with the parts, and, undecompounded, communicate their flavour.

162 Aſſimilating power of flame.

An aſſimilating power is not peculiar to living bodies; it is obſerved in ferments and contagion, and is ſo obvious with reſpect to flame which is neither living nor organized, that whole nations who have ſeen it feeding on inflammable ſubſtances, have been diſpoſed to think it was animated, to call it the principle of life itſelf, and to pay it a kind of religious homage as the proper emblem of that Being by whom the whole univerſe is upheld.

In living bodies nutrition is only a ſpecies of ſecretion.

Sect. VI. *Secretion.*

163 Every living body in a ſtate of conſtant waſte and repair.

Is a function in which a part is ſeparated from the whole, and generally with ſome change of its qualities. In the caſe of nutrition it was obſerved, that all parts ſecrete for themſelves; and that ſome few, as the lungs, the ſtomach, the veſſels, and the nerves, officiate beſides for the general uſe of the whole ſyſtem. If all the ingeſta were to remain and to be aſſimilated, the body would go on continually increaſing. But living bodies are conſtantly in a ſtate of waſte and repair. In moſt animals part of the ingeſta is carried off by evacuation, without having entered the mouths of the abſorbents; part, which enters the abſorbents and veins, is thrown off by exhaling arteries or the urinary paſſage: and experiments with madder prove that the lymphatics, beſides originating from all the cavities and carrying back the lubricating fluids, do enter the ſubſtance of the hardeſt bones, and convey particles that had been aſſimilated back into the blood.

164 An office not generally aſcribed to the abſorbents.

165 Sweat and urine interchanged, and their odour.

This office has not been generally aſcribed to the abſorbents; nor has it been very generally ſuppoſed that the blood receives the excrementitious matters of the ſyſtem, and that one intention of the circulation was either to return them for reaſſimilation or to diſcharge them by exhaling veſſels or by the kidneys. Decayed parts, however, are diſcovered in the feces evacuated by the inteſtines; in the clouds, the ſediment, and colour of the urine, and by the ſmell of the perſpirable matter. The two laſt, on certain occaſions, and for ſome time, have often ſupplied the place of one another; and all the three, the feces, the urine and perſpirable matter, we have reaſon to believe are remarkably diſtinguiſhed by two kinds of odour; the one peculiar to the whole ſpecies, the other peculiar to the individual. By the perſpirable matter which adheres to the ground, and of which the odour is diffuſed by moiſture, the dog not only diſtinguiſhes a man from any other animal, but is able to trace his maſter through a crowd.

166 Evacuations of plants by exhaling veſſels.

The natural evacuations of plants, and of ſome few animals which feed by abſorbents, are all by perſpiration or exhaling veſſels. The urine in quadrupeds is before emiſſion collected in a veſicle, and thence carried off by the genital organ. In birds, and in a number of fiſhes, the ureters empty themſelves into the rectum, and their contents are evacuated along with the feces.

167 Some matters evacuated, ſome ſecreted for uſeful purpoſes.

Beſides being uſed to denote the function, the word ſecretion is ſometimes employed for the matters ſecreted. In this ſenſe there are various ſecretions. Beſides the feces, the urine, and the ſweat, and the vapour from the lungs, which are excrementitious, there are ſecretions which anſwer uſeful purpoſes in the ſyſtem. Of theſe the moſt important and general are the bile, the ſaliva, the gaſtric juice, and the pancreatic, which aſſiſt in digeſtion; the lymph and the fat, which lubricate the parts; the mucus, which protects them from acrid ſubſtances; the nervous fluid, which forms a very conſpicuous link between body and mind; the ſeminal fluid employed in generation to propagate the ſpecies; and the lacteal intended for ſome while to ſupport the young after they emerge from the fetal ſtate.

168 The ſaliva.

169 Concretions formed by it.

The ſaliva is a fluid that mixes with the food in the time of maſtication. In man it is ſecreted from the parotid, the ſublingual, and ſubmaxillary glands (Q); it is watery and ſomewhat viſcid; it is found to retard and moderate fermentation: it has ſometimes a tendency to form calculi like the urine. By theſe concretions it incruſts the teeth and ſometimes obſtructs the ſalivary ducts. It is the ſeat of the rabies canina.

170 The gaſtric juice.

Upon firſt examination the gaſtric liquor ſeems to poſſeſs a ſolvent power upon animal and vegetable ſubſtances without any great preference of affinity. The reaſon is, it varies according to the nature of the aliment; "it is ſometimes acid, ſometimes inſipid. Brugnatelli has found (ſays Chaptal) in the gaſtric juice of carnivorous birds and ſome others a diſengaged acid, a reſin, and an animal ſubſtance, united with a ſmall quantity of common ſalt. The gaſtric juice of ruminating animals contains ammoniac, an extractive animal ſubſtance, and common ſalt. In our time the phoſphoric acid has been found diſengaged in the gaſtric juice" of the gramenivorous kinds.

171 The bile.

"The bile ſecreted by the liver is glutinous or imperfectly fluid like oil, of a very bitter taſte, a green colour inclining to yellow, and froths by agitation like the ſolution of ſoap. Its conſtituent principles are water, a ſpiritus rector, a coagulable lymph, a reſinous oil,

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(Q) Theſe glands are very rarely met with in birds. It is mentioned as a ſingular circumſtance in the demoiſelle of Numidia, that "in the lower beak, on both ſides of the tongue, under the inward tunicle of the mouth, there were found two glandulous bodies, from whence proceeded ſeveral lympheducts which opened into the mouth, and there diſcharged, being ſqueezed, a white and viſcous humour. There were two of them towards the upper part a great deal bigger than the others. The tongue was fleſhy at top and cartilaginous underneath, as in hens.

"The tunicle of the palate was rough, with a great number of little nipples and of hard and membranous points. It likewiſe included a glandulous body, which ſhot forth two great ducts opening into the mouth. There was diſcovered a great quantity of other little glands at the ſides of the larynx, which had alſo ſome lympheducts." *Anat. Deſcript. of the Demoiſ. of Num. by the French Academy.*

oil, and ſoda. The reſinous part differs from vegetable reſins; becauſe theſe do not form a ſoap with fixed alkalis; becauſe they are more acrid and inflammable; and becauſe the animal reſin melts at the temperature of 40 degrees, and acquires a fluidity ſimilar to that of fat. From fat it differs in not being ſoluble in cold alcohol, in which reſpect it approaches to ſpermaceti, which alcohol cannot diſſolve without heat.

Bile, like other ſoaps, removes ſpots of oil from theſe ſubſtances to which they are adherent; when its paſſages are obſtructed the motion of the inteſtines becomes languid. It is neither alkaline nor highly putreſcent. In putrefaction it yields ſomething of a muſky colour; the foſſil alkali precipitates from it a green ſediment; and with diſtilled vinegar it produces a mixture neither acrid nor ſweet. Like ſaliva and urine, it has a tendency to form concretions which are called *biliary calculi* or *gall-ſtones*. They are ſometimes found of an irregular texture, of a brown, black, yellowiſh, or greeniſh colour. They ſometimes conſiſt of tranſparent chryſtaline laminæ, like mica or talc, and are ſometimes radiated from the centre to the circumference. They are always inflammable, of a more ſolid conſiſtence than the generality of animal oils, and reſemble ſpermaceti both in their ſolidity and chryſtallization; they are ſoluble in ardent ſpirit when aſſiſted by a moderate heat: the warm ſolution, when filtered, depoſites by cooling a number of laminated white brilliant cryſtals, ſuch as Poulletier de la Salle found in the bile, and which have been compared to the ſalt of benzoin, the concrete acid of borax, and to ſpermaceti. Many of their characters indicate that they are a ſubſtance of the ſame nature with the laſt mentioned. Fourcroy found that the ſubſtance of which theſe cryſtals are compoſed exiſts not only in the cryſtallized gall-ſtones or bile; he obſerved it to a very conſiderable degree in a human liver which had been expoſed to the air for ſeveral years, and had loſt its volatile parts by putrefaction. He detected it alſo in a ſaponaceous form in bodies which had been many years buried under ground; and lately Dr Pearſon of London has artificially converted the muſcular fibre into a ſubſtance of a ſimilar kind, highly inflammable, and reſembling ſpermaceti (R).

172 Concretions formed by it.

173 Muſcular fibre converted into fat.

174 The pancreatic juice.

The pancreatic juice reſembles the ſaliva, and was examined in the laſt century, with a good deal of care, by De Graaf and Swammerdam. It has often been obſerved forming ſtony concretions (S).

175 The lymph

The lymph conſiſts chiefly of water, but, like the ſerous part of the blood, contains a ſubſtance which is coagulable by heat, by acids, and by ſpirit of wine. It is found in the cellular membrane, in the ventricles of the brain, in the pericardium, on the ſurface of the pleura, in the abdomen, in the burſæ mucoſæ, and in the joints under the name of *ſynovia*, where it has more than an ordinary degree of viſcidity and of the lubricating quality. Sometimes, when it ſtagnates in the ſheathes of the tendons and burſæ mucoſæ, it acquires a thickneſs and forms indolent tranſparent tumors, which become at laſt gelatinous. It is ſecreted chiefly by arteries.

176 Fat.

Animal fat is a ſubſtance of a nature ſimilar to thoſe oils which are called *fat* in the vegetable kingdom. Its colour is uſually white, ſometimes yellow, and its taſte inſipid. Its conſiſtence is various in different animals. In cetaceous animals and fiſhes it is nearly fluid: in carnivorous animals more fluid than in the frugivorous: in birds, finer, ſweeter, and more unctuous, and generally leſs ſolid, than in quadrupeds. In the ſame animal it is more ſolid near the kidneys and under the ſkin than in the vicinity of the moveable viſcera. As the animal grows old it becomes yellower and more ſolid; and in moſt animals is more copious in winter than in ſummer. In man and ſome other animals, it is collected in particular follicles of the cellular membrane, accumulated in great quantities in the groin, in the axilla, in the epipiploon around the kidneys and around the blood veſſels: it is likewiſe ſecreted on the ſurface of the ſkin which it protects from acrid ſubſtances, and where it ſometimes concretes, often from a want of cleanlineſs, in the form of ſmall worms. In cetaceous animals and fiſhes it is generally diſpoſed in certain reſervoirs, ſuch as the cavity of the cranium and the vertebræ; in ſome it is chiefly confined to the liver; in ſerpents, inſects, and worms, to the viſcera of the lower belly, where it is diſpoſed in ſmall lumps, and only a ſmall quantity found on the muſcles and under the ſkin: in frogs it is collected in certain bags which diverge, as it were, from a common trunk, and ſeem like appendages to the ovaria and teſtes. In many places it ſeems to be ſecreted by organic pores, and under the ſurface of the ſkin by glands. It is accumulated from a diminution of perſpiration, from the nature of the aliments, from morbid affection, and from idioſyncraſy. It is of the ſame nature as the fixed oil of plants; and Lorry has found a ſtriking analogy between it and the bile*.

177 Its kinds in different animals.

178 Where found in different animals.

179 Analogous to the bile.

* See Fourcroy.

180 Its uſes.

It is a bad conductor of heat, and preſerves the warmth of thoſe regions where it is ſituated. It is more adheſive and leſs apt to evaporate than water, and is therefore a better lubricating fluid. When reabſorbed, it counteracts the ſaline impregnation if too copious;

(R) The means which he uſes is digeſtion in water; and the proceſs ſuppoſes a previous acquaintance with what is common and what peculiar to the fibre and the fat. He maintains that the fibre is entirely compoſed of carbone, oxygene, hydrogene, and azote. In a high temperature theſe are decompoſed, or at leaſt ſeparated, without producing fat. But when the fibre is kept in water in a low temperature, the carbone unites with the hydrogene of the water, and forms a fat reſembling ſpermaceti, and highly inflammable. Part of the oxygene, too, uniting with azote, forms the nitric acid; and part of the azote uniting with the hydrogene conſtitutes ammonia; ſo that three ſubſtances are thus formed.

(S) De Graaf was of opinion, that calculi might be formed in all glands. He had ſeen them above twenty times in the pineal gland, that was long thought the reſidence of the ſoul:—He ſays, too, that they occur more frequently in the pineal gland of Frenchmen than of Dutchmen; and very pleaſantly aſſigns this reaſon, that the volatile ſpirit of a Frenchman requires more ballaſt than that of a Hollander. *De Succo Pancreatico*, cap. 7.

copious; and its nutritive power is as three to one when compared to that of the muſcular fibre. Theſe properties may partly ſerve to explain its uſes around the ſeveral branches of the blood veſſels in thoſe parts which require warmth, and in thoſe which are anywiſe expoſed to motion. They will likewiſe account for its being more copious in winter than in ſummer (T); and for its being found in great quantities in the marmot, the dormouſe, in the bear, and thoſe animals in general which are conſtrained to along abſtinence. It forms ſometimes ſteatomatous tumors, and contains the ſebacic acid, which acts readily on lead, copper, and iron.

181 Vegetable fat.

The vegetable fat is contained chiefly in the fruit; and is known by the names of *fat oil*, *ſweet oil* and *oil by expreſſion* It freezes in different degrees of heat, and varies according to the nature of the plant by which it is afforded.

182 The mucus.

The mucus is more viſcid, than the lymph, and is not coagulable by fire or alcohol. It is mild, not diſpoſed to corruption, nor ſoluble in water. This ſecretion is performed by glands. Theſe glands, in the pulmonary phthiſis, ſecrete often a mucus that reſembles pus, and occaſions a ſuſpicion of ulcers where there are none. Mucus is found in the noſe, through the whole length of the alimentary canal from the mouth to the anus, in the aſpera arteria, in the bronchia, in the kidneys, ureters, bladder, and moſt of all in the urethra. It forms hard ſtony concretions ſometimes in the lungs.

183 Concretions formed by it.

184 The ſeminal fluid.

The ſeminal fluid has been ſeldom the ſubject of chemical analyſis. It is heavier than water, ſoluble in urine, deliqueſces in air and with heat, it hardens with the fixed alkali, and is not coagulable by alcohol. It contains a number of animalculæ; and in the ſyſtem in which it is ſecreted, it affects the paſſions, the manners, and the voice, the taſte of the muſcles, the ſecretion of fat, and the growth of the hair. In many fiſhes this fluid is contained in a ſort of bags. In moſt animals it is ſecreted by glands, which are called *teſtes*, and is accumulated in the vaſa deferentia, or where they exiſt, in the ſeminal veſicles. Of theſe veſicles Swammerdam obſerved long ago, that in the ſcorpion they were probably "adapted by nature to ſecrete a ſeminal matter different from that ſupplied by the teſticles; they are largely (he ſays) ſupplied with glandules to anſwer that purpoſe, and conſiſt of a conſiderably thick and ſpongy ſubſtance." Mr Hunter ſince has endeavoured to ſhow that they ſecrete a particular fluid in all animals.

185 The nervous fluid.

So little are we acquainted with the nervous fluid, that ſome have doubted of its exiſtence. The diſcovery, however, of Galvani, and the numerous experiments that have ſince been making on animal electricity, leave us not without all hope that ſomething yet may be known of its properties that will greatly illuſtrate ſeveral phenomena in the animal economy.

186 The milky fluid.

The lacteal ſecretion is generally confined to one ſex, and is peculiar to the claſs of mammalia, though ſomething ſimilar may perhaps be ſecreted in the crops of pigeons.

187 Each ſpecies has peculiar ſecretions.

It would be impoſſible here to enumerate or to tell the uſes of all the different kinds of ſecretions in living bodies. We cannot enumerate all that we know without running into tedious detail. The eſſential oils, the camphor, the gums, the balſams, the reſins, and many others, are various ſecretions of the vegetable kingdom. Each ſpecies of plant and animal has generally ſome peculiar ſecretion; and this ſecretion in the individual has often ſome diſtinguiſhing quality, diſcoverable by taſte, by colour, or by ſmell. Theſe different ſecretions have likewiſe each their particular uſes. We know the intention of the oily juice with which the bird dreſſes its feathers, of the glutinous fluid of the fiſh, of the viſcid mucilage of the ſnail; we ſee the purpoſe for which the viper ſometimes employs its virulent humour, and for which the ſcuttle-fiſh ejects its ink: but yet we know only in part.

188 Cauſe of difference among the ſecretions.

The difference among the various ſecretions of the ſame ſyſtem ſeem principally owing to a difference of ſtimulants, and to ſome difference in the action, the form and the irritable power of the ſecretory organ. Paſſions of the mind very often affect the ſecretions; and it frequently happens that paſſion and medicine affect one ſecretory organ and not another. It is therefore probable that the organs of ſecretion, and the ſmalleſt fibre is an organ of this kind: we ſay, it is probable that the organs of ſecretion, like the eye, the ear, and all the different organs of ſenſe, are each affected in ſome meaſure by peculiar ſtimulants; as the ſtomach by hunger, by fauces the thirſt, and the genital organs by venereal orgaſmus.

189 To what reduced by chemical analyſis.

Fermentative mixture, and ſome original impregnation of the organs, have alſo been brought to explain the ſeveral phenomena of ſecretion. We conclude with obſerving, that however much the various fluids of living bodies may differ in appearance, chemical analyſis has generally reduced them to a water, a gluten, a ſaline impregnation, and an oil.

Sect. VII. *Integumation.*

190 Integumation.

All living bodies are furniſhed with one, two, or with more integuments, which are prepared by ſecretory organs, and which are a defence againſt thoſe injuries to which their ſituation is commonly expoſed. Of theſe integuments, ſome prevent the diſſipation of the fluids, ſome again reſiſt acrid and corroſive ſubſtances, ſome are indigeſtible in the ſtomach, and ſome are ſeemingly incorruptible in the earth. By theſe properties they preſerve ſeeds and the ova of inſects for a number of years, waiting the change of ſoil or of ſeaſon. They protect both from the action of weak membranous ſtomachs, and make thoſe animals who chooſe to ſwallow them contribute likewiſe to their propagation. The gelatinous ſubſtance ejected by birds, and called the *tremella-noſtoc* or *ſtarfall*, we have lately found, by numerous experiments, to be a ſubſtance of this kind. It is nothing elſe than the oviducts of frogs, which, as the embryo in form of an egg moves along their winding canal, are intended by nature to ſecrete that tranſparent and viſcid glaire which

191 Some integuments indigeſtible in the ſtomach, and reſiſt corruption in the earth.

(T) The efficient cauſe may be diminiſhed by perſpiration.

which conſtitutes the albuminous part of the ovum, and feeds and protects the embryo in water (u).

192 Some integuments form a defence by their hardneſs;

Some integuments are chiefly uſeful by their ſtrength and hardneſs. The ſhells of the beetle are an excellent defence for the membranous wings which the creature is ſeen to pack up in folds when it inclines to creep into the earth. The ſhell of the ſnail lodges the inteſtines (x) when the animal comes forth to ſearch for its food, and it furniſhes a ſafe retreat for the body when any danger is threatened from without.. Some animals, confined to their ſhells, can open and cloſe them by a muſcular power; and ſome ſhells, like the ſcales obſerved on fiſhes and inſects, are diſpoſed into plates, ſo as to be no hinderance to motion. Several inſects which ſpend a part of their time in the water always compoſe a ſhell for themſelves where it is needful. The uſual materials are ſand, ſtraws, or mud, which they cement by a viſcid ſecretion. The ſhells of moſt inſects are corneous. Swammerdam found that cretaceous ſhells are compoſed of layers of indurated membranes, and that they are ſometimes covered with a cuticle.

193 By their hair, down, or feathers;

Some integuments are covered with feathers, ſome with hair or a thick down. Beſides many other obvious uſes of theſe coverings, they ſerve in general to repel inſects; and being bad conductors of heat, maintain a genial and neceſſary warmth.

194 By their prickles;

When the integuments are covered with prickles, they repel attacks by the ſtrength of their points, or by the venom which they infuſe, as the ſtings of nettles and the downs of ſome inſects and plants.

195 By a viſcid ſecretion;

When they are moiſtened with a viſcid ſecretion, they preſerve the neceſſary ſoftneſs of the parts, prevent evaporation, reſiſt acrimony, enable plants to deſtroy their enemies, and aſſiſt the ſnail in performing its motions.

196 By their effluvia;

Both plants and animals, but particularly the former, are often protected by an odorous effluvia from their integuments. This effluvia is the finer part of their volatile oil, always inflammable, and ſo ſubtile, that the continual emiſſion of it from wood or flowers does not ſenſibly diminiſh their weight. To this fragrance it is owing, that the deadly nightſhade, the henbane, hounds-tongue, and many others, are ſeen on almoſt every high road untouched by animals. The mancinelle-tree of the Weſt Indies emits ſo very dangerous vapours, that the natives poiſon their arrows with its juices, and thoſe have died who have ventured to ſleep under its ſhade. The lobelia longiflora of America produces a ſuffocating oppreſſion in the breaſt of thoſe who reſpire in its vicinity. The return of a periodical diſorder has been attributed to the exhalation of the rhus toxico dendron. Every one knows, ſays Chaptal, the effects of muſk and oriental ſaffron on certain perſons. Ingenhouſz mentions a young lady whoſe death was occaſioned by the ſmell of lilies; and Triller reports an inſtance of another who died in conſequence of the ſmell of violets. The ſelection of graſſes by different animals ſeems to be owing to the manner in which the volatile aroma affects their ſenſes. But of all the vegetable exhalations known, thoſe emitted by the bohun-upas, or poiſon-tree of Java, are the moſt remarkable. For many miles round no animal can breathe the air, no plant dares to peep from the ſoil, the fiſhes die in the poiſoned ſtream, and the birds that venture athwart the atmoſphere with deſpairing ſhrieks ſink down lifeleſs. Such often is the uſe of the fragrant oils in the vegetable economy. The ſhrubs and trees that are covered with thorns are in general a grateful food to animals. They generouſly avow their manner of attack, and ſcorn the dark aſſaſſination by poiſon.

197 By their colour;

The various colours of the integuments, as well as the aroma, is a ſpecies of defence. "Caterpillars which feed on leaves (ſays Darwin) are generally green; and earth worms the colour of the earth which they inhabit. Butterflies which frequent flowers are coloured like them. Small birds which frequent hedges have greeniſh backs like the leaves, and light coloured bellies like the ſky, and are hence leſs viſible to the hawk who paſſes under them or over them. Thoſe birds which are much amongſt flowers as the goldfinch are furniſhed with vivid colours. The lark, partridge, hare, are the colour of dry vegetables or earth on which they reſt; and frogs vary their colour with the mud of the ſtreams which they frequent (y), and thoſe which live on trees are green. Fiſh which are generally ſuſpended in the water, and ſwallows which are generally ſuſpended in the air, have their backs the colour of the diſtant ground, and their bellies of the ſky." The ſphinx-convolvuli, or unicorn-moth, reſembles in colour the flower on which it reſts; and among plants, the nectary and petals of the ophrys, and of ſome kinds of the delphinium, reſemble both in form and colour the inſects which plunder them, and thus ſometimes eſcape from their enemies by having the appearance of being pre-occupied.

198 By their change of colour.

From colour being thus employed as a defence, many animals vary their colours with the ſeaſons and circumſtances; and thoſe which are of different colours in ſummer according to the places which they inhabit, do all in winter aſſume in common the colour of the ſnow.

199 Are changed themſelves.

But a change of colour is not the only change of the integuments. As the outmoſt are often inſenſible to ſtimulants, and for obvious reaſons poſſeſs little of the vital principle, in all caſes where they cannot be enlarged to admit an additional increaſe of growth, or where they are not furniſhed with neceſſary organs to repair thoſe injuries which they may ſuffer from diſeaſe or accident, the body is endowed by nature with a power to throw them off, and to produce others in their ſtead (z). For this reaſon we ſee the tree caſting annually its exterior bark, the lobſter his ſhell, the bird

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(u) We have often inflated the oviducts of frogs, and dried them; and afterwards putting ſmall pieces of them into water, have ſeen them ſwoln in a few hours to a large ſize, and forming the tremella-noſtoc, or ſtarfall.

(x) This ſnail is found in our gardens, and carries its ſhell, including the inteſtines, upon its back.

(y) The ſame is the caſe with many fiſhes that live in lakes.

(z) Several ſmall animals in changing their integuments change likewiſe the interior coat of the alimentary canal, which they void with the fæces.

200 Toads eat the ſkin.

bird his feathers, the quadruped his hair, and ſometimes his horns, the ſerpent his ſkin, and man himſelf renewing the ſcales of the epidermis. Theſe changes uſually take place once a-year, twice frequently with reſpect to ſerpents, and oftener in toads, who have been obſerved to devour the ſkin which they throw off. All the integuments of ova and ſeeds, being wholly the production of parental organs, neither are nor can be repaired.

Sect. VIII. *Irritability.*

201 Irritability.

202 The phenomena of irritability have led to ſtrange concluſions.

203 Some of theſe concluſions.

Is that property of the living fibre by which it acts in conſequence of ſtimulants. Being one of the great cauſes of motion in living bodies, no property has excited more wonder, been the cauſe of more error, or exhibits ſuch a number of ſtriking phenomena to the ſenſes. Theſe effects, however, have ariſen rather from the nature of the ſtimulants than from any thing myſterious in irritability. Many of the ſtimulants by which this property in bodies is diſplayed are often inviſible, unknown, or unthought of, and men being conſcious that a number of their motions proceed from a ſtimulant, that is, under the direction of a mental power, they readily conclude from a ſort of analogy, that every motion in plant and inſect that ſeems to anſwer a uſeful purpoſe, and is cauſed by ſome inviſible ſtimulant, is the conſequence of mind directing from within. They further ſuppoſe that irritability is in all caſes the conſequence of nerves, which are thoſe organs which nature has employed in the animal kingdom to convey ſtimuli between body and mind. Theſe ſingular concluſions have led to others that are leſs admiſſible even than themſelves. It has been imagined that creatures the moſt ſtupid poſſeſs within them a principle of mind that is incapable of further improvement, but which notwithſtanding is in many reſpects ſuperior to reaſon, and a ſurer guide in whatever relates to ſelf-preſervation or that of the ſpecies: it enables the animal to predict without foreſight, and to act rationally without intelligence. This wondrous principle has been called inſtinct: and in order to account for ſome of the ſingular phenomena of vegetables, a ſhare of it has graciouſly been allowed to plants; which having become favourites of late, have been alſo preſented with the privilege of ſenſation, permitted to fall in love, and to marry, and on ſome occaſions to exerciſe the faculty of volition.

204 Voluntary actions of two kinds, from deſign and propenſity.

205 Whence propenſities ariſe.

At theſe conceſſions the metaphyſician will naturally ſmile. He knows how many impoſe on themſelves by the mere ſound of their own words, as if by calling the ſnow black they were to diſcover a new property; which curious diſcovery would turn out at laſt to be only a groſs ignorance of language, and the fooliſh miſapplication of a ſyllable. He who has ſtudied the philoſophy of mind, and been accuſtomed to view objects through another medium than the magic colourings of paſſion and of fancy, readily perceives a ſomething of abſurdity in aſcribing ſuch wiſdom to plants and inſects. With reſpect to animals, theſe gentlemen do not recollect that voluntary actions are of two kinds, as they proceed from deſign or propenſity; that in performing one of theſe kinds the mind itelf has an object in view, and is properly the ſource whence they originate; but that in the other the mind is merely a ſecondary agent, is acting under the influence of ſtimulants, is often not aware of the conſequences, or although aware is often ſo infatuated as not to regard them, however fatal. It is generally well known to the naturaliſt, that not a few of theſe propenſities ariſe from the form and ſtructure of the body, from the manner in which the optic nerve is affected by colours, the olfactory by ſmells, the guſtatory by taſtes and auditory by ſounds; from the different ways in which the fauces are affected by thirſt, the ſtomach by hunger, and the genital parts by venereal orgaſmus.

206 They act as ſtimulants through the medium of nerves.

Beſides theſe and other propenſities which operate as ſtimulants in the ſyſtem itſelf, the naturaliſt has found that light, heat, and moiſture, in various degrees, from abſolute darkneſs, coldneſs, and dryneſs, act as ſtimulants upon living bodies: he has experienced that electricity is a general agent, that ſeveral plants emit flaſhes (A), and that ſome animals even give ſhocks reſembling the electric. He has made it probable that it

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(A) "In Sweden (ſays the author of the *Loves of the Plants*) a very curious phenomenon has been obſerved on certain flowers by M. Haggeren, lecturer on natural philoſophy. One evening he perceived a faint flaſh of light dart from a marigold: ſurpriſed at ſuch an uncommon appearance, he reſolved to examine it with attention; and to be aſſured that it was no deception of the eye, he placed a man near him with orders to make a ſignal at the moment when he obſerved the light. They both ſaw it conſtantly at the ſame moment; the light was moſt brilliant on marigolds of an orange or flame colour, but ſcarcely viſible on pale ones: the flaſh was frequently ſeen on the ſame flower two or three times in quick ſucceſſion, but more commonly at intervals of ſeveral minutes; and when ſeveral flowers in the ſame place emitted their light together, it could be obſerved at a conſiderable diſtance. This phenomenon was remarked in the months of July and Auguſt at ſunſet, and for half an hour after when the atmoſphere was clear, but after a rainy day or when the atmoſphere was loaded with vapours nothing of it was ſeen. The following flowers emitted flaſhes more or leſs vivid in this order: The marigold, garden naſturtion, orange lily, African marigold; ſometimes it was obſerved on the ſun-flowers; but bright, yellow, or flame colour, ſeemed in general neceſſary for the production of this light, for it was never ſeen on the flowers of any other colour. The flowers were carefully examined with a microſcope without any inſects or phoſphoric worms being found. M. Haggeren, after having obſerved the flaſh from the orange-lily, the anthera of which are a conſiderable ſpace diſtant from the petals, found that the light proceeded from the petals only; whence he concludes, that this electric light is cauſed by the pollen which, in flying off, is ſcattered upon the *petals (Obſerv. Phyſique par M. Rozier*, vol. xxxiii. p. 111.)"—Addition to the note on *Tropæolum, the Loves of the Plants*. The author of this beautiful poem ſuppoſes, that the time of the twilight is ſometimes extended by different bodies emitting the light which they had abſorbed during the day.

it produces all the wonders of cryſtallization; and that the cauſe of chemical affinity, and of all the phenomena diſplayed by the magnet, if not ſimply a modification, is at leaſt akin to it. In the male parts of plant and animal, he has ſeen both the fluid and the pollen that give the ſtimulus in generation, and are accompanied with ſo extraordinary changes in the ſyſtem.

207 Irritable principle affected by various ſtimulants.

He has found that much of the vegetable economy, and that even the function of generation itſelf, as the developement of the fecundating powder, and its application to the female organ, is partly carried on by wind, heat, and other ſuch agents. He has reaſon to conjecture that many general agents in nature are yet unknown. By the help of chemiſtry, he has found out lately a conſiderable number which are called gaſes, which are of the very higheſt importance in both the animal and vegetable economy, and which, like the aromas of plants, or the cauſes of contagion, produce their effects without being viſible. It is only, too, of a late date that the celebrated profeſſor Galvani of Bologna has excited ſo much curioſity through Europe, by the diſcovery of a certain ſtimulus that reſides in the nerves, that paſſes along electric conductors, and which by a certain application of metals occaſions a vivid flaſh in the eye, convulſes the body of a living frog, and rouſes the detached limbs into action. The change of colour in the integuments according to different ſeaſons and circumſtances, though it anſwer a rational and uſeful purpoſe, proceeds from a cauſe that does not ſeem to be very well known. Even many agents which are not inviſible, nor yet unknown, exert their influence in a ſecret manner, ſo as not be obvious to the ſenſes.

208 Singular motions in plants.

It is generally known that many ſingular movements of plants are owing to heat, many to light, and ſeveral to moiſture. The barley-corn is often obſerved to creep on the ground by means of its awn, which dilates and contracts according to the different degrees of moiſture. The wild oat, employed as an hygrometer, moves through the barn, travels through the fields, nor ceaſes to be changing its ſituation till its beard fall off, or till it meet with a ſoil where it conveniently may ſtrike root. Upon a ſimilar principle of motion, the ingenious Edgeworth conſtructed an automaton which moved through a room which it inhabited. It is eaſily conceived how theſe ſingular effects, ariſing from cauſes that are unknown, inviſible, or unthought of, ſhould give birth to the notions of witchcraft and of inſtinct, and impreſs the fancy with an idea of ſomething reſembling ſenſation and volition in the vegetable kingdom. Theſe agents, whether inviſible, unknown, or unthought of, directed by regular and uniform laws under the great Author of nature, produce effects that indicate preſcience, wiſdom, and deſign, and cauſing a tranſient or permanent propenſity in the mental part, frequently controul by reſiſtleſs ſway the finite minds that reſide in matter. Theſe minds, in a living body, have generally been found accompanied with ſome ſyſtem of nerves; and theſe nerves happening with equal facility and promptneſs to convey ſtimuli from the mind to the body and the body to the mind, the great difficulty has been to determine with reſpect to others when the action proceeds ſolely from deſign, ſolely from propenſity, or from deſign and propenſity together.

209 Brutes act chiefly from propenſity.

The uniform conduct of the brute creation would ſeem to imply that their mind has little of inventive power; that it generally acts from the impulſe of propenſity; and that its manners are varied, not in conſequence of a change of ſentiments, but from the induction of new habits, and the application of new ſtimulants.

210 Vigour of mind depends on the brain, the acuteneſs of the ſenſes on the ſtructure of their organs.

It has been obſerved, that in all animals the vigour of mind has ſome relation to the quantity of brain, and to the perfection of its organization; and that the acuteneſs of the different ſenſes is generally proportioned to the quantity of nerve beſtowed on their organs (B). Man has a greater proportion of brain than any other animal; but many an animal has a much greater proportion of nerve beſtowed on different organs of ſenſe. Many animals have therefore acuter ſenſes than man; but man has a greater vigour of mind than any other animal on this globe.

211 The brain of quadrupeds

The brain of quadrupeds is ſomewhat ſimilar to that of man, but proportionally ſmaller, and not perhaps ſo well organized. Willis has obſerved, that among animals the ſtructure of the cerebrum is more variable than that of the cerebellum; that the former generally furniſhes nerves to the voluntary muſcles, and the latter with the medulla oblongata to the involuntary. He has likewiſe remarked, that the round prominences commonly called the nates and teſtes are large in the quadrupeds, which are active and vigorous, and in ſome meaſure able to procure their own ſubſiſtence at birth; that the tuber annulare is large in the quadrupeds that are diſtinguiſhed for their ſagacity; that wherever the tuber annulare is ſmall, the prominences are large, and wherever it is large the prominences are ſmall. From theſe obſervations he has concluded that the tuber annulare is the ſeat of genius, and the round prominences the ſeat of what has been called inſtinct (C).

212 And birds.

The brain of birds is ſeemingly the reverſe of the human brain; the cortical ſubſtance the interior, and the ventricles are ſituated in the white part on the outſide. In the brain of the bird there are no circumvolutions like the inteſtines, no fomix, corpus calloſum, nor corpora ſtriata.

213 The brain of fiſhes.

The brain of fiſhes is in many reſpects ſimilar in its ſtructure to the brain of birds. It is very ſmall in proportion to their body, and is generally ſurrounded with an oily matter. In one genus of fiſhes, the gadus, Dr Monro found ſpheroidal bodies between the dura

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(B) The acuteneſs of the ſenſes depends upon the readineſs with which their organs are affected by ſtimuli. This readineſs depends on irritability. It is not neceſſarily connected with mind, nor ſhould it ever be confounded with perception, which in claſſical language ſignifies a property of the mental principle.

(C) Few perhaps who have diſſected different animals, and who, beſides a number of ſtructures have ſeen a variety of tubercles and lobes exiſting in the brain, will be raſh in aſcribing to any one of them one particular office. The pineal gland was for ſome time thought the ſeat of the ſoul. It was afterwards found to be often dura and pia mater, and covering the greater part of the nerves like a coat of mail. The two ſenſes, ſeeing and hearing, in many fiſhes are often acute. By laying one ear on the water, and ſtriking the ſurface at ſome diſtance, this element is found to be a better conductor of ſound than even the air.

214 Of reptiles.

The reptile tribes have very little brain, and like the fiſhes have no ganglions upon their nerves.

215 Of inſects.

Moſt inſects have no brain at all, but a nervous cord that is full of ganglions, that runs from one extremity to the other, and is denominated the ſpinal marrow. This knotty cord, however, is not marrow; the inſect has nothing reſembling a ſpine; and the ſituation of the cord in the animal is often not along the back but the breaſt. In the ſilk-worm, and moſt other inſects, this cord is in contact with the alimentary canal; and the firſt ganglion, which is ſometimes called the brain, though not in the head, divides, in order to give a paſſage to the ſtomach, and again unites in a ſecond ganglion. Swammerdam found in a ſpecies of ſnail a brain with two lobes, in contact with the ſtomach, moveable by muſcles, and without a fixed place in the body.

216 A moveable brain in a ſpecies of ſnail.

217 Polypes.

The polypes exhibit no appearance of brain or of nerve, as in other animals. Their ſkin, however, is obſerved to be full of a number of ſmall granulary bodies, which are connected by a glareous matter that reſembles a thread. Like rows of bead-ſtrings, they extend from one extremity to the other, and along the arms. Trembley learned from a number of experiments that they received their colour from the food, and therefore ſuppoſed them to be veſicles or glands. If not like the tuberous nerves of the inſects, they at leaſt are not very different in appearance from the nerves of the gadus that are covered with a number of ſpheroidal bodies like a coat of mail.

218 Nerves act under other agents beſides mind.

Some things would inſinuate that a nervous ſyſtem does not ſeem to be neceſſarily connected with mind. The ſtimuli of nerves may be brought into action by other cauſes beſides mind. Even many nerves are not ſubjected to the influence of mind; and the mind often by its own inattention may loſe the power which it originally poſſeſſed over nerves. Many perſons can move the muſcles of the ear, and others may have loſt that power through neglect. After Fontana had obſerved that the heart was a voluntary muſcle in a wheel polype, he learned to retard and accelerate the motions of his own at pleaſure. If ſome nerves, from a ſort of preſcription, thus ceaſe to be obedient to the power of mind, others by frequent ſervice and habit become ſo obedient as to convey their ſtimuli to the muſcles almoſt without the conſciouſneſs of mind. The motions excited by the ſtimuli of nerves are in many caſes exceedingly rapid. Theſe may be ſeen in the wings of moſt inſects, but are moſt noticed in dancers, tumblers, and apes, and all thoſe animals that are exhibited for ſeats of agility.

219 The great influence of the nerves.

The motions which we ſee excited in the body by the ſtimuli of nerves have often been ſo vigorous and prompt, as to have torn the muſcle from the bone, and to have broken the bone itſelf. They often affect the organs of ſecretion, have often unhinged the fabric of the ſyſtem, occaſioned death, and accounted for the miracles that have been aſcribed to the power of fancy. The prompt motions of what have been named ſenſitive plants ſeem owing to a different ſpecies of ſtimulants acting on extremely irritable fibres (D).

In the animal kingdom all muſcles in the time of action

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ten filled with ſtony concretions; and the celebrated Nuck, inſtead of aſſigning to it any prerogative, contented himſelf with writing its epitaph.

VIATOR
Gradum. Siſte.
Omnique Conatu. CONARIUM.
Reſpice. Sepultum.
Partem. Tui. Corporis. Primam.
Ut. Olim. Volebant.
Animæ. Sedem.
GLANDULAM. PINEALEM.
Hoc. Seculo. Natam. Et. Extinctam.
Cujus. majeſtatem. Splendoremque.
Fama. Firmarat.
Opinio. Conſervarat.
Tamdiu. Vixit.
Donec. Divinæ. Particulæ. Aura.
Avolaverat. Tota.
Lymphaque. Limpida.
Locum. Suppleret.
Abi Sine. Glande. Viator.
Lymphamque. Ut aliis. Conario. Concede
Ne tuam poſteri
Mirentur Ignorantiam.

(D) In many inſtances the prompt motions of animals ſeem more owing to the irritability of their fibres than to what has been called the ſenſibility of their nerves. The poet was miſtaken when he ſuppoſed that the mangled inſect would feel as ſenſibly as a mangled giant. When the gad-fly fixes fairly on the hand, you may cut off its wings, its legs, its antennæ, and a part of the lower diviſion of its body, without diſturbing its gratification, or apparently occaſioning to it much trouble.

220 What muſcles are moſt irritable.

221 Effects of ſtimulus when long continued.

action are obſerved to diſcharge a quantity of their blood and thoſe muſcles which are naturally white are the moſt irritable. In all living bodies, the irritable power will ceaſe to obey the action of a ſtimulant if either long or violently applied. After exerciſe. therefore, the irritable fibre requires reſt, after heat cold, after waking ſleep, before it again becomes ſubmiſſive to the action of the ſtimulant that overwhelmed it. This is the reaſon that in plants and animals there are certain exertions and functions of the ſyſtem that can only be continued at intervals and ſeaſons. The natural ſtimuli of involuntary muſcles continue to act, and the muſcles continue to obey through life.

222 Organs of ſenſe intended to give diſtinct impreſſions.

223 Different organs affected differently by the ſame ſtimulus,

The organs of ſenſe were formed to mark the difference of ſtimulants; yet living bodies are affected by light without having eyes, by ſounds without having ears, by odorous effluvia without having ſmell, and by ſapid bodies without having taſte. It is eaſily conceived how theſe objects, by their inherent properties or motion, may produce a confuſed ſort of excitement in every highly irritable fibre. But the organs of ſenſe are peculiarly fitted to receive accurate and diſtinct impreſſions from each of thoſe objects; and theſe different impreſſions ſeem not to ariſe from any difference in the kind of nerves by which they are received. All the difference that has been obſerved ariſes from the ſtructure of the organ itſelf, and from the manner in which the nerve is diſtributed through it. Other parts of the animal body, as the ſtomach, the fauces, and genital organs, are thus affected by particular ſtimulants; and many animals, and even vegetables, may be affected in various manners, and by various ſtimulants, of which neither our feelings nor our ſenſes can give intimation of any thing analogous.

224 The organs of ſenſe.

With reſpect to the ſeveral organs of ſenſe, ſome animals have many eyes without any motion, and ſome animals have few eyes with varieties of motion. The entrance to the ear in ſome animals is from the mouth, as happens in the frog; and the bones of the ear are without the cranium, as in ſome fiſhes. The ſenſe of ſmelling is found in the noſe: this ſenſe is aſtoniſhing in dogs; and even ſheep, in diſtinguiſhing their lambs, truſt to it more than ſeeing or hearing. The ſenſe of taſte is far from being general; and the ſenſe of touch can hardly be ſaid to reſide peculiarly in any one organ.

225 Motion.

Sect. IX. *Motion.*

226 Locomotion.

Irritability is one of the great ſources of motion in all living bodies; and this power is brought into action immediately by nerves or ſome other ſtimulants. Locomotion here is principally conſidered; for altho' the kinds of internal motion employed in ſecretion and the other functions be as remarkable, in the eye of the philoſopher they have not ſo generally attracted the attention. Moſt animals are capable by nature of changing the place which their body occupies; for this reaſon the irritable fibres being formed into bundles, which are called *muſcles*, are in moſt animals attached to bones, cartilages, or hard integuments, which they move as levers: theſe levers, with their muſcles attached, are in moſt caſes formed into wings, fins, and legs of various kinds, and are employed in performing the motions of flying, ſwimming, walking, leaping, and creeping. So very neceſſary, in the opinion of ſome of the ancients, was one or other of theſe inſtruments to progreſſive motion, that the movement of the ſerpent was often aſcribed to a preternatural cauſe, was ſuppoſed to reſemble the *inceſſus deorum*, and procured to the animal one of the higheſt and moſt honourable ranks among the emblematic kinds of divinities. Even Moſes himſelf, who was unwilling to allow it the character of an agathodæmon or good genius, was yet ſo puzzled at its being able to move without feet, that he pronounces it a tool of the devil; and ſays that it was deprived of its feet by a curſe from heaven for ſeducing mankind into idolatry. Notwithſtanding, however, the ſurpriſe that has been occaſioned by the ſingular movement, the motion of ſnails, though not ſo rapid, is in many reſpects as extraordinary: they adhere by a certain viſcid ſecretion, on dry ground this ſecretion forms a pavement over which they glide; and they proceed by the action of muſcles without bone, cartilage, or ſhell, to which theſe muſcles can be attached.

227 Performed by fins, wings, legs;

228 By the elaſtic ſpring of the body;

229 By muſcles and a viſcid ſecretion:

230 Rapid motion depends not on the number of inſtruments employed. Different ways of moving the body.

No animal walks without legs or flies without wings (E): but there are many that ſwim without fins, and that leap and creep without any legs. The rapidity of movement is not proportioned to the number of inſtruments that are employed: if the ſpout-fiſh be obſerved to move ſlowly with one leg, the ſea-urchin moves ſtill ſlower with many thouſands; the oyſter moves by ſquirting out water; the ſcallop by the jerk of its ſhell, and when in the water it riſes to the ſurface and ſails before the wind.

231 Inſtruments of locomotion changed,

Many animals are formed by nature to fly, walk, leap, and ſwim: the fate of thoſe is rather uncommon whoſe muſcles or feet are by nature attached to their integuments; the lobſter is obliged to throw off its ſhell, and the caterpillar all its feet with the ſkin, and in that ſituation to remain ſtationary till it receive new inſtruments of motion.

232 Many things neceſſary to explain locomotion.

Whoever has read the celebrated work *De Motu Animalium*, needs not to be told that, beſides the organs which are here mentioned, the form, the ſtructure, and even the ſpecific gravity of the body, as depending on the nature of the bones and muſcles, or as varied by air, veſicles, and bubbles, with a great variety of other circumſtances, are neceſſary to explain the different phenomena of locomotion.

233 Motions of vegetables,

As to vegetable motions, they evidently depend on external agents: The motion of the wild oat has been mentioned; the wings of ſeeds only fit them to be carried by the wind, their ſpecific gravity to float in the water, and their legs or tentacula to adhere to bodies that are in motion; the ſingular motions which have been aſcribed to ſleeping, to waking, to ſenſation, and volition, in the vegetable kingdom, ſeem only the conſequence of light, heat, moiſture, and ſuch ſtimulants, acting inviſibly or with ſecret influence; the opening and cloſing of the meteoric flowers are always correſpondent to the ſtates of the atmoſphere; and the opening and cloſing of the equinoctial and tropic flowers, to the light, the length, or ſhortneſs of the day.

The

(E) The fins of the flying fiſh enable it rather to ſpring than to fly.

234 Intention of locomotion.

The principal intentions of locomotion are to get food, to ſhun danger, to promote intercourſe, and diſperſe the ſpecies.

Sect. X. *Habit.*

235 Habit;

Habit here deviates a little from its uſual meaning. We employ it to ſignify that principle in living bodies by which they accommodate themſelves to circumſtances, aſſume as it were a different nature, and in many reſpects undergo a ſpecies of transformation.

236 Its effects on vegetables;

So very much do ſome individuals of the vegetable tribe accommodate themſelves to different ſituations, to ſoil, to climate, and the ſtate of cultivation, that thoſe naturaliſts who have not been accuſtomed to nice and accurate diſcriminations, have frequently miſtaken the variations of the ſame plant for ſo many ſpecies. Theſe variations may be daily ſeen by examining the plant as it grows on the mountains, in the valleys, in the garden, or in the fields; or by bringing it from a rude uncultivated ſtate, when it ſometimes lays aſide its formidable prickles, and changes the colour and ſtructure of its flowers.

237 On the conſtitution and integuments;

In the plant and animal, the delicacy and vigour of the conſtitution are oftener the effects of habit and circumſtance than original conformation. We have mentioned already the varying colour of the integuments, and the purpoſe which it ſerves in changing with the ſeaſons. We may here add, that animals covered with a down or hair have it thick or thin, long or ſhort, according to the different exigencies of climate.

238 On manners and propenſities;

Thoſe changes produced on their body are accompanied with others which are the cauſes of new taſtes, of new propenſities, and new manners. At the Cape of Good Hope the oſtrich inclines to ſit on her eggs day and night like any other bird; but in Senegal, where the heat is great, ſhe is ſomehow diſpoſed to leave them to the ſun during the day. In thoſe countries where proviſions can be found during the greateſt part of the year, the bee gradually loſes the propenſity of laying up ſtores for the ſeaſon of winter; and in "thoſe countries infeſted with monkeys, many birds (ſays an amuſing and inſtructive writer) which in other climates build in buſhes and the clefts of trees, ſuſpend their neſts upon ſlender twigs, and by this ingenious device elude the rapacity of their enemies."

239 On man.

Man, from imitation, is expoſed to a great number of habits peculiar to himſelf; and phyſical cauſes have ingeniouſly been aſſigned for the variety of his features and complexion.

240 The extent of its effects unknown.

Few experiments have yet been inſtituted with a view to ſhow how far this accommodating principle in nature may be extended in the different ſpecies of plants and animals. It is known, however, that the lamb and the dove can be made carnivorous; and that the hawk, laying aſide his ferocity, can be brought by art to live upon grain.

241 How far it accommodates with reſpect to generation,

Of all the effects of this ſingular principle, the moſt wonderful are thoſe which are ſeen to take place with reſpect to generation. The fact is far from being new to the naturaliſt, that certain animals, oviparous at one ſeaſon, are viviparous at another. This indicated much of accommodating power, though far inferior to what has been ſince witneſſed and diſplayed: for who from all this could ſuſpect, that any animal which uſually propagates by an intercourſe of ſexes, could in any circumſtance accommodate ſo far as to multiply its ſpecies another way. Bonnet of Geneva, however, has diſcovered, that the puceron or vine fretter, which generally propagates by an intercourſe of ſexes, is not only oviparous at one period and viviparous at another, but in all caſes where the union of the ſexes is not to be obtained, can eaſily accompliſh all the purpoſes of generation without it. Similar experiments have likewiſe proved, that many plants can bring to maturity a productive ſeed, though the male parts of the flower be deſtroyed before they can in the uſual way have any impregnating effect on the female. In this caſe the concluſions drawn have been ſomewhat new. From theſe experiments it has been inferred, that the ſexual ſyſtem is ill-founded, and that moſt of the learned naturaliſts of Europe are on this ſubject labouring at preſent under a miſtake. This reaſoning, however, is not ſatisfactory: for why, it might be aſked, in the vegetable kingdom more than in the animal, ſhould the mode of generation be neceſſarily uniform? Tho' ſome plants may, like ſome animals, propagate without ſexual diſtinctions, the concluſion is not logical that theſe diſtinctions are uſeleſs in all; and though ſome few may, in particular inſtances, propagate without that impregnation to which they were accuſtomed, will any one demonſtrate, that accommodating nature does not here as in the puceron adopt a new method to accompliſh her deſigns?

242 Its effects laſting and ſometimes propagated.

In all living bodies, it frequently happens that ſeveral characteriſtic diſtinctions, as the colour, the features, and a number of diſeaſes that are originally the effects of circumſtance, do at laſt become ſo fixed in the ſyſtem, that they are afterwards tranſmitted to poſterity through ſome generations (f). With regard to animals theſe facts are well known; and as to vegetables, it has been obſerved by a pupil of Linnæus, that the apple trees which are ſent from Britain to New England bloſſom at firſt too early for the climate, and

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(f) Might not theſe facts reaſonably claim the attention of thoſe who mean to form matrimonial connections? How many might eaſily entail on their poſterity hale conſtitutions, regular features, beautiful forms, ſound minds, and tempers at once uniform and cheerful, who yet, from their ſordid deſire of wealth or their fond admiration of high rank, bequeath to them only ſcorbutic habits, deformed perſons, diſagreeable features, mean underſtandings, and forbidding tempers. Excepting the more extraordinary properties of body and mind, there are few that may not in ſome meaſure be tranſmitted to poſterity: but nature ſeems unwilling that what is very eminent ſhould ever be extended to a genus or a ſpecies; and therefore the ſons of Cicero and Cromwell are only two of a thouſand inſtances that might ſerve to prove, that neither extenſive nor eccentric geniuſes can be made hereditary: In the ſecond generation they often degenerate into minds that are weak, fatuous, or deranged; or into minds that are chiefly remarkable by their oddities and whims.

243 Renders the reſult of experiments deluſive.

and bear no fruit; and that it is only after ſome years that they conform to their ſituation: and this circumſtance, by the way, explains why roots and ſeeds germinate ſooner when brought from ſouthern than when they are brought from northern latitudes. The very permanency of theſe effects has often been the cauſe of much confuſion and error in philoſophy: for the naturaliſt, miſtaking the laſting though temporary qualities of habit for the real and eſſential qualities of ſpecies, has not unfrequently drawn concluſions from his experiments that have been contradicted by ſimilar experiments in other circumſtances. This is one of the obvious reaſons why experiments exhibit ſo many inconſiſtencies and contradictions, and why we are amuſed with ſuch a multitude of viſionary theories about the properties of living bodies.

244 And medical preſcriptions often dangerous.

From not attending to the numerous circumſtances that induce habits, and to that general accommodating principle in living bodies, many medical preſcriptions are found to be not only uſeleſs but miſchievous; and many parents, by ſtudying the health and comfort of their children, bring on habits that prove the ſources of perpetual ſickneſs or the certain preſages of an early death.

245 Its origin;

The accommodating principle is one of the conſequences of irritability. Its various effects ariſe from the actions of different ſtimulants on the irritable fibre; and the after-duration of theſe effects, from the modifications of the irritable fibre, become habitual from the frequently repeated action of the ſtimulants.

246 Its deſign.

The deſign of this accomodating principle is to fit both the plant and the animal for a more extenſive and a more varied range of exiſtence.

SECT. XI. *Tranſformation.*

247 Transformation.

MORE remarkably ſtriking than any of thoſe changes to which the plant and animal are expoſed, from the variations of habit or the change of integuments, are thoſe alterations which they undergo from metamorphoſis or transformation. It has indeed been aſſerted, that theſe alterations conſiſt in throwing off certain temporary coverings or envelopes: but there is here a want of preciſion in the ideas, and conſequently a want of accuracy in the expreſſion. The ſame perſons who make this aſſertion inform us, that caterpillars change their ſkin, and many of them even ſeveral times, previous to the period of their transformation. Transformation, therefore, and a change of integuments, by their own conceſſions, are different things. The truth is, transformation frequently takes place independent of any change of integuments; and there is often a change of the integuments without transformation or any appearance of a new form: but a new form or change of appearance is always implied in metamorphoſis or transformation. This new form is ſometimes occaſioned by a change of ſhape, conſiſtency, and colour; as when the lobes of a ſeed are converted into ſeminal leaves. It is ſometimes occaſioned by a change of proportions among the parts: the proportions of a fœtus, every one ſees, are different from thoſe of a full grown man; and the painter, merely by obſerving the proportions, repreſents a child, a dwarf, and a giant, on the ſame ſcale. It is ſometimes occaſioned by the addition of new organs; as when the emmet receives wings, and the plume of the ſeed is fed by new roots ſtriking into the ground; or it is occaſioned by a change of both the form and the organs, and their mode of operation, as happens remarkably in ſome inſects: for though all living bodies, plants and animals without exception, undergo partial or general transformations, yet theſe changes are chiefly obſervable among inſects. Many inſects appear to conſiſt of two diſtinct animal bodies one within the other: the exterior, a creature of an ugly form, reſiding in the water or under the earth, breathing by gills or ſometimes by tracheæ projecting from the tail, poſſeſſing a voracious and groveling appetite, and having a ſyſtem of ſanguiferous veſſels that circulates the blood towards the head. When all its parts decay and fall off, the creature incloſed ſucceeds in its ſtead: this often is an animal of a different form, generally lives in a different element, feeds on a different ſpecies of food, has different inſtruments of motion, different organs of ſenſe, different organs of reſpiration, and differently ſituated; and being endowed with the parts of generation, inclines to gratify the ſexual propenſity, and produces an embryo which becomes like the firſt, and from which afterwards in proceſs of time a creature is evolved ſimilar to itſelf.

248 Not merely a change of temporary envelopes.

249 In what it conſiſts, and different kinds of it.

250 Transformation of inſects.

251 Accommodating principle in plants and animals.

If the embryo or egg be depoſited on a leaf, the leaf frequently is obſerved to bend, to wrap it in folds intended for the purpoſe, and to protect it from injuries and danger. If depoſited in the body of an animal or plant, they accommodate themſelves to its wants and neceſſities, and furniſh a tumour which ſerves it for a nidus, and beſides, like an uterus, ſupplies it with nouriſhment; and if depoſited in the body of an inſect, the creature provides for the future deſtination of its young charge with all the tender care of a parent, and then dies.

252 Difficult ſometimes to know the parents of inſects.

Theſe circumſtances, added to the great variety of forms which inſects aſſume, render it ſometimes difficult to know who is the parent. We cannot, for inſtance, pronounce with certainty who is the true parent of the gordius, known by the name of the *ſeta equina*, or hair eel. A ſet of experiments, which we once began with a view to throw ſome light on the ſubject, were interrupted unfortunately by an accident, and we have not ſince had leiſure to reſume them. We learned only, from a number of obſervations, that certain black beetles about the end of the ſummer months have the ſtrongeſt propenſity to run into the water, where they ſoon die; and that one or two, and ſometimes three or more, of thoſe eels gradually drop from the beetle by the anus. Whether other inſects provide for the gordius in this manner we have not yet been able to determine.

253 When transformation is moſt obſervable in ſome animals.

The tranſmutations of ſome animals are moſt obſervable in the uterus and egg. Some early transformations of the chick may be ſeen in the plate belonging to this article; and anatomy has often witneſſed the change which happens at birth with reſpect to circulation, reſpiration, digeſtion, and the other functions.

If the reader wiſh to be much acquainted with the manners and transformations of inſects, he will derive information and pleaſure from conſulting the plates and memoirs of Reaumur. If he wiſh to know their intimate ſtructure, the laborious Swammerdam can introduce him to a new and amuſing ſpecies of anatomy. This laſt author had before Reaumur defined and deſcribed

254 Similar tranſformation in plants and animals.

ſcribed the kinds of tranſmutations among inſects and ſome other animals. He has ſhown ſimilar tranſmutations in plants; and in plate 46 of his Book of Nature, has compared the frog and the clove July-flower under their ſix different forms.

255 Transformation accompanied with new propenſities, &c.

In all living bodies poſſeſſed of mind, the changes of form, as well as the change of habit and of age, are uſually accompanied with new propenſities, appetites, and paſſions. It may thereſore be inferred, that we ought not to look for the cauſe of temper in either the brain or the nervous ſyſtem; or to imagine, that the propenſities, appetites, and paſſions, are properties of mind: they ſeem only affections happening to mind in conſequence of ſtimuli and organic ſtructure.

256 Is an evolution of parts by nutrition.

Microſcopic obſervations having demonſtrated, that all the forms of the plant and animal exiſted previouſly in the ſeed or embryo, transformation muſt be owing entirely to the evolution of the different parts by means of nutrition.

257 The deſign of transformation.

What nature intends by tranſformation, we pretend not to ſay; but by means of transformation different elements are peopled, the different ſeaſons variouſly adorned, and animated nature wonderfully diverſified without a multiplication of beings.

Sect. XII. *Generation.*

258 Generation

259 One hypotheſis, that all living bodies were formed at once, and brought into view by generation.

Many of the cauſes which contribute to the formation of a living body have hitherto eluded human reſearch; may in all probability never be diſcovered; and perhaps are beyond human comprehenſion. Some philoſophers, conſidering the extreme diviſibility of matter, and learning from the microſcope that transformation is but the developement of certain parts that previouſly exiſted, have thence imagined that generation is ſomewhat analogous; that all regularly organiſed bodies received their form at the beginning; that the firſt of every genus and ſpecies contained by involution the numerous millions of ſucceeding generations; and that the union of the two ſexes gives only a ſtimulus, and brings into view forms that had exiſted ſince the world began.

260 Objections to this hypotheſis.

This hypotheſis has attempted to explain a thing that is unknown by what muſt for ever remain incomprehenſible to the human mind in its preſent ſtate. It appeals abſurdly from obſervation to conjecture; and ſuppoſes that bodies which are originally brought in view, which are daily augmented, frequently repaired, and ſometimes renewed by organic action, do nevertheleſs in their firſt formation require an effort ſuperior to what omnipotent power is able to perform by ſecondary agents

261 Does not explain the renewal of parts,

Had the ſupporters of this hypotheſis conſidered that many herbaceous plants produce new flowers when the firſt ſet are untimely cut off, that lobſters and many a ſpecies of inſect renew their limbs, and that certain polypes can raiſe ſo perfect vegetable forms as to puzzle the naturaliſt whether or not he ſhould claſs them under plants; they would not ſurely have preſcribed ſuch bounds to omniſcient wiſdom and almighty power, or declared with ſuch confidence what the Author of Nature, to ſpeak with the vulgar, muſt neceſſarily perform by his own hands, or what he may intruſt to ſecondary cauſes regulated by his laws.

262 Nor the production of monſtrous forms.

263 Proceeds on queſtionable data.

Theſe philoſophers will find it difficult to account in a very ſatisfactory manner for monſtrous productions, and for thoſe changes of ſtructure and of form which for a while continue hereditary from the influence of habit. They object to others, that all the parts of a living body are mutually dependent on one another, and that they muſt neceſſarily have been coeval or exiſted at once. But though every attempt that has yet been made to aſcertain which of the vital organs are prior and which poſterior in a living body has proved unſucceſsful, it has not been demonſtrated that either themſelves or their functions are coeval. It may, on the contrary, be plainly demonſtrated from obſervation, that the lungs and the ſtomach do not begin to perform their functions ſo early as the heart and the vaſcular ſyſtem; that the heart and its ſyſtem perform their functions, even with ſome conſiderable changes, immediately after birth; that the vegetable tribes are without nerves; and that brain and nerves in the animal kingdom perform more and more of their functions as the ſyſtem approaches towards maturity. It has even been ſhown that bones will unite, and the limbs of an animal continue to be nouriſhed without nerves; that there is a principle of life in the blood; that the heart will act under other ſtimuli beſides that of nerves; and that ſound logic does by no means require us to ſuppoſe that the firſt actions of the fœtal heart, or the punctum ſaliens, are owing to the influence of ſtimuli from the brain, or that the brain muſt have exiſted when the heart firſt moved.

264 Embryo formed by ſecondary cauſes.

Although the minuteneſs and tranſparency of the parts may prevent us from ſeeing the firſt gradual formation of the embryo, yet every obſervation corroborates the opinion that it is formed by ſecondary cauſes, and through the medium of organic powers.

265 By one of the ſexes or both.

It has been aſked, whether or not is the embryo formed by the joint operation of the two ſexes? or is it formed entirely by the one, and brought into action by a ſtimulus from the other? The former of theſe queſtions ſuppoſes that each of the ſexes has a ſeminal fluid; that ſome mixture takes place in the uterus, and produces an embryo, in the ſame manner that a neutral ſalt aſſumes a certain and determinate form. The notion implies ſome general and confuſed idea of chemical combination; but does not beſpeak a very clear head, profound reflection, or much acquaintance with the nature and properties of living bodies.

266 The opinion of Hippocrates, Hervey, and their followers,

267 Of Hamme, Leeuwenhoek, and their followers.

For a long time paſt the moſt rational phyſiologiſts have generally agreed that the embryo is formed gradually and ſlowly in one or other of the two ſexes, not by chemical combination and mixture, but a ſyſtem of organs, directed by laws and prompted by ſtimuli, with many of which we are yet unacquainted. From the great Hippocrates downwards to Aquapendens and Harvey, the credit of furniſhing the fœtal embryo was almoſt univerſally given to the females of thoſe animals which are named oviparous. Among the viviparous, appearances were ſuch, that the female was left to conteſt it with the male. At laſt the eclat of Leeuwenhoek's diſcoveries ſeemed to put an end to all doubts entertained upon the ſubject. He very plainly ſaw through his microſcope that very great profuſion of particles that move to and fro with amazing rapidity in the male ſemen. Upon this he embraced the doctrine of Hamme, who had ſeen them before, and ſuppoſed from their motions that theſe particles were not only animalcules, but the principles or rudiments of that animal in whom they were formed, and that they were depoſited in the uterus of the female only to be nouriſhed and augmented in ſize.

268 Objections to this laſt opinion.

What raiſed ſuſpicions againſt this theory were the numerous animalcules diſcoverable by the microſcope in other fluids, and that vaſt profuſion of young embryos in thoſe caſes where never more than one or two arrive at maturity. It was an objection to it, that ſome females had been impregnated where the hymen remained unbroken, and where the vulva had been ſhut ſo cloſely as to leave only a paſſage for the urine. The male ſemen in theſe inſtances could have reached only the mouth of the uterus. It was another *, that in all birds which have no intrant penis the male ſemen is never ſent farther than the mouth of the vulva, and that a ſingle act of the male impregnates the whole eggs of the ovarium. A third objection is the pollen of flowers, which is not applied immediately to the ſeed, but often to a diſtant part of the veſſel in which it is contained. A fourth may be taken from frogs and fiſhes, and all thoſe animals whoſe eggs are impregnated after emiſſion. And, laſtly, Haller had obſerved the pullet completely formed in thoſe eggs that were not fecundated.

* Vid. Harv. de Partu.

269 The former opinion better ſupported.

Suppoſing animalcules in every kind of prolific ſemen, yet it frequently happens that this ſemen undergoes a change before it can be applied to the embryo. The ſemen of the frog is diſſolved in water; and that which is injected diſappearing ſuddenly after coition, would ſeem to intimate, that in thoſe animals which have been examined it had met with a ſolvent ſomewhere in the uterus, and produced its effect after the change. It is now, we believe, pretty generally known, that the embryo does not commence its exiſtence in the cavity of the uterus. De Graaf obſerved it on its paſſage down the Fallopian tube; he ſaw the place where it firſt began in the teſticle of the female; and caſes have occurred where it has miſſed the Fallopian tube, where it has fallen into the abdomen, where the placenta has been formed, and the fœtus has grown among the viſcera of the lower belly.

270 More generally adopted.

From theſe facts it has been concluded, notwithſtanding ſome feeble objections, that the female teſticles are real ovaries containing eggs; that theſe eggs are brought into action by the ſtimulating power of the male ſemen, which is ſometimes thrown into the cavity of the uterus, ſometimes applied only to its mouth, and ſometimes ſprinkled over the egg after emiſſion. The principal difference, therefore, that occurs between oviparous and viviparous animals, conſidered as ſuch, appears to be this: the former are accuſtomed to eject their embryo before it eſcapes from the membranes of the egg; the latter retain it long in the uterus until it acquires a conſiderable ſize, until the membranes can hold it no longer, and then eject it when the membranes are burſt. A plant is oviparous when it yields ſeed; viviparous when it produces a gem, a bud, a bulb, or an eyed root. The membranes of the ſeed being removed, an incipient embryo is ſeen through the microſcope.

271 Difference between oviparous and viviparous animals and plants.

272 Some animals oviparous and viviparous.

Some animals, according to the ſeaſon, eject the embryo encloſed in its membranes, or retain it in the uterus till the membranes are broken. Theſe are the animals which are ſaid to be oviparous at one period and viviparous at another. The ſpider-flies retain their young till they be as large as the natural ſize of their own bodies, and have undergone all their transformations within the expanſile membranes of the egg, and an uterus as expanſile as the ſtomach of a ſerpent.

273 Union of the ſexes.

In moſt caſes generation requires a temporary union of two ſexes: but it has been ſaid, that in Senegal there is a ſpecies of ſhell-fiſh among whom this operation is the joint work of three individuals. In our own country, too, three frogs are frequently obſerved adhering together, though the labours of the third have generally been thought more officious than neceſſary. In ſome animals the ſexual union is almoſt inſtantaneous. It conſtitutes nearly the buſineſs of life in the laſt ſtage of the ephemeron; and the male both of the frog and toad often continues on the back of the female not for hours and for days only but for ſome weeks. Upon examination it has been found, that with his fore-feet he aſſiſts the female to protrude her eggs through the windings of the oviduct; and when they at laſt arrive at the anus, a ſpecies of the toad has been obſerved to draw them out with his hind legs. Theſe animals were probably the firſt of the maſculine gender who practiſed this art. But due honour has not been aſcribed to the diſcoverers. In former days, the generous and grateful ſpirit of the ancients made them ready to acknowledge their obligations to different animals for the arts of bleeding, clyſtering, and purging; but ſuch is the degeneracy of modern times, that many write only to claim the diſcoveries of others. On this account we ought not to wonder that many accoucheurs, in publiſhing encomiums on their own merit, have invidiouſly concealed the ſuperior pretenſions of the obſtetrical toad.

274 Different appearance of the ſexes.

Among all living bodies the two ſexes are generally ſimilar, and the male ſex generally diſtinguiſhed by ſuperior ſtrength, beauty, and courage. The law, however, does not hold univerſally. The females of ſome carnivorous animals, who are left by the male to provide for their offspring, are larger, ſtronger, and more ferocious than he. Among ſome inſects the male and female have no ſimilarity even in form. The male of the glow-worm is a beetle, which flies in the dark, and is attracted not by the form, but the brilliancy of his miſtreſs (G). The female gall inſect is a large maſs like a vegetable

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(G) Such glowing beauty allures enemies as well as lovers. "In Jamaica, in ſome ſeaſons of the year, (ſays Dr Darwin), the fire-flies are ſeen in the evenings in great abundance. When they ſettle on the ground, the bull-frog greedily devours them; which ſeems to have given origin to a curious, though cruel, method of deſtroying theſe animals: If red-hot pieces of charcoal be thrown towards them in the duſk of the evening, they leap at them, and, haſtily ſwallowing them, are burnt to death." *Botanic Garden.* From this fact the romantic moraliſt and ſpiritualizer might derive ſome hints for amuſing declamation; and in their diſſuaſives might plauſibly demonſtrate, that in moſt caſes beauty is fatal to the object, beloved, to the lover, and deſtroyer.

vegetable excreſcence, without locomotion; the male a ſmall fly full of activity. The one is as unlike to the other as a Harpy to a Venus, and as diſproportioned in point of bulk as a horſe to an elephant.

275 Male and female parts of animals. In many animals the diſtinctions of ſex are concealed in the body. When any of their parts are placed externally, or protruded occaſionally, the male parts are uſually prominent, and the female hollow, in order to receive them. In the acari, however, in many flies, and a few hornets, the caſe is reverſed; the female parts ſuffer erection, and the male parts are open and hollow for their reception.

276 Their ſituation. The external ſituation of theſe parts is very much varied in different animals. In many worms it is near to the head. It is often upon the ſide of the ſnail: near to the breaſt in the female of the dragon-fly. It is at the extremity of the antennæ in the male ſpider. The vulva enters from the rectum in birds. Its common ſituation in moſt animals is well known. ---The male penis, where there is one, is ſometimes found to enter the vulva, and ſometimes not: it is ſometimes imperforated, ſometimes forked, ſometimes double, ſometimes fleſhy, ſometimes bony, ſometimes ſtraight, ſometimes winding ſpirally like a ſcrew, ſometimes with a knob and ſometimes with a point at its extremity, according to the kinds and varieties of animals.

277 Androgynous animals. Few individuals have more than one ſex. Many ſnails, however are androgynous, and have two. In copulation they perform the office of two ſexes, and are mutually impregnated†. This circumſtance has often led the ſenſualiſt to wiſh that he were a ſnail. With equal reaſon the Epicure might wiſh to be one of thoſe worms that imbibe by abſorbents, and ſuck in nouriſhment by a thouſand mouths. The organs employed may be more in number, the continuance of their function may be much longer, and yet the gratification may be leſs. The diſcreet beauty can afford a million of pleaſures to her lover which no ſnail or ſenſualiſt enjoys, and which proſtitution can never yield.

278 Male and female parts of vegetables. The male and female parts of the vegetable are ſometimes both on the ſame flower, ſometimes on ſeparate flowers, and ſometimes even on different plants of the ſame ſpecies. Beſides the flower another organ of generation is found in vegetables. This is the corona, from which the buds and branches proceed. It is a ſubſtance between the pith and the ligneous circles, and from which the diametral inſertments diverge.

279 Parts of generation change, and ſometimes diſappear. The corona is moſt conſpicuous at the time when it ſends forth ſhoots. The flower comes forth only at the time when the ſeed is to be formed; and the teſticles and ovaries of thoſe animals which procreate only at ſtated periods are diminiſhed in ſize, and ſometimes diſappear, till the genial ſeaſon. Even ſome females, when they ceaſe to be prolific, as the pheaſant, for inſtance, aſſume many marks of the other ſex, as if their former ſex had been aſſumed only for a while, and to anſwer ſome temporary purpoſe.

280 Incipient embryos perhaps neuters. In all animals the incipient embryos are perhaps neuters, and the ſex determined according to the predominancy of the male or female ſtimulus on the parts. It would not a little confirm this opinion, were the obſervation to be well founded, that certain bulls are very apt to beget males and others females, and that certain cows which have females always when they are young bring forth males when they grow old. The different proportions of males and females in different climates might alſo ſerve to illuſtrate this doctrine. It is no objection to it that the order of male and female births in the ſame family is often irregular. The proportional force of the two ſtimuli will naturally be different at different times. It may depend on the quantity or quality of the fluid ſecreted, upon the difference of ardour in the parties, on the fancy, the paſſions, the particular ſtate of the ſyſtem at the time, and a thouſand circumſtances, beſides the age, and the uſual or general habit of the body. We mean only to infer at preſent, that wherever a male or female is produced, the ſtimulus of that particular ſex, whatever was the cauſe, had during the time of coition and conception acquired the aſcendency over the parts that were to become ſexual in the embryo. We cannot ſo readily anſwer the queſtion, Why the offspring ſhould poſſeſs the form and diſpoſitions of one parent, and the ſex of the other? In this caſe the different ſtimuli may have acted differently on different parts; in the caſe of hermaphrodites, which are very common in the horſe, the aſs, the cow, and the ſheep, the two parents ſeem to divide the form, the ſex, and the diſpoſitions, equally between them.

281 Female orgaſmus. The particular cauſe which excites the orgaſmus in the female organs is not aſcertained. That viſcous fluid which young laſcivious females eject when fond of the male, is chiefly a ſecretion from the glands of the vagina, the mouth of the uterus, and the neighbouring parts. In ſome reſpects it appears to be ſimilar to thoſe periodical diſcharges of females which frequently aſſume the erect poſture; and theſe diſcharges being uſually diſcontinued during the times of pregnancy and ſuckling, we muſt ſuppoſe that it is a portion of that fluid which nature has prepared for the uſe of the fœtus. Theſe diſcharges are always a proof that the female has arrived at the age of puberty; that her ovary is now performing its office; and that ſhe is diſpoſed to propagate her kind. Whatever be the cauſe of the female orgaſmus, it is often ſo ſtrong as to counteract the natural effects of the ſeminal fluid, and prevent impregnation. For this reaſon, few young and laſcivious females conceive immediately after their marriage; and after coition, therefore, in cattle, it is ſometimes a practice to beat the female, to plunge her in water, to weary her with running, and to uſe other means to prevent the return of the ſexual deſire.

282 Influence of fancy over the parts of generation. In man, and ſome of the noble animals, the influence of fancy over the organs of generation is unqueſtionably great; but the extent and mode of its agency is not defined. Thoſe who allow it ſo much power in impreſſing marks, and altering the form and colour of the fœtus, ſupport their opinion rather by the number than the ſtrength of their arguments. Many of the ſtories which they adduce as a ſort of proofs are evidently fabulous, and have brought the truth of the whole into queſtion. The reports, however, of the French commiſſioners who were appointed to examine the nature of animal magnetiſm, ought to deter the can-

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† Swammerd. Hiſt. of Inſects, p. 1. ch. 9.

did inquirer from drawing very haſty concluſions.—The queries of Fienus (H) concerning the powers of this mental faculty are important and curious, and might be of uſe in directing our reſearches; but they ought to be anſwered by accurate experiments, and not by acute metaphyſical reaſoning and hiſtorical anecdotes that are ill authenticated.

283 The mixture of ſpecies prevented, how.

To prevent a confuſion of genera and ſpecies, animals are generally reſtricted by propenſity to their own kind; and the ſeminal fluids, beſides, being various in various animals, they cannot indiſcriminately act as a ſtimulus on all female organs of generation. The changes of form induced by habit, which is owing itſelf to the influence of ſtimuli, will partly explain the manner in which the progeny is made to reſemble the male. As the irritability of different parts is of different kinds, the ſtimulus will have a different effect on different organs; and in theſe caſes where either genera or ſpecies are mixed, the parts which are moſt and leaſt affected by the ſtimulus of the male will be obvious in the ſhape and form of the offspring.

284 Generation without ſexual diſtinctions

We have hitherto ſpoken of generation as being performed by the temporary intercourſe of two ſexes; but the puceron is an inſtance where ſexual diſtinctions are not always neceſſary. Even where they exiſt they are daily diſpenſed with in the vegetable kingdom. Plants grow from the gem, the bulb, the leaf, or the root—They propagate by ſlips, by ſuckers, and by layers, and ſome of them multiply by ſpontaneous ſeparation (I). In many animals the diſtinctions of ſex are totally unknown. It has been obſerved, that infuſory animalcules multiply their ſpecies by continual diviſions and ſubdiviſions of their own body; that ſome polypes, by ſpontaneous ſeparation, ſplit tranſverſely, ſome longitudinally, and that ſome ſend off ſhoots. When experiments have been made upon theſe animals, it has been diſcovered that the numerous and artificial diviſions of their body or their head produce entire animals. Trembley learned that they might be engrafted upon one another, and produce monſters as wild and extravagant as poet or fabuliſt has ever dreamed of.

285 Plants and ſome animals congeries of living bodies.

It was noticed already that the alimentary canal of ſome animals diſtributed nouriſhment through the whole body without the intervention of circulating veſſels, and that the vital organs of vegetables were generally diffuſed through the whole ſyſtem. The caſe is the ſame in polypes as in plants. Every part is a miniature of the whole. It is found to have ſimilar organs of digeſtion, of reſpiration, of circulation, and of generation. In perfect animals all the parts are more dependent on one another; the vital organs have diſtinct ſituations, and their powers are concentrated in diſtinct places. The arm of a man has no heart; it has no lungs; it has no ſtomach, and no organs of generation; but the branch of a tree has as complete a ſyſtem of organs as the trunk itſelf, and is as independent of that body from which it grew as the graft is independent of the ſtock.

286 Difference between plants and the nobler animals.

The ſeveral parts of perfect animals all contribute to make one whole; the ſeveral parts of a plant or polype, when united together, form only a congeries of living bodies. Theſe facts contribute to explain the principal phenomena in this mode of propagation.

SECT. XIII. *Sleep.*

287 Sleep.

SLEEP is rather an affection of mind than a property of body, and is therefore more naturally a ſubject of metaphyſics

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(H) The ſmall work of Fienus to which we allude is intitled *De Viribus Imaginationis Tractatus*. The following queſtions ſerve to give an idea of its contents, and are named *Index Queſtionum hujus Libri*.

Queſtio. I. An anima habeat vim agendi in ullum corpus?
II. In quæ corpora agere poſſit, et qua actione?
III. Per quas potentias illos motus et actiones exerceat?
IV. An anima agat aliquid per potentiam imaginativam?
V. An phantaſia poſſit ullum corpus movere localiter?
VI. An poſſit alterare?
VII. An phantaſia poſſit vim nullam acquirere ab influxu cœlorum?
VIII. An ergo phantaſia nullam habeat vim agendi?
IX. Per quas potentias phantaſia corpora immutet?
X. Quid poſſit in corpus proprium, et *ſpecialiter*, an poſſit in eo creare morbos?
XI. An poſſit morbos creare?
XII. Quid poſſit in alienum externum?
XIII. Quid poſſit in alienum propinquum ſeu fœtum?
XIV. Quomodo et qua ratione fœtum immutet?
XV. Quomodo poſſit conformatricem dirigere?
XVI. Quænam imaginatio habeat illam ſignandi poteſtatem? quæ non?
XVII. Cur non omnis imaginatio quam animi paſſiones ſequuntur ſignat?
XVIII. An omnes animi paſſiones ſignant?
XIX. Quænam imaginatio ſignet, an tantum matris an etiam patris?
XX. An etiam brutorum imaginatio ſignet?
XXI Quo tempore ſignet, an tantum graviditatis, an etiam conceptus?
XXII. Quantam permutationem poſſit in fœtum inducere, et quas ſignaturas poſſit cauſare?
XXIII. Cur phantaſia non ſemper imprimit in fœtum res imaginatas eodem modo, ſed ſæpe tam diverſis?
XXIV. Cur non eidem ſemper parti ſed diverſis notæ inducuntur?

(I) As the houſe leek and ſome graſſes.

288
An affection of mind.

metaphyſics than of phyſiology. This affection is often induced by fatigue and exerciſe; and ſeveral perſons, when they are weary and no longer able to move their limbs, ſay they are exhauſted. Though the word *exhauſted*, in this expreſſion, has ſeldom any preciſe meaning, it ſeems, however, to have been the means of ſuggeſting a theory with regard to ſleep. This theory ſuppoſes that ſleep is occaſioned by the exhauſtion of irritability in the living ſyſtem; but it ſeems to be founded on very limited and partial obſervations, or rather has been formed, like a great many others, prior to any obſervations at all, and afterwards tortured to account for facts which it does not comprehend. It does not account for the periodical returns of ſleep, for the almoſt unremitting drowſineſs of infants, and for that liſtleſs lethargic inaction ſo often attendant on old age. When no exhauſtion of irritability can well be ſuppoſed to have taken place, the propenſity to ſleep on many occaſions becomes irreſiſtible, from the effects of monotonous ſpeaking, from ſtillneſs, darkneſs, or from the ſameneſs of ſcenery around us; and when one ſtimulus, after long application, can rouſe no more (a plain proof that the irritable principle is by no means exhauſted) another ſtimulus that is leſs powerful in ordinary caſes is accompanied with excitement.

289
Favours nutrition

Of theſe phenomena, we frankly confeſs that we can aſſign no phyſical cauſe that is ſatisfactory. It is eaſy, however, to ſee the intention which nature has in view by inducing ſleep. It has long been obſerved, that in all living bodies there is a continual waſte and repair, or, to ſpeak with more preciſion and accuracy, one proceſs of aſſimilation and another of diſſolution conſtantly taking place in all the different parts of the ſyſtem. It is alſo true that this aſſimilation, when the body is healthy, predominates in youth; that diſſolution prevails in old age; and that the two are nearly on a par during the vigour and meridian of life. Another fact which admits of demonſtration is, that a gentle and moderate exertion of mind and body will promote both. And laſtly, it is certain that immoderate exertion in either reſpect, or any exertion that is not ſuited to our ſtrength, habits, or period of life, prevents aſſimilation, haſtens diſſolution; and that the means which nature employs to reſtore the balance is uſually by inducing a ſtate of ſleep.

290
Sleeping and waking each ſuited to different functions in the ſyſtem.

When the balance is reſtored, and all the parts are again repaired for diſcharging their office, man awakes; but his waking period is of ſhort duration. If appetite or paſſion do not engage him in ſome purſuit, if his mind be not occupied with ſome object, or if no ſtimuli be applied from without. This period ſeems chiefly intended for collecting food, and for being employed in thoſe exertions which promote reſpiration, digeſtion, abſorption, circulation, and ſecretion; while ſleep after the food is collected, aſſiſts nutrition, and promotes aſſimilation throughout the ſyſtem. If what is the natural food of the ſpecies cannot be collected by the plant or animal in a ſhort time, the period of ſleep is proportionally reſtricted. If the food received be difficultly aſſimilated, the period of ſleep is proportionally extended. If the food be not prepared for aſſimilation, the ſleep is diſturbed. If it be difficultly prepared by the organs, the active exertions are more vigorous; if eaſily prepared, they are more feeble. If it be collected during the day, the ſleep is in the night; if collected in the night, the ſleep takes place during the day; and all living bodies are directed by nature to ſelect that time and ſpecies of food which is moſt ſuited to their nature, their habits, their circumſtances, and age.

291
Violent exertions of mind or body hurtful to the ſyſtem.

To favour nutrition, not only the body, but even the mind, muſt be allowed to indulge in reſt. The child ſleeps, and his mental faculties are under reſtraint, that thoſe functions employed in nutrition may not be diſturbed. The mental faculties are ſtill feeble in a more advanced period of life; and the moderate exertions of mind and body which are natural to youth are chiefly ſuch as favour the preparatory organs of the ſyſtem, and promote growth: but the active and vigorous exertions of manhood, conſidered with reſpect to mind or to body, ſoon cauſe diſſolution to preponderate in the ſcale, and old age becomes liſtleſs, inactive, and drowſy, and the mind returns to childhood or dotage, becauſe living bodies are known to accommodate themſelves to circumſtances, and becauſe the prevailing diſſolution is retarded by the frequent returns of reſt and of ſleep, which favour ſo much the aſſimilating powers, counteract *re-abſorption*, and oppoſe decay.

292
Mental exertion counteracts nutrition.

During ſleep the irritable principle is more languid, and all the ſenſes are more obtuſe. The mind then is withdrawn to its reſt, and does not attend to ſtimuli from without. The ſame happens when the mind is abſorbed in profound thought: but profound thought is hurtful to the ſyſtem. The mind then is engaged in purſuits peculiarly its own, and is leſs attentive to the calls of nature. In the time of ſleep it withdraws ſeemingly, not ſo much for its own ſake as that of the body, which then being freed from the interruption of voluntary motions, all thoſe organs which act ſpontaneouſly can more eaſily diſcharge their functions.

293
Charge of the ſyſtem not contracted by the mind, therefore

For the beſt of reaſons, the mind is not allowed to judge for itſelf when it is proper to eat, to drink, to ſleep, to wake, and to propagate the ſpecies. Theſe and the like are offices too important to be wholly intruſted with a being of ſo very limited intelligence. In all theſe caſes, it is therefore directed by certain propenſities reſulting from the body in conſequence of ſtimuli or organic ſtructure. Being often amuſed with thoughts and ideas on thoſe objects which are purely intellectual, as the notes of memory, the forms of fancy, and its own operations in the way of reaſoning; being inveſted with ſome little power in rouſing, calming, and regulating the paſſions, the deſires, and appetites; and having the command of all the voluntary movements of the body; it ſometimes neglects its charge of the ſyſtem, deſtroys it ſometimes by exceſſive indulgence, and ſometimes employs it in accompliſhing ends peculiarly its own. One ſhould imagine that the mental principle in the lower animals ſhould occaſion but little diſturbance to the ſyſtem; yet it has been obſerved that geeſe fatten ſooner in the dark than they do in light, where the mind is entertained with varieties of objects; and this circumſtance will partly explain why man does not fatten ſo regularly as the brute, and why caſtration, which prevents ſo much anxiety and paſſion and exhauſting efforts, aſſiſts growth and the organs of nutrition. The venereal ſtimulus, for this reaſon, is not ſtrongly felt at a very early period of youth, nor is very troubleſome in old age. In the former caſe it would prevent the growth of the ſyſtem; in the latter it would haſten its diſſolution.

294 The ſyſtem accommodates with reſpect to ſleep.

The natural returns of waking and ſleeping may be altered by the preſence or abſence of ſtimuli, and are curiouſly affected by the influence of habit. Although the commencement of one of theſe periods happen to be changed, the commencement of the other will continue as before. If a perſon be accuſtomed to ſleep preciſely at nine in the evening, and to riſe again at ſix in the morning, though his ſleep in the evening may now and then be kept off till twelve, he will waken at ſix; and though continued by darkneſs, quietneſs, or ſuch like cauſes, till the day be advanced, it will recommence in the evening at nine. The ſtate of phyſiology is ſuch at preſent that we cannot aſſign any preciſe phyſical cauſe for the natural kinds of ſleeping and waking, or for their regular periods of return. As for the cauſes which occaſion morbid ſleeping and waking, we refer our readers to books on pathology.

295 Sleep of plants.

Plants too have been ſaid to ſleep. At the approach of night, many of them are obſerved to change their appearances very conſiderably, and ſometimes even to ſuch a degree as ſcarcely to be known for what they were before. Theſe changes happen principally to the leaves and the flowers. During the night, many leaves, according to the nature and genus of the plant, are ſeen to riſe up, to hang down, or to fold themſelves in various ways for the protection of the flowers, the buds, the fruits, or young ſtems; and many flowers, to eſcape a ſuperabundance of moiſture, to hang down their mouths towards the earth, or wrap themſelves up in their calixes. It was mentioned already, that theſe phenomena are owing to ſtimuli acting from without: we may add here, that moſt of the motions are performed at the joints where the leaves and petals articulate with the ſtem. A period of reſt is as neceſſary to plants as ſleep is to animals. The irritable principle cannot act long under the influence of the ſame ſtimulant, except at intervals; and the rapid growth obſervable in plants during the night, is a ſtrong proof that the organs employed in aſſimilation had been diſturbed in diſcharging their functions during the day, when expoſed to the actions of heat and light and of other ſtimulants.

Sect. XIV. *Death.*

296 Death.

Death is the ceſſation and total abſence of the living principle in organized bodies. It is ſometimes imitated by ſleep and ſwoons; and a ſtate of torpor in many inſtances can hardly be diſtinguiſhed from it.

297 In ſome inſtances not diſtinguiſhable from a ſtate of torpor.

Several moſſes and a few animals, as the ears of blighted wheat, the ſeta equina, the wheel polype, and ſome ſnails as we learn from the Philoſophical Tranſactions, may be ſafely preſerved as dried preparations, not for months only but for years; and after irritability and ſenſation have been totally ſuſpended, will return to life upon the proper application of moiſture. A wheel polype was put by Fontana upon a bit of glaſs, and expoſed during the whole ſummer to the noonday ſun; another was expoſed in a ſimilar manner for a year and a half; and after they were like a piece of hardened glue, were reſtored to the uſe of all their functions by a few drops of water (k). Wherever there is death, there muſt therefore be likewiſe a partial or general decompoſition of one or more of the vital organs.

298 A certain period of life allotted to the ſpecies.

This decompoſition takes place naturally in ſome living bodies after a few hours, in ſome after a few days; the life of others is extended to weeks; ſome are vigorous for months or a ſeaſon. Man has often ſeen more than fourſcore; and the hardy oak ſurvives the ſhock of two or three centuries. Theſe obſervations conſpire to ſhow that there is a certain period of exiſtence allotted by nature to every ſpecies of living bodies.

299 Accommodates with reſpect to individuals.

In the individual this period is ſometimes abridged, and may be ſometimes extended by circumſtances; but yet there is a bound which it cannot paſs, when the vital organs muſt be decompoſed, and the ſyſtem return to moulder with the duſt. The time of incubation and the time of geſtation are pretty much defined in every ſpecies, becauſe the circumſtances of the individual in theſe caſes are generally ſimilar; but after emerging from the fœtal ſtate, the individuals are partly entruſted to their own organs and the chances of life, which are much varied; and hence we account for the difference of their age.

300 Life proportioned to the ſeries of functions to be performed.

Life in general ſeems to be proportioned to the ſpace occupied by that ſeries of functions which the ſpecies is evidently deſtined to perform: and here ſometimes the accommodating principle is ſingularly remarkable. As the period of decay is never ſeen to commence in the ſpecies till that of propagation be nearly elapſed, and as propagation in the lower tribes of plants and of animals is often the immediate harbinger of death; ſo many animals which have not propagated, indulged the propenſity, nor became uneaſy from the languor of deſire, continue vigorous longer than ordinary, as if it were waiting for an opportunity to multiply their kind. And in the vegetable kingdom, where no individual is ever the victim of deſire or paſſion, annuals, if prevented from flowering and ſeeding in their proper ſeaſon, will live double, and ſometimes triple, the uſual time, till theſe functions be

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(k) Father Gumillo a Jeſuit, and the Indians of Peru, ſays Dr Fowler, are quoted by Fontana, on the authority of Bouguer, as ſpeaking of a large and venomous ſnake, which being dead and dried in the open air or in the ſmoke of a chimney, has the property of coming again to life on its being expoſed for ſome days to the ſun in ſtagnant and corrupted water. But, adds the Doctor, it would almoſt require the credulity of an Indian to credit the teſtimony of the Jeſuit. *Experiments and Obſervations relative to Animal Electricity, by Richard Fowler.*—With regard to this report, we ſhall only obſerve, that the ſnake would not readily return to life after it was dead: but if the Jeſuit meant only that it recovered after it was dried, and its ſeveral functions had been ſuſpended, we muſt ſay, that if his report be not ſufficiently authenticated, neither has it been ſufficiently diſproved.

301 Symptoms of decay.

be ſomehow performed, and then die. But when all the organs are fully evolved and have diſcharged, or have continued for the uſual time capable of diſcharging, thoſe offices for which they were intended; diſſolution commences, the aſſimilating organs begin gradually to loſe their tone, and the reabſorbents carry off more from the different parts than what they receive in the way of nutrition: the irritable fibre then becomes rigid; the membranes and cartilages begin to oſſify; the bones grow harder; the ſmaller veſſels collapſe and diſappear; the parts no longer are obedient, as before, to the action of ſtimulants; and death enſues.

302 An attempt to account for death.

Some, in order to account for this event, imagine that the body receives at firſt a certain portion of irritability, and continues to live till that be exhauſted: but this theory explains nothing; and without pretending to a great deal of foreſight, we will venture to predict, that for all the irritability which it has, it will not be diſtinguiſhed for its longevity.

303 Phyſical cauſes not eaſily aſſigned for periodical phenomena in the ſyſtem.

With regard to the periods by which the life, the functions, and diſeaſes of living bodies are ſo frequently regulated, and which periods may ſometimes be varied but not evaded, the moſt prudent language that, perhaps, can be adopted in the preſent ſtate of phyſiological ſcience is this of the Divine, That the God who formed us hath numbered our days, determined our times, and preſcribed the limits of our exiſtence.

The following Table may be conſidered as in ſome reſpect a ſummary view of the foregoing Sections, and as a Supplement to the Table of D'Azyr.

1. Respiration.

Some living bodies have reſpiratory organs (L)

Diffuſed through the ſyſtem.
Confined to one place.
Situated externally.
Situated internally.
In the courſe of circulation.
Not in the courſe of circulation.
Within or without the courſe of circulation at pleaſure.
Without tracheæ (M).
With tracheæ ramified through the ſyſtem where the reſpiratory organs are generally diffuſed.
——————not ramified through the ſyſtem where the reſpiratory organs are confined.
——————formed by rings.
————————————by ſegments of rings on one ſide, and a membrane on the other.
————————————by continuous rings running ſpirally like a ſcrew.
——————admitting air by one entrance.
————————————by ſeveral entrances.
——————wholly concealed in the body.
——————partly projecting from the body.
——————opening at the head.
————————————at the oppoſite extremity.
————————————upon one ſide.
————————————upon both ſides.

2. Digestion.

Some living bodies have an alimentary canal

Without teeth.
With teeth in the mouth.
———— in the ſtomach.
—— ſtones or artificial teeth in the ſtomach.
—— glands in the mouth for ſecreting a liquor to be mixed with the food.
—— pouches in the mouth where the food is kept and moiſtened.
—— a ſac or bag where the food is kept and moiſtened.
—— a membranous ſtomach.
—— a muſcular ſtomach.
—— an intermediate ſtomach.
Without a cœcum or blind gut.
With a cœcum.
—— two cœca.
—— three cœca.
—— four cœca.
} Theſe parts, as well as ruminating ſtomachs and their œſophagus, have antiperiſtaltic motions.
—— one entrance or mouth.
—— many entrances by abſorbents.

Plants

(L) The gentlemen of the French Academy, who have been attentive to mark the number of lobes in the lungs and livers of different animals, have ſufficiently demonſtrated, by the facts which they relate, that many of thoſe phyſiological concluſions which have been drawn from the number of lobes in theſe two viſcera, are juſt as deluſive as many of thoſe which have been drawn from the number of lobes and the different tubercles found in the brain.

(M) Where the reſpiratory organs are ſituated externally.

Digestion.

Plants have many alimentary canals (n).
Some polypes have alimentary canals that branch through the body.
The alimentary canals of plants, of ſome polypes, and worms, diſtribute the fluids without the aid of a circulating ſyſtem.

3. Absorption. Performed

By veſſels beginning from the alimentary canal.
———— from the cavities.
———— from the ſurface.
— veins in the penis and placenta.
— reabſorbents originating from all the parts of the ſyſtem.

4. Circulation. Some living bodies have

No circulating ſyſtem.
A circulating ſyſtem with one heart.
———— a heart for diſtributing the blood through the reſpiratory organs, and an artery for diſtributing it through the ſyſtem.
———— one heart for the reſpiratory organs, and one for the ſyſtem, both in one capſule.
———— two hearts for the reſpiratory organs, and one for the ſyſtem.
———— a pulmonary heart, or a heart for the reſpiratory organs in the courſe of circulation.
———— a pulmonary heart within or without the courſe of circulation at pleaſure.
———— a heart ſituated in the breaſt.
———————— near to the head.
———————— in the oppoſite extremity.

5. Nutrition. The food is prepared.

By the alimentary canal.
— the lacteals.
— the reſpiratory organs.
— the circulating ſyſtem.
— the cellular membrane.
— glands.
And by the ſeveral parts in which it becomes finally aſſimilated.

6. Secretion. Performed

By veſſels.
— exhaling veſſels.
— excretory organs.
— organic pores.
— glands.
And by all the parts of which the ſyſtem is compoſed.

7. Integumation (o). Some living bodies have integuments.

Which are ſcaly.
———— ſhelly.
———— membranous.
———— corneus.
———— cretaceous.
———— ligneous.
———— covered with down.
———————— hair.
———————— prickles.
———————— feathers.
———————— a viſcid matter.
——— change their colour.
———————— their covering.
——— are changed themſeves.

8. Irri-

(n) The ſubterraneous bulbs, the ſwoln fleſhy parts of the roots, and certain cups and veſicles which contain water, ſerve often as reſervoirs of food to the plants, although for various reaſons we have not ventured to call them ſtomachs. *Stomach* would be a vague and unmeaning word were it applied even to all thoſe reſervoirs of water or ſecreted fluids which we find in fiſhes, and by which ſome of theſe animals are preſerved alive on the dry ſhore till the tide return.

(o) There ſeems to be a want of preciſion in claſſing bones with integuments, or integuments with bones, as is

3. IRRITABILITY. The irritable principle effected.

By ſtimulants inviſible.
— ——— unknown.
— ——— unthought of.
— the nervous influence.
— light.
— heat.
— moiſture.
— electricity.
— ſalts.
— gaſes.
— bodies that act mechanically.

9. MOTION. Locomotion performed

By legs.
— wings.
— fins.
— the tail.
— organs which fall not properly under theſe deſcriptions.
— the ſpringineſs of the body or of ſome part of it.
— contrivances which fit living bodies for being moved by foreign agents (P).

is done in D'Azyr's table. Comparatively ſpeaking, bones are confined to a few genera of living bodies, and are never ſubject to periodical changes like the integuments or cuticular coat of the alimentary canal in ſome animals.

For the ſake of perſpicuity, it could have been wiſhed that either anatomiſts or phyſiologiſts had defined bones in a manner different from what they have done, and as far as poſſible avoided thoſe looſe and inaccurate expreſſions which diſgrace ſcience; for ſome ſpeak of animals having their bones, by which they mean ſhells, on their outſide, and the muſcles within them. Some ſpeak of ſolid and compact bones, that were once cartilages, membranes, nay a mere jelly; and ſome ſpeak of bones in general as the hardeſt, moſt ſolid, and moſt inflexible parts of the organized body. From all this we are led to infer, that integuments, if hard, ſolid, and inflexible, may be called bones; that the heart and blood-veſſels, if converted into a hard, ſolid, and inflexible ſubſtance, may be called bones; and that a jelly, a membrane, or a cartilage, if it can be ſuppoſed that in the courſe of nature they will become hard, ſolid, and inflexible, may likewiſe be called bones. But certainly if hardneſs, ſolidity, and inflexibility, be to conſtitute the characteriſtics of bones in a living body, however often we may be neceſſitated to include ſhells, wood, horns, and ſtony concretions, under that denomination, we can never with propriety ſpeak of bones that are cartilaginous, membranous, or even a mere jelly. Theſe expreſſions might be proper enough were oſſification conſidered merely as a natural or accidental circumſtance, and were bones defined to be thoſe internal parts of an animal which are intended by nature to form what is meant by the ſkeleton in its uſual ſenſe. Theſe parts, we know, after paſſing through the forms of jellies, membranes, and cartilages, often become hard, ſolid, and inflexible, from oſſification: a ſpecies of induration which is natural to the parts which form the ſkeleton of ſome animals, an induration which occaſionally is extended to other parts, which ſometimes exhibits the appearance of cryſtallization, and in many reſpects is different from the manner in which the wood of vegetables and the ſhells of animals become hard.

Oſſification does not interfere ſo much as may be commonly imagined with the ſtructure of bones: the ſtructure of bodies may often be ſimilar, and yet their mode of induration be different. Bones have been obſerved to conſiſt of laminæ, or plates like ſhells, and cylindric bones of concentric circles like wood. The concentric circles of wood have been found to conſiſt of indurated membranes, which they receive ſucceſſively from the bark; and Swammerdam diſcovered that the ſhells of ſome fiſhes were compoſed of laminæ that conſiſted likewiſe of indurated membranes or hardened cuticles, that had been ſucceſſively furniſhed by the body. It has thence been ſuppoſed that bones, though hardened in a different manner, are of a ſtructure nearly ſimilar to that of ſome ligneous bodies and ſhells, and that their laminæ in many inſtances conſiſt alſo of indurated membranes, ſupplied ſucceſſively by the perioſteum when it is preſent. When it is abſent, nature, which accommodates herſelf to circumſtances, can form the bone in another way, and afterwards cover her new productions with a perioſteum. For many excellent phyſiological obſervations on bones, we refer our readers to the *Oſteology* of the late Dr Monro, and particularly to the volume already publiſhed of Mr Bell's *Syſtem of Anatomy*.

(P) The pulp which ſurrounds ſeeds is often the means of their propagation. Animals ſwallow the ſeeds for the ſake of the pulp; and the ſeeds remaining indigeſtible, are carried to a diſtance, and diſcharged with the feces.

10. Habit. Accommodates with reſpect
- To reſpiration.
- — digeſtion.
- — abſorption.
- — circulation.
- — nutrition.
- — ſecretion.
- — integumation.
- — irritability.
- — motion.
- — transformation.
- — generation.
- — ſleep.
- — death.
- — form.
- — ſize.
- — climate.
- — propenſity.
- — the healing of parts that are morbid.
- — the renewal of thoſe that are broken off.

11. Transformation. Takes place
- By a change of proportion among the parts.
- ———— of their form.
- — throwing off old parts.
- — an addition of new ones of a different uſe, ſtructure, and form.
- — a change of the whole form together.
- ———— of qualities, propenſities, manners.

12. Generation. Performed
- By the temporary union of two ſexes.
- — the ſpontaneous ſeparation of parts.
- — organs ſituated in the breaſt.
- ———— in the ſide.
- ———— near to the head.
- ———— in the oppoſite extremity.
- — an intrant organ of the male and a recipient organ of the female.
- — an intrant organ of the female and a recipient organ of the male.
- — the ſtamina and piſtils of flowers.
- — the ſeminal ſecretion of the male thrown into the organs of the female.
- ———— ſprinkled at the entrance of the female organs.
- ———— thrown upon them from a diſtance.
- ———— tranſported to them by the winds.
- ———— ſprinkled on the embryo after emiſſion.
- ———— diſſolved in a fluid ſecreted by the female before it can rightly perform its office.
- ———— diſſolved in water.
- ———— diſſolved perhaps ſometimes in air, as in the caſe of diœcous plants, where it probably acts like an aroma.

13. Sleep. Natural ſleep is occaſioned
- By quietneſs.
- — the abſence of ſtimuli.
- — the ſameneſs of ſtimuli when long continued.
- — deficient aſſimilation.
- — deficient irritability, which is owing ſometimes to the weakneſs, inattention, or confined powers of the mental principle.

14. Death. Happens naturally to ſome ſpecies of living bodies
- After hours.
- —— days.
- —— weeks.
- —— months.
- —— ſeaſons.
- —— years.
- Not till after centuries.

All living bodies are much exhauſted after performing the act of generation, and many of the inferior plants and animals begin immediately to ſicken and decay.

We conclude by confeſſing, that concerning many uſes of the parts, and concerning different ſpecies of variety in the form, ſtructure, and poſition of the organs, much, after all, is ſtill reſerved for farther reading, for farther obſervation, and for future phyſiological arrangement.

Bryant's Flora Diætetica.

PHYTOLACCA, pokeweed, or *American nightſhade*, in botany, is of the decandria icoſandria claſs of plants. It grows naturally in the United States of America. It hath a thick, fleſhy, perenial root, divided into ſeveral parts as large as middling parſneps. From this riſe many purpliſh, herbaceous ſtalks, about an inch thick, and ſix or ſeven feet long, which break into many branches, irregularly ſet with large, oval, ſharp-pointed leaves, ſupported on ſhort footſtalks. Theſe at firſt are of a freſh green colour, but as they grow old they turn reddiſh. At the joints and diviſions of the branches come forth long bunches of ſmall bluiſh-coloured flowers, conſiſting of five concave petals each, ſurrounding ten ſtamina and ten ſtyles. Theſe are ſucceeded by round depreſſed berries, having ten cells, each of which contains a ſingle ſmooth ſeed.

In Virginia and other parts of America the inhabitants boil the young leaves, and eat them in the manner of ſpinach. They are ſaid to have an anodyne quality, and the juice of the root is emetic and cathartic. The young ſtems when boiled are as good as aſparagus; but when old they are to be uſed with great cantion, being violently cathartic. The Portugueſe had formerly a cuſtom of mixing the juice of the berries with their red wines, in order to give them a deeper colour; but as it was found to debaſe the flavour and to make the wine deleterious, the matter was repreſented to his Portugueſe Majeſty, who ordered all the ſtems to be cut down yearly before they produced flowers, thereby to prevent any further adulteration. The ſame practice was common in France till it was prohibited by an edict of Louis XVI. and his predeceſſor under pain of death. This plant has been ſaid to cure cancers; but the truth of this aſſertion requires to be proved by a greater number of experiments. Dr Shultz in his ingenious inaugural diſſertation on this ſubject obſerves that "ſcabies and herpes have been often removed by it. In theſe caſes, a ſolution of the extract in water is generally ſubſtituted, where the expreſſed juice cannot be had.—In rheumatiſm the whole ſubſtance of this plant has at different times been of eſſential ſervice; although the berries have generally been preferred. In thoſe rheumatic affections which ſometimes occur to ſyphilitic patients, its virtue far exceeds that of opium."

For medical purpoſes "the leaves ſhould be gathered about July, (when the foot-ſtalks begin to aſſume a reddiſh colour), dried in the ſhade and powdered for uſe. An extract may eaſily be obtained from the leaves when gathered at this period, by gently evaporating their expreſſed juice to a proper conſiſtence.

"A tincture may be made by diſſolving either the extract, or the leaves, in their green or dry ſtate in common brandy; or in the ſpirit diſtilled from the berries.

"An ointment is alſo made by powdering the dried leaves, and mixing them well with hogs-lard, or ſimple cerate; or by boiling ſome hogs-lard and bees-wax with freſh leaves, and ſtraining the maſs. The proper time for gathering the berries in this climate, will be in October, when they become ſoft and ripe, and are of a blackiſh colour. They are generally uſed in tincture, made by infuſing them in Brandy. An extract may eaſily be made by evaporating their expreſſed juice.

"The root is to be gathered about November or December, when the ſtalks of the plant are perfectly dead. It may be prepared in the ſame manner as the leaves are; but to facilitate drying, it ſhould be perfectly divided into ſmall pieces." It has alſo been uſed in compounds as an article in dyeing.

PHYTOLOGY, a diſcourſe concerning the kinds and virtues of plants. See Botany, and Materia *Medica*.

PHYTON, a general of the people of Rhegium againſt Dionyſius, the tyrant of Sicily. He was taken by the enemy, and tortured, and his ſon was thrown into the ſea. See Syracuse.

PIA mater. See Anatomy, nº 130. p. 756, &c.

PIABA, in ichthyology, is a ſmall freſh-water fiſh, caught in all the rivers and brooks in the Braſils, and in ſome other parts in America. It is about the bigneſs of the common minow; is well taſted, and much eſteemed by the natives.

PIABUCU, in ichthyology, is an American fiſh eaten in many places by the natives. It is ravenous, and ſo greedy of blood, that if a perſon goes into the water with a wound in any part of his body, the piabucu will make up to it to ſuck the blood. It ſeldom exceeds four inches in length.

PIACENZA is a city of Italy, in the duchy of Parma, in E. Long. 10. 25. N. Lat. 45. It is a large handſome city, whoſe name is derived by ſome from its pleaſant ſituation, in a fruitful plain, on the Via Æmilia, about half a mile from the Po. It is the ſee of a biſhop ſuffragan of Bologna, and has a univerſity, but of no great fame. It is defended by a wall and a ſtrong citadel, and is reckoned about three miles in circumference, ſo that it is ſomewhat bigger than Parma.

PIASTUS, a native of Poland, was originally a wheelwright and the ſon of Coſſiſco, a citizen of Cruſwitz. He flouriſhed in the year 830, when on the extinction of the family of Popiel great diſputes aroſe about his ſucceſſor, and Cracow was afflicted with a ſevere famine. During this extremity, when the people were dropping down in the ſtreets, two angels in human forms, as the ſtory is told, took up their reſidence with Piaſtus, who was celebrated for his piety and extenſive charity. He had nothing left but a ſmall caſk of the common liquor of the country, and this he preſented to his new gueſts, who charmed with his hoſpitality, promiſed him the crown of Poland. The faith of Piaſtus was equal to his other virtues: he implicitly believed the word of his gueſts, and piouſly followed their directions in every particular. He was ordered to diſtribute the liquor out of his little caſk to the multitude: he did ſo, and found that it was inexhauſtible. The people were aſtoniſhed; all cried out,

Mod. Univ. Hiſtory, vol. xxx. p. 336, &c.

"A miracle!" and the electors determined to chuſe a perſon in whoſe favour Heaven had ſo viſibly declared: Piaſtus was accordingly taken from his ſhop, and raiſed to the ducal dignity.

Such is the relation of the canon of Cracow, which differs in many particulars from the account given by Guagnini and ſeveral other hiſtorians. According to them, Piaſtus had prepared a ſmall collation, to entertain ſome friends who were aſſembled at the birth of a child. Two pilgrims, Paul and John, afterwards murdered at Rome, came about this time to Cracow. They begged charity at the door of the election-hall, and were rudely repulſed; upon which they ſtumbled on the houſe of Piaſtus, and were kindly received. The miracle we have mentioned was wrought by them; and the two pilgrims, and not angels, were the inſtruments of the elevation of the hoſpitable wheelwright. Tho' we pay but little regard to the marvellous means by which Piaſtus aſcended the ducal throne of Poland, it would be preſumptuous entirely to omit a fact atteſted by all the writers upon this ſubject: it was proper, therefore, to take notice of it, and we leave the reſt to the reader's judgment.

Being now raiſed to the ſupreme dignity, he was not intoxicated with his proſperity. His natural charity, benevolence, and ſweetneſs of diſpoſition, remained: nothing was altered but his power of doing good. He was truly called the father of his people: the injured never returned unredreſſed, nor merit unrewarded. Piaſtus wiped the tear from the eyes of the widow: and was himſelf the guardian of the orphan, and the general patron of the poor and diſtreſſed. His excellent inclinations ſerved him in the room of great abilities; and the happineſs that his people enjoyed made them forget that their prince was not born a ſtateſman and a warrior. Several inteſtine commotions aroſe during his adminiſtration, all which he quelled by the mildneſs and clemency of his nature: his nobility were aſhamed of rebelling againſt a ſovereign who devoted his whole life to render his people happy. He removed the court from Cruſwitz, a city which he deteſted, becauſe it was the ſcene of Popiel's crimes and tragical end, and fixed his reſidence at Gneſna, where he died beloved, eſteemed, and even adored by his ſubjects.

It is in memory of this excellent prince, that all the natives of Poland, who have been ſince promoted to the ducal or regal dignity, were called Piaſtes, in contradiſtinction to the foreigners.

Piaſtus aſſociated his ſon Ziemovitus with him in the government before his death; a circumſtance of much benefit to the people.

PIAZZA, in building, popularly called *piache*, an Italian name for a portico, or covered walk, ſupported by arches.

The word literally ſignifies a broad open place or ſquare; whence it alſo became applied to the walks or porticoes around them.

PIBROCH, ſays Dr Beattie *, is a ſpecies of tune peculiar, I think, to the Highlands and Weſtern Iſles of Scotland. It is performed on a bagpipe, and differs totally from all other muſic. Its rythm is ſo irregular, and its notes, eſpecially in the quick movement, ſo mixed and huddled together, that a ſtranger finds it almoſt impoſſible to reconcile his ear to it, ſo as to perceive its modulation. Some of theſe pibrochs, being intended to repreſent a battle, begin with a grave motion reſembling a march, then gradually quicken into the onſet; run off with noiſy confuſion and turbulent rapidity, to imitate the conflict and purſuit; then ſwell into a few flouriſhes of triumphant joy; and perhaps cloſe with the wild and ſlow wailings of a funeral proceſſion.

PICA, in ornithology. See Corvus, ſp. 9.

Pica *marina* in ornithology. See Hæmatopus, and Alca, n° 3.

Pica, in medicine, a depravation of appetite, which makes the patient long for what is unfit for food, or incapable of nouriſhing; as chalk, aſhes, coals, plaſter-lime, &c. See Medicine, n° 371.

Pica, or *pye*, had formerly the ſame ſenſe as *ordinal*, meaning a table or directory, pointing out the order in which the devotional ſervices appointed for different occaſions were to be performed. Accordingly we are told it is derived from Πι, a contraction of *πιναξ, a table:* and by others from *litera picata*, a great black letter at the beginning of ſome new order in the prayer. The term was uſed in a ſimilar ſenſe by officers of civil courts, who called their kalendars or alphabetical catalogues directing to the names and things contained in the rolls and records of their courts the *pyes*.

PICARD, a native of the Netherlands, who founded a ſect the profeſſors of which were called *Picards*. See Picards.

Picard (John), an able mathematician, and one of the moſt learned aſtronomers of the 17th century, was born at Fleche, and became prieſt and prior of Rillie in Anjou. Going to Paris, he was in 1666 received into the Academy of Sciences in quality of aſtronomer. In 1671, he was ſent, by order of the king, to the caſtle of Uraniburg, built by Tycho Brahe in Denmark, to make aſtronomical obſervations there; and from thence he brought the original manuſcripts wrote by Tycho Brahe, which are the more valuable as they differ in many places from the printed copies, and contain a book more than has yet appeared. He made important diſcoveries in aſtronomy; and was the firſt who travelled through ſeveral parts of France, to meaſure a degree of the meridian. His works are, 1. A treatiſe on levelling. 2. Fragments of dioptrics. 3. *Experimenta circa aquas effluentes.* 4. *De menſuris.* 5. *De menſura liquidorum & aridorum.* 6. A voyage to Uraniburg, or aſtronomical obſervations made in Denmark. 7. Aſtronomical obſervations made in ſeveral parts of France, &c. Theſe, and ſome other of his works, which are much eſteemed, are in the ſixth and ſeventh volumes of the Memoirs of the Academy of Sciences.

PICARDS, a religious ſect which aroſe in Bohemia in the 15th century.

Picard, the author of this ſect, from whom it derived its name, drew after him, as has been generally ſaid, a number of men and women, pretending he would reſtore them to the primitive ſtate of innocence wherein man was created: and accordingly he aſſumed the title of the *New Adam*. With this pretence he taught his followers to give themſelves up to all impurity; ſaying that therein conſiſted the liberty of the ſons of God; and that all thoſe not of their ſect were in bondage.

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* Eſſays by Dr Beattie, 8vo edit. p. 422. note.

He firſt publiſhed his notions in Germany and the low countries, and perſuaded many people to go naked, and gave them the name of *Adamites*. After this he ſeized on an iſland in the river Lauſnecz, ſome leagues from Thabor, the head quarters of Ziſca, where he fixed himſelf and his followers. His women were common, but none were allowed to enjoy them without his permiſſion: ſo that when any man deſired a particular woman, he carried her to Picard, who gave him leave in theſe words, *Go, increaſe, multiply, and fill the earth*.

At length, however, Ziſca, general of the Huſſites, (famous for his victories over the emperor Sigiſmud), hurt at their abominations, marched againſt them, made himſelf maſter of their iſland, and put them all to death except two; whom he ſpared, that he might learn their doctrine.

Such is the account which various writers, relying on the authorities of Æneas Sylvius and Varillas, have given of the Picards, who appear to have been a party of the Vaudois, that fled from perſecution in their own country, and ſought refuge in Bohemia. It is indeed doubtful whether a ſect of this denomination, chargeable with ſuch wild principles and ſuch licentious conduct, ever exiſted; and it is certainly aſtoniſhing that Mr Bayle, in his art. *Picards*, ſhould adopt the reproachful repreſentations of the writers juſt mentioned: for it appears probable at leaſt that the whole is a calumny invented and propagated in order to diſgrace the Picards, merely becauſe they deſerted the communion and proteſted againſt the errors of the church of Rome. Laſitius informs us, that Picard, together with 40 other perſons, beſides women and children, ſettled in Bohemia in the year 1418. Balbinus the Jeſuit, in his *Epitome Rerum Bohemicarum*, lib. ii. gives a ſimilar account, and charges on the Picards none of the extravagancies or crimes aſcribed to them by Sylvius. Schlecta, ſecretary of Ladiſlaus, king of Bohemia, in his letters to Eraſmus in which he gives a particular account of the Picards, ſays that they conſidered the pope, cardinals, and biſhops of Rome, as the true Antichriſts, and the adorers of the conſecrated elements in the euchariſt as downright idolaters; that they denied the corporal preſence of Chriſt in this ordinance; that they condemned the worſhip of ſaints, prayers for the dead, auricular confeſſion, the penance impoſed by prieſts, the feaſts and vigils obſerved in the Romiſh church; and that they confined themſelves to the obſervance of the ſabbath, and of the two great feaſts of Chriſtmas and Pentecoſt. From this account it would appear that they were no other than the Vaudois; and M. de Beauſobre has ſhown that they were both of the ſame ſect, though under different denominations. Beſides, it is certain that the Vaudois were ſettled in Bohemia in the year 1178, where ſome of them adopted the rites of the Greek, and others thoſe of the Latin church. The former were pretty generally adhered to till the middle of the 14th century, when the eſtabliſhment of the Latin rites cauſed great diſturbance. On the commencement of the national troubles in Bohemia, on account of the oppoſition to the papal power (ſee MORAVIANS), the Picards more publicly avowed and defended their religious opinions; and they formed a conſiderable body in an iſland by the river Launitz or Lauſnecz, in the diſtrict of Bechin, and recurring to arms, were defeated by Ziſca. *Encyclop.* art. Picards.

PICARDY, a province in France, is bounded on the north by Hainault, Artois, and the Straits of Calais; on the eaſt by Champaigne; on the ſouth by the Iſle of France; and on the weſt by Normandy and the Engliſh Channel (A). This province is long and narrow, being uſually compared to a bent arm; and in this figure is nearly 150 miles in length, but not above 40 in breadth, and in many places not above 20. It is generally a level country; and produces wine, fruit of all kinds, plenty of corn, and great quantities of hay: but wood being ſcarce, moſt of the inhabitants burn turf. They have, however, ſome pit-coal, but it is not ſo good as that of England. It was united to the crown of France in the year 1643; and is ſuppoſed to contain 533,000 inhabitants.

Payne's Geography, vol. ii. 464.

Its principal rivers are the Somme, the Oiſe, the Canche, the Lanthie, the Lys, the Aa, the Scarpe, and the Deule.

The ſituation of this province on the ſea, its many navigable rivers and canals, with the induſtry of the inhabitants, render it the ſeat of a flouriſhing trade. In it are made beautiful ſilk ſtuffs, woollen ſtuffs, coarſe linen, lawn, and ſoap; it alſo carries on a large trade in corn and pit-coal. In the government of Calais and Boulogne are annually bred 5000 or 6000 colts, which being afterwards turned looſe in the paſtures of Normandy, are ſold for Norman horſes. The fiſheries on this coaſt are alſo very advantageous. This province is divided into Upper, Middle, and Lower Pircardy; and is again ſubdivided into four deputy-governments. The principal town is Amiens.

PICART (Bernard), a celebrated engraver, ſon of Stephen Picart, alſo a famous engraver, was born at Paris in 1673. He learned the elements of his art from his father, and ſtudied architecture and perſpective under Sebaſtian le Clerc. As he embraced the reformed religion, he ſettled in Holland to enjoy the free exerciſe of it; where his genius produced thoſe maſterpieces which made him eſteemed the moſt ingenious artiſt of his age. A multitude of books are embelliſhed with plates of his engraving. He died in 1733.

PICCOLOMINI (Alexander), archbiſhop of Patras, and a native of Sienna, where he was born about the year 1508, was of an illuſtrious and ancient family, which came originally from Rome, but afterwards ſettled at Sienna. He compoſed with ſucceſs for the theatre; but he was not more diſtinguiſhed by his genus, than by the purity of his manners, and his regard to virtue. His charity was very great; and was chiefly

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(A) The origin of the name of this province does not date earlier than A. D. 1200. It was an academical joke; an epithet firſt applied to the quarrelſome humour of thoſe ſtudents in the univerſity of Paris who came from the frontier of France and Flanders, and hence to their country. *Valeſii Notitia Galliarum*, p. 447. *Lorguerac, Deſcription de la France*, p. 52.

exerted in relieving the neceſſities of men of letters. He has left behind him a number of works in Italian. The moſt remarkable of which are, 1. Various Dramatic Pieces, which laid the firſt foundation of his character as a writer. 2. A Treatiſe on the Sphere. 3. A Theory of the Planets. 4. A Tranſlation of Ariſtotle's Art of Rhetoric and Poetry, in 4to. 5. A Syſtem of Morality, publiſhed at Venice, 1575, in 4to; tranſlated into French by Peter de Larivey in 4to; and printed at Paris, 1581. Theſe, with a variety of other works, prove his extenſive knowledge in natural philoſophy, mathematics, and theology. He was the firſt who made uſe of the Italian language in writing upon philoſophical ſubjects. He died at Sienna the 12th of March 1578, aged 70. A particular catalogue of his works may be ſeen in the Typographical Dictionary. There is one performance aſcribed to this author, intitled *Dialogo della bella Creanza delle Donne*, (printed at Milan, 1558, and at Venice, 1574, in 8vo.); which but ill ſuits the dignity of a prelate. It is filled with maxims which have an evident tendency to hurt the morals of young women. Piccolomini's name, indeed, is not in the title page; and it has all the appearance of being a juvenile production. It is very ſcarce; and the public would ſuſtain no loſs by its being entirely out of print. It was tranſlated into French by F. d'Amboiſe, and publiſhed at Lyons, in 16mo, under the title of *Inſtruction des jeunes dames*. It was afterwards reprinted in 1583, under that of *Dialogue & Devis des Demoiſelles*.

Piccolomini (Francis), of the ſame family with the foregoing, was born in 1520, and taught philoſophy with ſucceſs, for the ſpace of 22 years, in the moſt celebrated univerſities of Italy, and afterwards retired to Sienna, where he died, in 1604, at the age of 84. The city went into mourning on his death. His works are, 1. Some Commentaries upon Ariſtotle, printed at Mayence, 1608, in 4to. 2. *Univerſa Philoſophia de Moribus*, printed at Venice, 1583, in folio. He laboured to revive the doctrine of Plato, and endeavoured alſo to imitate the manners of that philoſopher. He had for his rival the famous James Zabarella, whom he excelled in facility of expreſſion and neatneſs of diſcourſe; but to whom he was much inferior in point of argument, becauſe he did not examine matters to the bottom as the other did; but preſſed too rapidly from one propoſition to another.

Piccolomini of *Aragon* (Octavius), duke of Amalfi, prince of the empire, a general of the emperor's army, and knight of the order of the Golden Fleece, was born in 1599. He firſt bore arms among the Spaniſh troops in Italy. He afterwards ſerved in the army of Ferdinand II. who ſent him to the relief of Bohemia, and entruſted him with the command of the imperial troops in 1634. After having ſignalized himſelf at the battle of Nortlingue, he made Marſhall de Chatillon raiſe the ſiege of St Omer. He had the good fortune to gain a victory over Marquis de Feuquieres in 1639: nor did the loſs of the battle of Wolfenbuttel, in 1651, impair his glory. He died on the 10th of Auguſt 1656, being five years after, aged 57, without iſſue; and with the character of an able negociator and an active general. The celebrated Caprara was his nephew.

Piccolomini (James), whoſe proper name was *Ammunati*, took that of *Piccolomini* in honour of his patron Pius II. He was born in a village near Lucca in 1422. He became biſhop of Maſſa, afterwards of Freſcati; a cardinal in 1461, under the name of *Cardinal de Pavie*; and died in 1479, at the age of 57, of an indigeſtion of figs. He left 8000 piſtoles in the bankers hands, which Pope Sixtus IV. claimed; and of which he gave a part to the Hoſpital of the Holy Ghoſt. His works, which conſiſt of ſome Letters, and a Hiſtory of his own time, were printed at Milan, in 1521, in folio. His hiſtory, intitled *Commentaries*, commences the 18th of June 1464, and ends the 6th of December 1469. They may very properly be conſidered as a Sequel of Pope Pius II.'s Commentaries, which end with the year 1463.

Piccolomini, (Æneas Sylvius). See Pius II.

PICENTIA, (Strabo, Pliny), the capital of the Picentini, whoſe territory, called *Ager Picentinus*, a ſmall diſtrict, lay on the Tuſcan Sea, from the *Promontorium Minervæ*, the ſouth boundary of Campania on the coaſt, to the river Silarus, the north boundary of Lucania, extending within-land as far as the Samnites and Hirpini, though the exact termination cannot be aſſigned. The Greeks commonly confound the *Picentini* and *Picentes*, but the Romans carefully diſtinguiſh them. The former, with no more than two towns that can be named, *Silernum* and *Picentia*; the ſituation of both doubtful: only Pliny ſays the latter ſtood within-land, at ſome diſtance from the ſea. Now thought to be *Bicenza*, (Holſtenius), in the Principato Citra of Naples.

PICENUM, (Cæſar, Pliny, Florus); Picenus Ager, (Cicero, Salluſt, Livy, Tacitus); *Ager picentium*, (Varro): a territory of Italy, lying to the eaſt of Umbria, from the Apennine to the Adriatic; on the coaſt extending from the river Aeſis on the north, as far as the *Prætutiani* to the ſouth. In the upper or northern part of their territory the Umbri excluded them from the Apennine, as far as Camerinum, (Strabo); but in the lower or ſouthern part they extended from the Adriatic to the Apennine. A very fruitful territory, and very populous. *Picentes*, the people, (Cicero); from the ſingular, *Picens*, (Livy): different from the *Picentini*, on the Tuſcan ſea, though called ſo by the Greeks; but Ptolemy calls them *Piceni*, as does alſo Pliny. Their territory at this day is ſuppoſed to form the greateſt part of the March of Ancona, (Cluverius).

PICHFORD, in the county of Salop in England; on the ſouth-eaſt ſide of Shrewſbury, near Condover. It is noted for a ſpring of pitchy water (from whence ſome derive its name), on the top of which there always flows a ſort of liquid bitumen. Over moſt of the coal pits hereabouts there lies a ſtratum of blackiſh rock; of which, by boiling and grinding, they make pitch and tar, and alſo diſtil an oil from it.

PICHINCHA, a mountain in Peru. See Peru, nº 56.

PICKERING, in the north riding of Yorkſhire in England, 13 miles from Scarborough, and 225 from London, is a pretty large town belonging to the duchy of Lancaſter, on a hill among the wild mountains of Blakemore; having the foreſt of Pickering on the north, and Pickering-common on the ſouth. It is ſaid to have been built 270 years before Chriſt by Peridurus, a king of the Britons, who was buried here. It had once a caſtle, the ruins of which are ſtill to be ſeen; to whoſe juriſdiction many of the neighbouring villages were ſubject: and the adjacent territory, commonly called Pickering-Lath, or the liberty or foreſt of Pickering, was given by Henry III. to his ſon Edmund earl of Lancaſter. A court is kept here for all actions under 40 s. ariſing within the honour of Pickering.

PICKERY, in Scots law, petty theft, or ſtealing things of ſmall value.

PICKETS, in fortification, ſtakes ſharp at one end, and ſometimes ſhod with iron, uſed in laying out the ground, of about three feet long; but, when uſed for pinning the faſcines of a battery, they are from three to five feet long.

PICKETS, in artillery, are about five or ſix feet long, ſhod with iron, to pin the park lines, in laying out the boundaries of the park.

PICKETS, in the camp, are alſo ſtakes of about ſix or eight inches long, to faſten the tent cords, in pitching the tents; alſo, of about four or five feet long, driven into the ground near the tents of the horſemen, to tie their horſes to.

PICKET, an out-guard poſted before an army, to give notice of an enemy approaching.

PICKET, a kind of puniſhment ſo called, where a ſoldier ſtands with one foot upon a ſharp-pointed ſtake; the time of his ſtanding is limited according to the offence.

PICKLE, a brine or liquor, commonly compoſed of ſalt, vinegar, &c. ſometimes with the addition of ſpices, wherein meat, fruit, and other things, are preſerved and ſeaſoned.

PICO, one of the Azore Iſlands, is ſo called from ſome lofty mountains on it; or rather from one very high mountain, terminating like Teneriffe in a peak, and reputed by ſome writers equal to it in height. This iſland lies about four leagues ſouth-weſt from St George, twelve from Tercera, and about three leagues ſouth-eaſt of Fayal; in W. Long. 28. 21. and N. Lat. 38. 29. The mountain Pico, which gives name to the iſland, is filled with diſmal dark caverns or volcanoes, which frequently vomit out flames, ſmoke, and aſhes, to a great diſtance. At the foot of this mountain towards the eaſt is a ſpring of freſh water, generally cold, but ſometimes ſo heated with the ſubterraneous fire, as to ruſh forth in torrents with a kind of ebullition like boiling water; equalling that in heat, and ſending forth a ſteam of ſulphureous fetid vapours, liquefied ſtones, minerals, and flakes of earth all on fire, in ſuch quantities, and with ſuch a violence, as to have formed a kind of promontory vulgarly called *Myſterios*, on the declivity of the coaſt, and at the diſtance of 1200 paces from the fountain. Such at leaſt is the account of Ortilius; though we do not find this laſt circumſtance of the promontory confirmed by later obſervations. The circumference of Pico is computed at about 15 leagues: and its moſt remarkable places are Pico, Lagoas, Santa Cruce or Cruz, San Sebaſtian, Peſquin, San Rocko, Playa, and Magdalena, the inhabitants of which live wholly on the produce of the iſland, in great plenty and felicity. The cattle are various, numerous, and excellent in their ſeveral kinds: it is the ſame with the vine; and its juice, prepared into different wines, the beſt in the Azores. Beſides cedar and other timber, they have a kind of wood which they call *teixo*, ſolid and hard as iron; and veined, when finely poliſhed, like a rich ſcarlet tabby; which colour it has in great perfection. The longer it is kept, the more beautiful it grows: hence it is, that the teixo tree is felled only for the king's uſe or by his order; and is prohibited from being exported as a common article of trade.

Pico Marina, a ſea-fiſh common at Kongo in Africa, derives its name from the reſemblance of its mouth to the beak of a wood-pecker. It is of a large ſize, and prodigious ſtrength, has four fins on its back, three under its belly, and one on each ſide of its head; its tail is large and forked, by which it cuts the waves with ſurpriſing force and velocity. It is at war with every fiſh that ſwims, and with every thing it meets in its way, without being intimidated by the largeſt veſſels; a ſurpriſing inſtance of which intrepidity, we are told by ſome miſſionaries, whoſe ſhip was attacked by one of them, near theſe coaſts, in the dead of night. The violence of the ſhock which it gave to the veſſel quickly awakened the captain and the reſt of the people; who immediately ran to the ſhip's ſide, where they perceived, by moon light, this huge monſter faſtened by its forehead to the veſſel, and making the ſtrongeſt efforts to diſengage itſelf; upon which ſome of them tried to pierce him with their pikes, but he got off before they could accompliſh their aim. On the next morning, upon viſiting that ſide of the veſſel, they found, about a foot below the ſurface of the water, a piece of its bony ſnout ſtuck faſt into the wood, and two or three inches of it projecting outwards. They went preſently after to viſit the inſide of the ſhip, and diſcovered about five or ſix inches more of the point of the horn which had penetrated through the plank.

Mod. Univ. Hiſtory, vol. xiii. p. 46, &c.

PICQUERING, a flying war, or ſkirmiſh, made by ſoldiers detached from two armies for pillage, or before a main battle begins.

PICQUET, or PICKET. See PICQUET.

PICRAMNIA, in botany: A genus of the pentandria order, belonging to the diœcia claſs of plants; and in the natural method ranking with thoſe that are doubtful. The calyx is tripartite; the corolla has three petals; the ſtamina from three to five, awl-ſhaped, and ſeem to join together at the baſe; there are two ſtyli, which are ſhort and bent backwards; the berry is roundiſh, and contains two oblong ſeeds, and ſometimes one ſeed only. There is only one ſpecies, viz. the antideſma, or murjoe buſh. This ſhrub is frequent in copſes and about the ſkirts of woods in Jamaica, riſing about eight or nine feet from the ground. The leaves are of an oval form, pointed and placed in an alternate form along the branches; the flower ſpikes are long, pendulous, and ſlender; the florets ſmall and white: the berries are numerous; at firſt red, then of a jet black colour; the pulp is ſoft, and of a purple complexion.—The whole plant is bitter, and eſpecially the berry. The negroes make a decoction of them, and uſe it in weakneſſes of the ſtomach and in venereal caſes.

PICRANIA AMARA, or *Bitter Wood*, is a tall and beautiful timber tree, common in the woods of Jamaica. It is a new genus, belonging to the pentandria monogynia of Linnæus. The name is expreſſive of its ſenſible qualities.

Every part of this tree is intenſely bitter; and even after the tree has been laid for floors many years, whoever rubs or ſcrapes the wood, feels a great degree of bitterneſs in their mouth or throat. Cabinet-work made of this wood is very uſeful, as no inſect will live near it.

This tree has a great affinity to the *Quaſſia Amara* of Linnæus; in lieu of which it is uſed as an antiſeptic in putrid fevers. When uſed, leſs of it will do than of the *Quaſſia Amara* of Surinam. See Quassia.

PICRIS, Ox-tongue; a genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants. There are four ſpecies, of which the only remarkable one is the echioides, or common ox-tongue, growing ſpontaneouſly in corn-fields in Britain. It has undivided leaves embracing the ſtem, with yellow bloſſoms, which ſometimes cloſe ſoon after noon, at other times remain open till nine at night. It is an agreeable pot-herb while young. The juice is milky, but not too acrid.

PICRIUM, in botany: A genus of the monogynia order, belonging to the tetandria claſs of plants; and in the natural method ranking with thoſe that are doubtful. The calyx is monophyllous and quinquefid; the corolla monopetalous, and its tube is ſhort; the filaments are four in number, and hooded at the place of their inſertion; the ſtyle long and thick; the ſtigma bilamellated; the capſule is round, bivalved, and contains a number of ſmall ſeeds.—There are two ſpecies, viz. the *ſpicata* and *ramoſa;* both natives of Guaiana. Both ſpecies are bitter, and employed in dyſpepſy, and to promote the menſes: they are alſo recommended in viſceral obſtructions.

PICTET (Benedict), born at Geneva, in 1655, of a diſtinguiſhed family, proſecuted his ſtudies with great ſucceſs. After having travelled into Holland and England, he taught theology in his own country with an extraordinary reputation. The univerſity of Leyden, after the death of Spantreina, ſolicited him to come and fill his place; but he thought that his own country had the beſt right to his ſervices: and for that generoſity he received its thanks by the mouth of the members of council. A languiſhing diſorder, occaſioned by too much fatigue, haſtened his death; which happened on the 9th of June 1724, at the age of 69 years. This miniſter had much ſweetneſs and affability in his manner. The poor found in him a comforter and a father. He publiſhed a great number of works in Latin and French, which are much eſteemed in Proteſtant countries. The principal of theſe are, 1. A Syſtem of Chriſtian Theology in Latin, 3 vols. in 4to; the beſt edition of which is that of 1721. 2. Chriſtian Morality, printed at Geneva, 1710, 8 vols. in 12mo. 3. The Hiſtory of the 11th and 12th centuries; intended as a ſequel to that of Sueur, printed in 1713, 2 vols. in 4to. The Continuator is held in higher eſtimation than the firſt author. 4. Several Controverſial Treatiſes. 5. A great number of tracts on morality and piety; among which we muſt diſtinguiſh "The Art of Living and Dying well;" publiſhed at Geneva, 1705, in 12mo. 6. Some Letters. 7. Some Sermons, from 1697 to 1721; 4 vols. in 8vo. With a vaſt number of other books, the names of which it would be tedious to mention; but which, as Mr Sennebier ſays, "all ſhow evident marks of piety and good ſenſe."

Pictet (John-Louis), a counſellor of Geneva, born in 1739, was of the ſame family. He was member of the Council of Two Hundred; Counſellor of State and Syndic; and died in 1781. He applied himſelf to the ſtudy of aſtronomy, and made ſeveral voyages into France and England for his improvement. Few men were ever bleſſed with a clearer or more enlightened underſtanding. He has left in manuſcript the "Journal of a Voyage which he made to Ruſſia and Siberia in 1768 and 1769, in order to obſerve the tranſit of Venus over the ſun's diſk:" A work very intereſting, from the lively deſcriptions which it gives both of men and of nature.

PICTLAND. See Pentland.

PICTS, the name of one of thoſe nations who anciently poſſeſſed the north of Britain. It is generally believed that they were ſo called from their cuſtom of painting their bodies; an opinion which Camden ſupports with great erudition. (See Gough's edition, Vol. I. p. xci. of the preface). It is certainly liable, however, to conſiderable objections; for as this cuſtom prevailed among the other ancient inhabitants of Britain, who uſed the *glaſtum* of Pliny and the *vitrum* of Mela for the like purpoſe, it may be aſked, Why the name of *Picti* was confined by the Romans to only one tribe, when it was equally applicable to many others? Why ſhould they deſign them only by an epithet without ever annexing their proper name? Or why ſhould they impoſe a new name on this people only, when they give their proper name to every other tribe which they have occaſion to ſpeak of? As theſe queſtions cannot be anſwered in any ſatisfactory manner, it is plain we muſt look for ſome other derivation of the name. 1 Name.

The Highlanders of Scotland, who ſpeak the ancient language of Caledonia, expreſs the name of this once famous nation by the term *Pictich;* a name familiar to the ears of the moſt illiterate, who could never have derived it from the Roman authors. The word *Pictich* means *pilferers* or *plunderers.* The appellation was probably impoſed upon this people by their neighbours, or aſſumed by themſelves, ſome time after the reign of Caracalla, when the unguarded ſtate of the Roman province, on which this people bordered, gave them frequent opportunities of making incurſions thither, and commiting depredations. Accordingly this name ſeems to have been unknown till the end of the 3d century. Eumenius the panegyriſt is the firſt Roman author who mentions this people under their new name of *Pictich*, or, with a Latin termination, *Picti.* When we ſay that this name may have been probably aſſumed for the reaſon juſt now mentioned, we muſt obſerve, that, in thoſe days of violence, the character of a robber was attended with no diſgrace. If he had the addreſs to form his ſchemes well, and to execute them ſucceſsfully, he was rather praiſed than blamed for his conduct; providing he made no encroachments on the property of his own tribe or any of its allies. We mean this as no peculiar ſtigma upon the Picts; for other nations of antiquity, in the like rude ſtate, thought and acted as they did. See *Thucydides*, lib. 3. p. 3. and *Virg. Æn.* 7. 745. et 749.

2 Origin. Concerning the origin of the Picts, authors are much divided. Boethius derives them from the Agathyrſi,

thyrſi, Pomponius Lætus from the Germans, Bede from the Scythians, Camden (A) and Father Innes from the ancient Britons, Stillingfleet from a people inhabiting the Cimbrica Cherſoneſus, and Keating and O'Flaherty, on the authority of the Pſalter Caſhel, derive them from the Thracians. But the moſt probable opinion is, that they were the deſcendants of the old Caledonians. Several reaſons are urged in ſupport of this opinion by Dr Macpherſon; and the words of Eumenes, "Caledonum, aliorumque Pictorum, ſilvas," &c. plainly imply that the Picts and Caledonians were one and the ſame people.

As there has been much diſpute about the origin of the Picts, ſo there has been much diſpute about their language. There are many reaſons which make it plain that their tongue was the Gaelic or Celtic; and theſe reaſons are a further confirmation of their having been of Caledonian extract. Through the eaſt and north eaſt coaſts of Scotland (which were poſſeſſed by the Picts) we meet with an innumerable liſt of names of places, rivers, mountains, &c. which are manifeſtly Gaelic. 3 Language. From a very old regiſter of the priory of St Andrew's (Dalrymple's Collections, p. 122.) it appears, that in the days of Hungus, the laſt Pictiſh king of that name, St Andrew's was called *Mukroſs*; and that the town now called *Queensferry* had the name of *Ardchinneachan*. Both theſe words are plain Gaelic. The firſt ſignifies "the heath or promontary of boars;" and the latter, "the height or peninſula of Kenneth." In the liſt of Pictiſh kings publiſhed by Father Innes, moſt of the names are obviouſly Gaelic, and in many inſtances the ſame with the names in the liſt of Scottiſh or Caledonian kings publiſhed by the ſame author. Had Innes underſtood any thing of this language, he would not have ſuppoſed with Camden that the Picts ſpoke the Britiſh tongue. It was unlucky that the two words on which they built their conjecture (*Strath* and *Aber*) are as common in the Gaelic as they could have been in the Britiſh, and at this day make a part of the names of places in countries to which the Pictiſh empire never extended. The names of *Strathfillan* and *Lochaber* may ſerve as inſtances.

The venerable Bede, as much a ſtranger to the Celtic as either of the antiquaries juſt now mentioned, is equally unhappy in the ſpecimen which he gives of the Pictiſh language in the word *penuahel*, "the head of the wall." Allowing the commutation of the initial *p* into *c*, as in ſome other caſes, this word has ſtill the ſame meaning in Gaelic which Bede gives it in the Pictiſh. It is true, there might have been then, as well as now, a conſiderable difference between various dialects of the Celtic; and thus, perhaps, that pious author was led to diſcover five languages in Britain *agreeably to the five books of Moſes*: A conceit from which the good man derived a great deal of harmleſs ſatisfaction.

4 Territory. The Picts of the earlieſt ages, as appears from the joint teſtimony of all writers who have examined the ſubject, poſſeſſed only the eaſt and north-eaſt coaſt of Scotland. On one ſide, the ancient Drumalbin, or that ridge of mountains reaching from Lochlomond near Dumbarton to the ſrith of Taine, which ſeparates the county of Sutherland from a part of Roſs, was the boundary of the Pictiſh dominions. Accordingly we find in the life of Columba, that, in travelling to the palace of Brudius, king of the Picts, he travelled over Drumalbin, the *Dorſon Brittannia* of Adamnan. On the other ſide, the territory of the Picts was bounded by the Roman province. After Britain was relinquiſhed by the emperor Honorius, they and the Saxons by turns were maſters of thoſe countries which lie between the Frith of Edinburgh and the river Tweed. We learn from Bede, that the Saxons were maſters of Galloway when he finiſhed his eccleſiaſtical Hiſtory. The Picts, however made a conqueſt of that country ſoon after; ſo that before the extinction of their monarchy, all the territories bounded on the one ſide by the Forth and Clyde, and on the other by the Tweed and Solway, fell into their hands.

5 Hiſtory. The hiſtory of the Picts, as well as of all the other ancient inhabitants of Britain, is extremely dark. The Iriſh hiſtorians give us a long liſt of Pictiſh kings, who reigned over Pictavia for the ſpace of eleven or thirteen centuries before the Chriſtian era. After them Innes, in his Critical Eſſay, gives us a liſt of above fifty, of whom no leſs than five held the ſceptre, each for a whole century. It is probable that theſe writers had confounded the hiſtory of the Picts with that of their anceſtors the old Caledonians. In any other view, their accounts of them are highly fabulous; and have been long ago confuted by Dr Macpherſon of Slate, an antiquary of much learning and reſearch. The Picts, as has been already obſerved, were probably not known by that name before the 2d or 3d century. Adamnan, abbot of Ionia, is the firſt author that expreſsly mentions any Pictiſh king; and the oldeſt after him is Bede, We are informed by theſe two writers, that St Columba converted Brudius king of the Picts to the Chriſtian faith. Columba came into Britain in the year of the vulgar era 565. Before that period we have no general record to aſcertain ſo much as the name of any Pictiſh king. The hiſtory of *Druſt* or *Dreſt*, who is ſaid to have reigned over the Picts in the beginning of the fifth century, when St Ninian firſt preached the goſpel to that nation, has all the appearance of fiction (B); His having reigned a hundred years, and his putting an end to a hundred wars, are ſtories which exceed all the bounds of probability.

Brudius, the contemporary of Columba, is the firſt Pictiſh king mentioned by any writer of authority.

What figure his anceſtors made, or who were his ſucceſſors on the throne of Pictavia, cannot be aſcertained. Bede informs us, that during the reign of one of them, the Picts killed Egfred king of Northumberland in battle, and deſtroyed the greateſt part of his

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(A) See *Gough's edition of Camden*, Vol. I. Preface, p. xc. and the *Ancient Univerſal Hiſtory*, Vol. XVII. p. 39, &c.

(B) According to Camden, this converſion happened about the year 630, in the ſouthern Pictiſh provinces; while the northern, which were ſeparated by fruitful mountains, were converted by Columba.

Picts.

his army. The ſame author mentions another of their kings called *Naitan*, for whom he had a particular regard. It was to this *Naitan* that Ceolfrid, abbot of Wiremouth, wrote his famous letter concerning Eaſter and the Tonſure (c); a letter in which Bede himſelf is ſuppoſed to have had a principal hand. Roger Hoveden and Simon of Durham mention two other Pictiſh kings *Onnuſt* and *Kinoth*, the firſt of whom died in 761, and the latter flouriſhed about the 774, and gave an aſylum to Alfred of Northumberland, who was much about that time expelled his kingdom. The accounts given by the Scots hiſtorians, of ſeveral other Pictiſh kings cannot be depended on; nor are the ſtories told by the Britiſh hiſtorians, Geoffry of Monmouth and the author of the *Eulogium Britanniæ*, worthy of much greater credit.

In the ninth century the Pictiſh nation was otally ſubdued by the Scots in the reign of Kenneth Macalpin. Since that time their name has been loſt in that of the conquerors, with whom they were incorporated after this conqueſt; however, they ſeem to have been treated by the Scottiſh kings with great lenity, ſo that for ſome ages after they commanded a great deal of reſpect. The prior of Hogulſtead, an old Engliſh hiſtorian, relates, that they made a conſiderable figure in the army of David the Saint, in his diſputes with Stephen king of England. In a battle fought in the year 1136, by the Engliſh on one ſide, and the Scots and Picts on the other, the latter inſiſted on their hereditary right of leading the van of the Scots army, and were indulged in that requeſt by the king.

The principal ſeat of the Pictiſh kings was at Abernethy. Brudius, however, as appears from the accounts given by Adamnan, in his life of Columba, had a palace at Inverneſs, which was probably near the extremity of this territory in that quarter; for there is no good reaſon for believing, with Camden, that this king had any property in the Weſtern Iſles, or that he had made a gift of Iona to St Columba when he viſited him in that place.

6
Manners.

With reſpect to the manners and cuſtoms of the Picts, there is no reaſon to ſuppoſe they were any other than thoſe of the Old Caledonians and Scots, of which many particulars are related in the Greek and Roman writers who have occaſion to ſpeak of thoſe nations.

Upon the decline of the Roman empire, cohorts of barbarians were raiſed, and Picts were invited into the ſervice, by Honorius, when peace was every where reſtored, and were named *Honoriaci*. Thoſe under Conſtantine opened the paſſes of the Pyrenean mountains, and let the barbarous nations into Spain. From this period we date the civilization of their manners, which happened after they had by themſelves, and then with the Scots, ravaged this Roman province.

Picts Wall
||
Pictureſque beauty.

PICTS *Wall*, in antiquity, a wall begun by the emperor Adrian, on the northern bounds of England, to prevent the incurſions of the Picts and Scots. It was firſt made only of turf ſtrengthened with paliſadoes, till the emperor Severus, coming into Britain in perſon, built it with ſolid ſtone. This wall, part of which ſtill remains, begun at the entrance of the Solway Frith in Cumberland, and running north-eaſt extended to the German Ocean. See ADRIAN and SEVERUS.

PICTURE, a piece of painting, or a ſubject repreſented in colours, on wood, canvas, paper, or the like. See PAINTING.

PICTURESQUE BEAUTY, ſays a late writer on that ſubject, refers to "ſuch beautiful objects as are ſuited to the pencil." This epithet is chiefly applied to the works of nature, though it will often apply to works of art alſo. Thoſe objects are moſt properly denominated pictureſque which are diſpoſed by the hand of nature with a mixture of *varied rudeneſs*, *ſimplicity*, and *grandeur*. A plain neat garden, with little variation in its plan, and no ſtriking grandeur in its poſition, diſplays too much of art, deſign, and uniformity, to be called pictureſque. "The ideas of *neat* and *ſmooth* (ſays Mr Gilpin), inſtead of being pictureſque, in fact diſqualify the object in which they reſide from any pretenſions to pictureſque beauty. Nay, farther, we do not ſcruple to aſſert, that roughneſs forms the moſt eſſential point of difference between the beautiful and the pictureſque; as it ſeems to be that particular quality which makes objects chiefly pleaſing in painting. I uſe the general term *roughneſs*; but properly ſpeaking roughneſs relates only to the ſurfaces of bodies: when we ſpeak of their delineation, we uſe the word *ruggedneſs*. Both ideas, however, equally enter into the pictureſque, and both are obſervable in the ſmaller as well as in the larger parts of nature; in the outline and bark of a tree, as in the rude ſummit and craggy ſides of a mountain.

"Let us then examine our theory by an appeal to experience, and try how far theſe qualities enter into the idea of pictureſque beauty, and how far they mark that difference among objects which is the ground of our inquiry.

"A piece of Palladian architecture may be elegant in the laſt degree; the proportion of its parts, the propriety of its ornaments and the ſymmetry of the whole, may be highly pleaſing; but if we introduce it in a picture, it immediately becomes a formal object, and ceaſes to pleaſe. Should we wiſh to give it pictureſque beauty, we muſt uſe the mallet inſtead of the chiſſel; we muſt beat down one half of it, deface the other, and throw the mutilated members around in heaps; in ſhort, from a ſmooth building we muſt turn it into a rough ruin. No painter who had the choice of the two objects would heſitate a moment.

(c) We are told by ſome authors that Columba taught the Picts to celebrate Eaſter always on a Sunday between the 14th and 20th of March, and to obſerve a different method of tonſure from the Romans, leaving an imperfect appearance of a crown. This occaſioned much diſpute till Naitan brought his ſubjects at length to the Roman rule. In that age many of the Picts went on a pilgrimage to Rome, according to the cuſtom of the times; and amongſt the reſt we find two perſons mentioned in the antiquities of St Peter's church: *Aſterius* count of the Picts, and *Syra* with his countrymen, performed their vow, Pictureſque beauty.

"Again why does an elegant piece of garden-ground make no figure on canvas? the ſhape is pleaſing, the combination of the objects harmonious, and the winding of the walk in the very line of beauty. All this is true; but the ſmoothneſs of the whole, though right and as it ſhould be in nature, offends in picture. Turn the lawn into a piece of broken ground plant rugged oaks inſtead of flowering ſtrubs, break the edges of the walk, give it the rudeneſs of a road, mark it with wheel-tracks, and ſcatter arround a few ſtones and bruſhwood; in a word, inſtead of making the whole ſmooth, make it rough, and you make it alſo pictureſque. All the other ingredients of beauty it already poſſeſſed." On the whole, pictureſque compoſition conſiſts in uniting in one whole, a variety of parts, and theſe parts can only be obtained from rough objects.

It is poſſible therefore to find pictureſque objects among works of art, and it is poſſible to make objects ſo; but the grand ſcene of pictureſque beauty is nature in all its original variety, and in all its irregular grandeur. "We ſeek it (ſays our author) among all the ingredients of landſcape, trees, rocks, broken grounds, woods, rivers, lakes, plains, valleys, mountains, and diſtances. Theſe objects in themſelves produce infinite variety; no two rocks or trees are exactly the ſame; they are varied a ſecond time by combination; and almoſt as much a third time by different lights and ſhades and other aerial effects. Sometimes we find among them the exhibition of a whole, but oftener we find only beautiful parts."

Sublimity or grandeur alone cannot make an object pictureſque; for, as our author remarks, "however grand the mountain or the rock may be, it has no claim to this epithet, unleſs its form, its colour, or its accompaniments, have ſome degree of beauty. Nothing can be more ſublime than the ocean; but wholly unaccompanied, it has little of the pictureſque. When we talk therefore of a ſublime object, we always underſtand that it is alſo beautiful; and we call it ſublime or beautiful only as the ideas of ſublimity or ſimple beauty prevail. But it is not only the form and the compoſition of the objects of landſcape which the pictureſque eye examines, it connects them with the atmoſphere, and ſeeks for all thoſe various effects which are produced from that vaſt and wonderful ſtorehouſe of nature. Nor is there in travelling a greater pleaſure than when a ſcene of grandeur burſts unexpectedly upon the eye, accompanied with ſome accidental circumſtance of the atmoſphere which harmonizes with it, and gives it double value."

There are few places ſo barren as to afford no pictureſque ſcene.

———Believe the muſe,
She does not know that inauſpicious ſpot
Where beauty is thus niggard of her ſtore.
Believe the muſe, through this terreſtrial waſte
The ſeeds of grace are ſown, profuſely ſown,
Even where we leaſt may hope.———

Mr Gilpin mentions the great military road between Newcaſtle and Carliſle as the moſt barren tract of country in England; and yet there, he ſays, there is "always ſomething to amuſe the eye. The interchangeable patches of heath and green-ſward make an agreeable variety. Often too on theſe vaſt tracts of interſecting grounds we ſee beautiful lights, ſoftening off along the ſides of hills; and often we ſee them adorned with cattle, flocks of ſheep, heath-cocks, grous, plover, and flights of other wild fowl. A group of cattle ſtanding in the ſhade on the edge of a dark hill, and relieved by a lighter diſtance beyond them, will often make a complete picture without any other accompaniment. In many other ſituations alſo we find them wonderfully pleaſing, and capable of making pictures amidſt all the deficiences of landſcape. Even a winding road itſelf is an object of beauty; while the richneſs of the heath on each ſide, with the little hillocks and crumbling earth, give many an excellent leſſon for a fore ground. When we have no opportunity of examining the grand ſcenery of nature, we have every where at leaſt the means of obſerving with what a multiplicity of parts, and yet with what general ſimplicity, ſhe covers every ſurface.

"But if we let the imagination looſe, even ſcenes like theſe adminiſter great amuſement. The imagination can plant hills; can form rivers and lakes in valleys: can build caſtles and abbeys; and if it find no other amuſement, can dilate itſelf in vaſt ideas of ſpace.

Mr Gilpin, after deſcribing ſuch objects as may be called pictureſque, proceeds to conſider their ſources of amuſement. We cannot follow our ingenious author through the whole of this conſideration, and ſhall therefore finiſh our article with a ſhort quotation from the beginning of it. "We might begin (ſays he) in moral ſtyle, and conſider the objects of nature in a higher light than merely an amuſement. We might obſerve, that a ſearch after beauty ſhould naturally lead the mind to the great origin of all beauty; to the

———firſt good, firſt perfect, and firſt fair.

But though in theory this ſeems a natural climax, we inſiſt the leſs upon it, as in fact we have ſcarce ground to hope that every admirer of pictureſque beauty is an admirer alſo of the beauty of virtue; and that every lover of nature reflects, that,

Nature is but a name for an *effect*,
Whoſe *cauſe* is God.———

If, however, the admirer of nature can turn his amuſements to a higher purpoſe; if its great ſcenes can inſpire him with religious awe, or its tranquil ſcenes with that complacency of mind which is ſo nearly allied to benevolence, it is certainly the better. *Apponat lucro.* It is ſo much into the bargain; for we dare not promiſe him more from pictureſque travel than a rational and agreeable amuſement. Yet even this may be of ſome uſe in an age teeming with licentious pleaſure; and may in this light at leaſt be conſidered as having a moral tendency"

Pictureſque beauty, Picuipinima.

PICUIPINIMA, in ornithology, is the name of a ſpecies of pigeon in Braſil. It is ſo very ſmall as ſcarce to exceed the lark in ſize. Its head, neck, and wings, are of a pale lead colour, with a black ſemilunar mark at the extremity of each wing; but its long wing-feathers, which are ſeen when the wings are expanded in flying, are of a reddiſh brown on one ſide, and blackiſh on the other, with black ends or tips; the tail is

Picumnus, Picus.

long, and is variegated with black, white and brown; the belly is covered with white feathers, every one of which has a brown mark of the ſhape of a half moon at the end.

PICUMNUS and PILUMNUS, were two deities at Rome, who preſided over the auſpices required before the celebration of nuptials. Pilumnus was ſuppoſed to patronize children, as his name ſeems in ſome manner to indicate *quod pellat mala infantiæ.* The manuring of land was firſt invented by Picumnus, from which reaſon he is called *Sterquilinius.* Pilumnus is alſo invoked as the god of bakers and millers, as he is ſaid to have firſt invented the art of grinding corn.

PICUS, the WOODPECKER, in ornithology, a genus belonging to the order of picæ. The beak is ſtraight and conſiſts of many ſides, and like a wedge at the point; the noſtrils are covered with briſtly feathers; the tongue is round like a worm, very long, and ſharp at the point, which is beſet with briſtles bent backwards.

The grand characteriſtic, ſays Latham, of theſe birds is the tongue (which in no bird is ſimilar, the wryneck excepted, whoſe other characters, however, differ too widely to give it place in this claſs), the muſcles neceſſary to the motions of which are ſingular and worthy of notice; affording the animal means of darting it forwards the whole length, or drawing it within the mouth at will. See *Ray on the Creation*, p. 143. *Derham's Phyſic. Theol.* p. 342. Note c. *Will. Orn.* p. 136. t. 21.

The ſame intelligent ornithologiſt enumerates no leſs than 50 different ſpecies of woodpeckers, beſides varieties of ſome of them which amount to nine more. Each of theſe ſpecies our readers cannot expect us to deſcribe; we ſhall therefore content ourſelves with ſuch as appear to be moſt remarkable.

1. The picus martius, or greateſt black woodpecker, is about the ſize of a jackdaw, being about 17 inches long; the bill is nearly two inches and a half in length, of a dark aſh-colour, and whitiſh on the ſides; the irides are pale yellow, and the eyelids are naked, according to Scopoli; the whole bird is black, except the crown of the head, which is vermillion; the firſt quill-feather is the ſhorteſt, and the two middle tail-feathers, which are longer than the others, make it appear a little rounded, the legs are of a lead colour, covered with feathers on the forepart for half their length.

Latham's Synopſis, vol. ii. p. 552.

"The female differs from the male in having the hind head only red, and not the whole crown of the head; and the general colour of the plumage has a ſtrong caſt of brown in it. It has likewiſe been obſerved, that the red on the hind head has been wholly wanting; and indeed both male and female are apt much to vary in different ſubjects; ſome having a much greater proportion of red on the head than others. This ſpecies is found on the continent of Europe, but not in plenty except in Germany. It is not an inhabitant of Italy, and is very rarely ſeen in France. Friſch mentions it as a bird common to to his parts; and it is found alſo in Sweden, Switzerland, and Denmark, but not in winter.

"It is ſaid to build in old aſh and poplar trees, making large and deep neſts; and Friſch obſerves, that they often ſo excavate a tree, that it is ſoon after blown down with the wind; and that under the hole of this bird may often be found a buſhel of duſt and bits of wood. The female lays two or three white eggs, the colour of which, as Willoughby obſerves, is peculiar to the whole of the woodpecker genus, or at leaſt all thoſe which have come under his inſpection."

Picus.

2. The picus principalis, or white billed woodpecker, is ſomewhat bigger than the laſt, being equal in ſize to a crow. It is 16 inches long, and weighs about 20 ounces. The bill is white as ivory, three inches long and channelled; the irides are yellow, and on the hind head is an erect pointed creſt, of a fine red colour ſome of the feathers of which are two inches long; the head itſelf, and the body in general are black; but the lower part of the back, rump, and upper tail-coverts, are white; from the eye there ariſes a ſtripe of white, which paſſes on each ſide of the neck down to the back; three or four of the prime quills are black, but the reſt are white; the tail is cuneiform, and of the ſame colour as the body; the legs and claws are alſo black.

"This ſpecies inhabits Carolina, Virginia, New Spain, and Braſil, and is called by the Spaniards *carpenter*, and not without reaſon, as this as well as moſt of the other ſpecies make a great noiſe with the bill againſt the trees in the woods, where they may be heard at a great diſtance, as if carpenters were at work, making, according to Catſby, in an hour or two a buſhel of chips. He adds likewiſe, that the Canadian Indians make uſe of the bills of theſe birds for coronets, ſetting them round in a wreath with the points outwards; and that the northern Indians purchaſe them of the ſouthern at the rate of two and three buck ſkins per bill. Kalm ſays they are found in New Jerſey, though very ſeldom, and only at certain ſeaſons."

3. The picus erythrocephalus, or red-headed woodpecker, is about eight inches three quarters long, and weighs two ounces. The bill is an inch and a quarter in length, of a lead colour, with a black tip; the irides are duſky, the head and the neck are of a moſt beautiful crimſon; the back and wings are black; the rump, breaſt, and belly, are white; the ten firſt quills are black, the eleventh black and white, and the others are white with black ſhafts; the tail is black and cuneiform; the legs and claws are of lead colour. The cock and hen are very nearly alike.

"This ſpecies inhabits Virginia, Carolina, Canada, and moſt of the parts of North America; but at the approach of winter it migrates more or leſs to the ſouthward, according to the ſeverity of the ſeaſon; and upon this circumſtance the people of North America foretel the rigour or clemency of the enſuing winter. Kalm obſerves that it is a very common bird, and is very deſtructive to the maize-fields and orchards, pecking through the ears of maize, and deſtroying great quantities of apples. In ſome years they are more numerous than in others, when they attack the orchards where the ſweet apples grow, which they eat ſo far that nothing remains but the mere pills. Some years ſince there was a premium of twopence per head paid from the public fund, in order to extirpate this pernicious bird; but this has been neglected much of late. They are ſaid likewiſe to be very fond of acorns. In Virginia and Carolina they ſtay the whole year, but are not ſeen in ſuch numbers in winter as in ſummer. During the winter they are very tame, and are frequently known to come into the houſes in the ſame manner as the red-breaſt is wont to do in England. It is obſerved that this ſpecies is found chiefly in old trees; and the noiſe they make with their bills may be heard above a mile diſtant. It builds the earlieſt of all the woodpeckers, and generally pretty high from the ground. It is accounted by many people very good eating. Buffon is of opinion, that it is neceſſity alone that cauſes theſe birds to feed on vegetables of any kind, as it is contrary to the nature of the genus."

4. The picus pubeſcens, or little woodpecker, according to Cateſby, weighs only about an ounce and an half. Briſſon ſays, it is larger than the ſmalleſt of the European ſpecies, being about five inches and a half long. The bill is about eight lines long, and of a horn colour; the top of the head is black, and on each ſide above the eye is a white line; the hind head is red; the hind part of the neck, the back, and rump, are black, which is divided into two parts by a line of white paſſing down the middle to the rump; the ſcapulars, upper wing and tail coverts are black; the greater wing coverts and quills are ſpotted with white; the under parts of the body are pale grey; the tail is black; the four middle feathers are plain, the reſt are barred with white and black; and the legs and claws are black.

The female has no red on the hind head. Linnæus tells us, that the outer tail feather is white, marked with four black ſpots. This ſpecies inhabits Virginia and Carolina. According to Kalm, it abounds in New Jerſey, where it is eſteemed of all others the moſt dangerous to orchards, and is the moſt daring. As ſoon as it has pecked one hole in a tree, it makes another cloſe to the firſt, in an horizontal direction, proceeding till it has made a circle of holes quite round the tree; and the apple-trees in the orchards, have often ſeveral of theſe rings of holes round the ſtem, inſomuch that the tree frequently dries up and decays.

5. The yellow woodpecker is about nine inches long. The bill is of a yellowiſh white, and more than an inch long; the hind head is creſted; the head itſelf, the neck, and whole body, are covered with dirty white feathers; from the lower jaw to the ears on each ſide, there is a red ſtripe; the wing coverts are brown and edged with yellowiſh, and ſome of the greater ones are mixed with rufous on the inner web; the quills are brown or rufous; the tail is black; the legs and claws are grey.

"This ſpecies is common at Cayenne, and is called there *charpentier jaune*. It makes its neſt in old trees which are rotten within; making with its bill a hole from without, at firſt horizontal, but declining downwards as ſoon as it has pierced through the ſound part, till it is at laſt a foot and a half below the firſt opening. The female lays three white and nearly round eggs, and the young are hatched about the beginning of April. The male bears his ſhare in the work with the female, and in her abſence keeps centinel at the entrance of the hole. The note of this bird is a kind of whiſtle ſix times repeated, of which the two or three laſt are in a graver accent than the others. The female wants the red band on the ſide of the head which is ſeen in the male.

"Specimens vary; ſome are of that dirty white, as Briſſon deſcribes it, others of a light yellow; which laſt is the caſe in a ſpecimen in the Leverian muſeum: This is 13 inches in length.

"In the place referred to above, we find a bird imperfectly deſcribed by Mr Fermin: he merely ſays, that it is a large ſpecies; that it has a fine red creſt on the head; the neck, breaſt, and belly, of a citron colour; and the wings blueiſh above. He only adds, that it may be diſtinguiſhed from others by the ſtrokes of the bill, which it gives to the trees, and may be heard at a great diſtance."

6. The picus auratus, or gold-winged woodpecker, is about 11 inches long, and weighs about 5 ounces. The bill is an inch and a half long, and is ſomewhat bent, and is not ſquare but roundiſh, ridged only on the top, the point being ſharp; the upper parts of the head and neck are aſh-coloured; the hind head is red; the ſides of the head, throat, and fore-part of the neck, are pale yellow; on each ſide of the head is a ſtripe of black, from the baſe of the lower jaw to the neck; the back, ſcapulars, and wing coverts, are of a grey brown colour, tranſverſely ſtriated with black lines; the rump is whitiſh; the breaſt, belly, and ſides, are whitiſh yellow, and each feather is marked with a round black ſpot at the tip; on the middle of the breaſt there is a large creſcent of black; the thighs, upper and under tail coverts, are black and white mixed; the quills are brown, with yellow ſhafts ſpotted with brown on the outer edge; the tail is blackiſh, being outwardly edged with grey; the outer feather is dotted with whitiſh on the margins; the ſhafts of all but the two middle feathers are yellow half way from the baſe; and the legs and claws are brown.

The female differs in having the crown and neck behind, grey-brown; the hind head of a leſs vivid red; and the greater quills not ſpotted on the edges. She alſo wants the black liſt on the throat, but otherwiſe like the male.

This ſpecies inhabits Carolina, Virginia, and Maryland, and is plenty in the middle ſtates, where it is called by ſome *hittock* or *pint*, and by others *high-hole* (A). Both the firſt names have ſome relation to its

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(A) "I have lately ſeen (ſays Latham) in the Leverian muſeum a bird which appears to be a mere variety though brought from a far different country. This was much like the picus auratus in colour, but rather leſs in ſize. The bill made exactly like that bird, and brown; on each ſide of the jaw is a ſtripe of crimſon like a whiſker; the under part of the wings of a pale red colour, not unlike what is called *red lead:* and the ſhafts of the quills and tail, which in the other bird are yellow, in this are red; the plumage on the upper parts of the body is brown, beneath vinaceous, marked with round black ſpots; tail black, pointed, and each feather bifurcated at the tip, exactly like the American one. This was brought from the Cape of Good Hope. I have ſeen two ſpecimens of this bird."

its note; and perhaps the latter, from the ſituation of the neſt. It is almoſt continually on the ground, and is not obſerved to climb on the trees, like others of the genus. It lives chiefly on inſects (b), and is commonly very fat, ſo as to be thought very palatable for the table. It ſtays all the year; and as it cannot at all times get inſects, it muſt perhaps eat ſome kind of graſs or plants in the fields. Its form and ſome of its qualities make it reſemble the cuckow (c). Though it climbs not on trees, it flies to their tops and ſits occaſionally on the branches.

Forſter, in the Philoſophical Tranſactions, obſerves, that it is a bird of paſſage in the northern parts of America, viſiting the neighbourhood of Albany Fort in April, and leaving it in September: that it lays from four to ſix eggs, in hollow trees, and feeds on worms and other inſects. Called by the natives *outhee-quan-now*.

The following ſpecies are pretty well known in Britain.

7. The viridis, or green woodpecker, weighs ſix ounces and a half; its length is 13 inches, the breadth 20 and a half; the bill is duſky, triangular, and near two inches long; the crown of the head is crimſon, ſpotted with black; the eyes are ſurrounded with black, and the males have a rich crimſon mark beneath the blackneſs; the back, neck, and leſſer coverts of the wings, are green; the rump of a pale yellow; the whole of the under part of the body is of a very pale green, and the thighs and vent are marked with duſky lines; the legs and feet are of a cinereous green; the tail conſiſts of ten ſtiff feathers, whoſe ends are generally broken, as the bird reſts on them in climbing; their tips are black; the reſt of each is alternately barred with duſky and deep green. Theſe birds feed entirely on inſects; and their principal action is that of climbing up and down the bodies or boughs of trees: for the firſt purpoſe they are provided with a long ſlender tongue, armed with a ſharp bony end barbed on each ſide, which by the means of a curious apparatus of muſcles, they can exert at pleaſure, darting it to a great length into the cliffs of the bark, tranſfixing and drawing out the inſects that lurk there. They make their neſts in the hollows of trees: in order therefore to force their way to thoſe cavities, their bills are formed ſtrong, very hard, and wedge-like at the end; Dr Derham obſerves, that a neat ridge runs along the top, as if an artiſt had deſigned it for ſtrength and beauty. Yet it has not power to penetrate a ſound tree; their perforation of any tree is a warning to the owner to throw it down. Their legs are ſhort, but ſtrong; their thighs very muſcular; their toes diſpoſed two backward, two forward; the feathers of the tail are very ſtiff, ſharp-pointed, and bending downwards. The three firſt circumſtances do admirably concur to enable them to run up and down the ſides of the trees with great ſecurity; and the ſtrength of the tail ſupports them firmly when they continue long in one place, either where they find plenty of food, or while they are forming an acceſs to the interior part of the timber. This form of the tail makes their flight very awkward, as it inclines their body down, and forces them to fly with ſhort and frequent jerks when they would aſcend, or even keep in a line. This ſpecies feeds oftener on the ground than any other of the genus: all of them make their neſts in the hollows of trees; and lay five or ſix eggs, of a beautiful ſemitranſparent white.

Willoughby ſays that the female lays five or ſix eggs; which Pennant (d) alſo obſerves; adding that they are of a beautiful ſemitranſparent white.

"Theſe birds ſometimes build in a hollow aſp or other tree, 15 or 20 feet from the ground. The male and female take it by turns to bore through the living part of the wood, till they come to the rotten part, wherein, after being hollowed out to a proper depth, they lay their eggs (e), which are generally five and ſometimes ſix (f) in number, greeniſh with ſmall black ſpots. The young ones climb up and down the trees before they can fly. It is worthy of remark to obſerve with what nicety the holes of the woodpecker are made, as perfectly round as if made by the aſſiſtance of a pair of compaſſes. Nuthatches, ſtarlings, and bats, frequently build in theſe holes when deſerted.

"Both Friſch and Klein miſtake in ſaying that the females have not the red crown, for even the young ones in the neſt have the appearance of it; and I have had them brought to me when they could ſcarcely fly, when the red was mixed with brown; but they do not become of a full red till after the firſt moult. They are ſaid to be fond of bees in winter, making great havock among them. Salerne obſerves, that they are found in the markets in Italy, at Bologna; but this is not extraordinary, for the Italians eat all ſmall birds almoſt without exception.

"In Sir A. Lever's muſeum there is a variety of this bird, of a ſtraw-colour throughout, except the crown, which is faintly marked with red."

8. The major, or great ſpotted woodpecker, weighs two ounces three quarters; the length is nine inches; the breadth is 16. The bill is one and a quarter long, of a black horn colour. The irides are red. The forehead

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(b) "In defect of inſects I have been informed (ſays Mr Latham), that it feeds on the berries of the red cedar, and grows fat on them. This food has been both diſgorged by the mouth, after being ſhot, as well as found in the ſtomach on diſſection."

(c) "Linnæus, in his tenth edition of the *Syſtema Naturæ*, had ranked this with the cuckows; and Buffon, from its ſimilarity to this genus, has placed it at the end of the wood peckers of its claſs."

(d) *Br. Zool.* p. 242. where ſome pertinent obſervations on theſe birds may be found. Let the reader alſo conſult *Ray on the Creation*, p. 143. and *Derham's Phyſico-theol.* p. 193; 339, 342.

(e) "This is ſometimes ſo deep that they muſt feed their young quite in the dark; for I have been told by one, that he was obliged to thruſt his whole arm to the ſhoulder down the hollow of a tree before he could reach the eggs."

(f) "I have ſeen ſix young ones together in one neſt." *Will. Orn.* p. 136.

head is of a pale buff colour; the crown of the head a gloſſy black; the hind-part marked with a rich deep crimſon ſpot. The cheeks are white; bounded beneath by a black line that paſſes from the corner of the mouth and ſurrounds the hind-part of the head. The neck is encircled with a black colour. The throat and breaſt are of a yellowiſh white; the vent feathers of a fine light crimſon. The back, rump, and coverts of the tail, and leſſer coverts of the wings, are black; the ſcapular feathers and coverts adjoining to them are white. The quill feathers are black, elegantly marked on each web with round white ſpots. The four middle feathers of the tail are black, the next tipped with dirty yellow; the bottoms of the two outmoſt black; the upper parts of a dirty white. The exterior feathers marked on each web with two black ſpots; the next with two on the inner web, and only one on the other. The legs are of a lead colour. The female wants that beautiful crimſon ſpot on the head; in other reſpects the colours of both agree. This ſpecies is much more uncommon than the preceding; and keeps altogether in the woods. This bird is pretty common in England, France, Germany, and other parts of Europe, frequenting the woods like the reſt of its genus, and is likewiſe met with in America. It is a very cunning bird; for when a perſon has ſeen one on a tree, he is almoſt ſure to loſe ſight of it, if the tree is large, and the obſerver not very attentive; for the moment it ſpies any one it will creep behind a branch, and there lie ſecure till the danger is over. The extreme facility with which birds of the woodpecker kind deſcend as well as aſcend the trees is worthy admiration, ſeeming to do both with equal eaſe to itſelf. We do not find any one who has noticed the colour of the eggs; but Buffon mentions having found a neſt with ſix young ones in an old decayed aſp tree, 30 feet from the ground.

9. The medius or middle-ſized woodpecker, agrees with the preceding in colours and ſize, excepting that the crown of the head in this is of a rich crimſon; the crown of the head in the male of the former black; and the crimſon is in form of a bar on the hind part. Birds thus marked have been ſhot in Lancaſhire and other parts of England; but Mr Pennant is doubtful whether they are varieties or diſtinct ſpecies. "Briſſon (ſays Latham), quotes many authors who have deſcribed this bird, but I am not clear in its being a diſtinct ſpecies. It is certainly much more ſcarce in England than any other. Buffon is reconciled to its being a variety only; but if ſo, this variety is regular, at leaſt, in all the ſpecimens which I have ſeen."

10. The minor, or leaſt ſpotted woodpecker, ſcarce weighs an ounce: the length is ſix inches; the breadth eleven. The forehead is of a dirty white: the crown of the head (in the male) of a beautiful crimſon: the cheeks and ſides of the neck are white, bounded by a bed of black beneath the former. The hind part of the head and neck, and the coverts of the wings, are black: the back is barred with black and white: the ſcapulars and quill-feathers ſpotted with black and white: the four middle feathers of the tail are black; the others varied with black and white: the breaſt and belly are of a dirty white: the crown of the head (in the female) is white; the feet are of a lead colour. It has all the characters and actions of the greater kind, but is not ſo often met with. Salerne tells us that this bird is not found in France; but Buffon affirms that it inhabits moſt of the provinces there. It approaches near habitations in winter, and may be ſeen in orchards adjoining to houſes, which no doubt it does for the ſake of food, finding about the trunks of the trees both caterpillars and larvæ of inſects of all kinds. It builds in an hole of a tree, and often diſputes the right of poſſeſſion with the little colemouſe, which laſt, as it is much weaker of the two, muſt yield the victory. Willoughby ſays it is called in England by the name of *hickwall*. Linnæus, in his ſynonymes of this bird, quotes Haſſelquiſt for the ſame; but whoever will diligently read what this author ſays of the matter, will be convinced that the reference ſhould be to the greater rather than the leaſt of this genus. It is ſaid by him to inhabit the higher parts of Aſia.

Mr Sonnerat mentions a bird found by him at Antigue, in the iſland of Panay, with the top of the head, and hind part of the neck, of a greyiſh black: on each ſide of the neck, two-thirds downwards, is a ſtripe of white, which begins juſt above the eye; and under this another of black from the eye to the ſhoulder. The upper part of the body is black and white. The under parts pale yellow, ſpotted with black. The tail is black above, and beneath barred with a dirty white and yellowiſh colour. The bill and legs blackiſh. The head had no red on it. Buffon ſuppoſes it to have been a female, and a variety only of our leaſt ſpotted woodpeckers.

Picus (fab. hiſt.), a king of Latium, ſon of Saturn. He married Venilia, alſo called Canens, by whom he had Faunus. He was tenderly loved by the goddeſs Pomona, and he returned her affection. As he was one day hunting in the woods, he was met by Circe, who became deeply enamoured of him, and who changed him into a woodpecker, called by the name of *picus* among the Latins. His wife Venilia was ſo diſconſolate when ſhe was informed of his death, that ſhe pined away. Some ſuppoſe that Picus was the ſon of Pilumnus, and that he gave out prophecies to his ſubjects by means of a favourite woodpecker; from which circumſtance originated the fable of his being metamorphoſed into a bird.

Picus (John), earl of Mirandola, a prodigy of parts and learning, was the youngeſt child of John Francis Picus earl of Mirandola and Concordia; and was born in the year 1463. The progreſs that he made in letters was ſo extremely rapid, that it was matter of aſtoniſhment to ſee even a boy one of the firſt poets and orators of his age. He was the ſcholar of R. Jochanan, a German Jew, who confirmed his natural fondneſs for the cabaliſtical writings, inſomuch that he is reported to have declared, that thoſe who dived into them dived in the true head ſpring; whereas thoſe rivulets that had flowed thence into Greece were no better than corrupt and ſtagnated waters. After viſiting the moſt famous univerſities of France and Italy, he went to Rome; where, in 1486, before he was 24 years of age, he publiſhed 900 propoſitions in logic, mathematics, phyſics, divinity, cabaliſtic learning, and magic, drawn not only from Greek and Latin, but even from Jewiſh and Arabian writers: ſubjoining to his advertiſement, that, "if any philoſopher or divine would come to Rome to diſpute with him upon any or all of them, he would defray the expences of his journey from the remoteſt corners of Italy". He enjoyed, however, the honour of this diſputatious challenge quietly, without danger to his credit: for envy procured ſome of his propoſitions to be charged with hereſy, and he was forbid to diſpute upon them. As a proof of the ignorance of his oppoſers, we are told that a theologian who had ſhown himſelf very zealous in cenſuring his book, being aſked what was the meaning of the word *cabbala?* anſwered, that he was a wicked man and a heretic, who had written againſt Jeſus Chriſt, and that thoſe who followed his opinion were called cabbaliſts. At the age of 28, he confined himſelf wholly to the ſtudy of the ſcripture; and undertook to combat the Jews and Mahometans, as well as to confound judicial aſtrology; but in this intention his credit was alſo ſaved, though with the loſs of his life, by his dying in 1494, in his 32d year. He was called the *phœnix of his age*, and by Scaliger *Monſtrum ſine Vitio*. He compoſed a great number of works, which have often been printed both ſeparately and together. The following epitaph is upon his tomb:

Hic ſitus eſt Picus Mirandola, cætera norunt
Et Tagus et Ganges, forſan et Antipodes.

Picus (John Francis), prince of Mirandola, nephew of John Picus mentioned above, was born about the year 1469. He cultivated learning and the ſciences after the example of his uncle; but he had a principality and dominions to ſuperintend, which involved him in great troubles, and at laſt coſt him his life. He was twice driven from his principality, and twice reſtored; and at laſt, in 1533, was, together with his eldeſt ſon Albert, aſſaſſinated in his own caſtle by his nephew Galeoti. He was a great lover of letters; and ſuch of his works as were then compoſed were inſerted in the Straſburgh edition of his uncle's in 1504, and contied in future impreſſions, beſides ſome others which were never collected.

PIECE, in matters of money, ſignifies ſometimes the ſame thing with ſpecies; and ſometimes, by adding the value of the pieces, it is uſed to expreſs ſuch as have no other particular name. For the piece of eight, or piaſtre, ſee *Money-Table*.

Piece, is alſo a kind of money of account, or rather a manner of accounting uſed among the negroes on the coaſt of Angola in Africa, See *Money-Table*.

Piece, in heraldry, denotes an ordinary or charge. The honourable pieces of the ſhield are the chief, feſs, bend, pale, bar, croſs, ſaltier, chevron, and in general all thoſe which may take up one-third of the field, when alone, and in what manner ſoever it be. See Heraldry.

Pieces, in the military art, include all ſorts of great guns and mortars. Battering pieces are the larger ſort of guns uſed at ſieges for making the breaches; ſuch are the 24-pounder and culverine, the one carrying a 24 and the other an 18 pound ball. Field-pieces are 12 pounders, demiculverines, 6-pounders, ſackers, minions, and 3 pounders, which march with the army, and encamp always behind the ſecond line, but in day of battle are in the front. A ſoldier's firelock is likewiſe called his *piece*.

PIEDMONT, a country of Italy, with the title of a principality, is bounded on the north by Savoy and Italy; on the weſt by France; on the ſouth by the Mediterranean and the republic of Genoa; and on the eaſt by the duchies of Montferrat and Milan; extending about 150 miles from north to ſouth, but much leſs from eaſt to weſt. It is called Piedmont, and in Latin *Piedmontium*, from its ſituation at the foot of the mountains, or Alps, which ſeparate France from Italy. This country is in ſome parts mountainous, but is every where very fruitful. The plains produce fine corn, and Montferrat and the Milaneſe yield great quantities of Turkey wheat, which commonly ſerves for bread, and with which the people of the middle rank mix rye; the pods are uſed for fuel, and the ſtalks being thick ſerve to mend the roads. The hills produce plenty of wine, which, like the Italian wines, is very lucious when new, eſpecially the white. There is alſo a tartiſh red wine called *vino bruſco*, ſaid to be very wholeſome for fat people, and, on the other hand, the ſweet wine is recommended as a ſtomachic. The neighbourhood of Turin is famous for its fine fruits, and many long walks of cheſnut and mulberry trees, which produce both pleaſure and profit. Marons, or large cheſnuts, are a favourite dainty among the common people. Theſe are put into an oven, and, when thoroughly hot, and cooled in red wine, are dried a ſecond time in the oven, and afterwards eaten cold. Truffles grow here in ſuch abundance, that Piedmont has obtained the name of the *truffle country*. Some are black, others white marbled with red. Their price is rated according to their ſize. Sometimes they are found of 12 or 14 pounds weight; and many country people earn from 60 to 70 dollars a-year merely by digging for them. The trade in cattle is ſaid to bring into Piedmont no leſs than three millions of livres per annum. The cultivation of ſilk is alſo a profitable article, the Piedmonteſe ſilk being, on account of its fineneſs and ſtrength, eſteemed the beſt in Italy. The Piedmonteſe gentry breed vaſt numbers of ſilk-worms under the care of their tenants, who have the eggs and mulberry leaves delivered to them, and in return they give half the ſilk to their maſters. This principality comprehends eleven ſmall provinces: Piedmont proper, the valleys between France and Italy, the valley of Saluza, the county of Nice, the Marquiſate of Suſa, the duchy of Aoſt, the Canaveſe, the lordſhip of Vetſail, the county of Aſt, and the Langes. It was formerly a part of Lombardy, but now belongs to the king of Sardinia, and lies at the foot of the Alps, which ſeparate France from Italy. It contains many high mountains, among which there are rich and fruitful valleys, as pleaſant and populous as any part of Italy. In the mountains are mines of ſeveral kinds, and the foreſts afford a great deal of curious game, among which the *tumor* is an uſeful animal. "The mules (ſays Mr Watkins) are very fine in this country; but the inhabitants have other beaſts, or rather monſters, which they find very ſerviceable, though vicious and obſtinate. Theſe are produced by a cow and an aſs, or mare and bull, and called *jumarres* or *gimerri* (A). I cannot ſay that I have ever ſeen any of them, but I am told they are very common."

(A) Theſe equivocal animals, however, if we may ſo term them, are ſo generally mentioned by travellers in

The Piedmonteſe have more ſenſe than the Savoyards, but then they are not ſo ſincere. Some authors repreſent them as lively, artful, and witty, the inhabitants of the mountain of Aoſta excepted, who are farther diſtinguiſhed by large wens, as even their horſes, dogs, and other animals. Mr Baretti, however, in his *Account of Italy*, vol. ii. p. 116. gives the following account of them. "One of the chief qualities (ſays he), which diſtinguiſh the Piedmonteſe from all other Italians, is their want of cheerfulneſs. Piedmont never produced a ſingle good poet, as far as the records of the country can go, whereas there is no other province of Italy but what can boaſt of ſome poet ancient or modern; and yet the Piedmonteſe are not deficient in ſeveral branches of learning, and ſome of them have ſucceeded tolerably well in civil law, phyſic, and the mathematics. It is likewiſe obſerved of this people, that none of them ever attained to any degree of excellence in the polite arts, and it is but lately that they can boaſt of a painter, Cavaliero Bomente; a ſtatuary, Signor Lodetto; and ſome architects, Conte Alfieri, Signor Borra, and others, who yet, to ſay the truth, are far inferior to numberleſs artiſts produced by the other provinces of Italy. They have, on the other hand, greatly advanced when conſidered as ſoldiers; though their troops have never been very numerous, every body converſant in hiſtory knows the brave ſtand they made for ſome centuries paſt againſt the French, Spaniards, and Germans, whenever they have been invaded by theſe nations. The ſkill of the Piedmonteſe in fortification is likewiſe very great, and their Bertolas and Pintos have ſhown as much genius as the Vaubans and Cohorns, in rendering impregnable ſeveral places which inferior engineers would only have made ſecure."

Payne's Geog. vol. ii.

The chief trade of this principality conſiſts in hemp and ſilk. Indeed, ſo great is their trade in raw ſilk, that the Engliſh alone have purchaſed to the value of 200,000 lb. in a year. The ſilk worm thrives ſo well, that many peaſants make above (B) 100 lb. of ſilk annually; and it is not only abundant, but univerſally known to be ſtronger and finer than any in Italy. The land owners divide the profit with their tenants. The Piedmonteſe workmen, however, are ſaid to want expertneſs, though they finiſh their work equally well with thoſe of other nations. The high duty and land-carriage on mules likewiſe tend to leſſen the value of this trade. They have beſides corn, rice, wine, fruits, flax, and cattle.

In the valleys of Lucerne, Peyrouſe, and St Martin, which have always belonged to Piedmont, live the celebrated Waldenſes or Vaudois, a name which ſignifies *people of the valleys*. Theſe have rendered themſelves famous in hiſtory for their diſſent from the Romiſh church long before the time of Luther and Calvin, and for the perſecutions they have ſuffered on that account; but ſince the year 1730 they have not been openly moleſted for their religion, but, in order to ſuppreſs them by degrees, a popiſh church has been built in every pariſh. They are heavily taxed, and labour under great oppreſſions. The number of people in theſe valleys ſcarce at preſent exceeds 10,000, of which 1000 are Catholics. The chief river of Piedmont is the Po, which flows out of Mount Viſo. The river Seſia, the Doria, Baltea, the ancient Druria, the Tenaro, and ſeveral others, run into it. The Var, anciently called the Varus, riſes in the county of Nice, and after watering it empties itſelf into the Mediterranean. The language of the Piedmonteſe is a mixture of French and Italian. In this country are about 50 earldoms, 15 marquiſates, a multitude of lordſhips, and 20 abbeys. Though the country be entirely popiſh, except ſome valleys inhabited by the Waldenſes, the king reſerves to himſelf the greateſt part of the power in church affairs, which in many other places is given up to the pope, and the conſtitution *unigenitus* is here univerſally oppoſed. Towards the end of the laſt century, the French king perſuaded the duke of Savoy to drive them out of the country; in conſequence of which 200,000 of them retired to Germany, England, and Holland, and yet they are not all extirpated, though, as we have obſerved, they are obliged to have a Roman Catholic church in every pariſh.

Turin, the general reſidence of the king of Sardinia, to whom this principality belongs, is the chief city. See TURIN. The number of inhabitants, Mr Watkins ſays, in Piedmont and Savoy, amount to 2,695,727 ſouls, of which Turin contains about 77,000.

PIENES, a ſmall iſland of Japan, over againſt the harbour of Saccai, is famed not only for the beauty of its walks, to which crowds of people reſort from the city, but for a deity worſhipped there, to which vaſt numbers of perſons devote themſelves. They go from his temple to the ſea ſide, where they enter into a boat provided for the purpoſe; then, launching into the deep, they throw themſelves overboard, loaded with ſtones, and ſink to the bottom. The temple of that deity, which is called Canon, is very large and lofty, and ſo are many others in the city itſelf; one in particular, dedicated to the gods of other countries, is thought the fineſt in the whole empire.

PIEPOUDRE *(Court of)*, the loweſt, and at the ſame time the moſt expeditious, court of juſtice known to the law of England. It is called PIEPOUDRE, *(curia pedis pulverizati)*, from the duſty feet of the ſuitors; or, according to Sir Edward Coke, becauſe juſtice is there done as ſpeedily as duſt can fall from the foot: Upon the ſame principle that juſtice among the Jews was adminiſtered in the gate of the city, that the proceedings might be the more ſpeedy, as well as public. But the etymology given us by a learned mordern writer is much more ingenious and ſatisfactory; it being derived, according to him, from *pied*

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this part of Europe, that we have no doubt of their exiſtence, nor of their being found hardy and ſerviceable as labourers.

(B) Each pound is valued in Piedmont at 18 s. Sterling. The little village of La Tour, in the valley of Lucerne, makes above 50,000 lb. annually, and the exports every year to the ſingle city of Lyons amount to more than 160,000 l. Sterling.

puldreaux, "a pedlar," in old French, and therefore ſignifying the court of ſuch petty chapmen as reſort to fairs or markets. It is a court of record, incident to every fair and market; of which the ſteward of him who owns or has the toll of the market is the judge. It was inſtituted to adminiſter juſtice for all commercial injuries done in that very fair or market, and not in any preceding one. So that the injury muſt be done, complained of, heard, and determined, within the compaſs of one and the ſame day, unleſs the fair continues longer. The court hath cognizance of all matters of contract that can poſſibly ariſe within the precinct of that fair or market; and the plaintiff muſt make oath that the cauſe of an action aroſe there. From this court a writ of error lies, in the nature of an appeal, to the courts at Weſtminſter. The reaſon of its inſtitution ſeems to have been, to do juſtice expeditiouſly among the variety of perſons that reſort from diſtant places to a fair or market; ſince it is probable, that no other inferior court might be able to ſerve its proceſs, or execute its judgments, on both or perhaps either of the parties; and therefore, unleſs this court had been erected, the complainant muſt neceſſarily have reſorted even in the firſt inſtance to ſome ſuperior judicature.

PIER, in building, denotes a maſs of ſtone, &c. oppoſed by way of fortreſs to the force of the ſea, or a great river, for the ſecurity of ſhips that lie at habour in any haven.

Piers of a Bridge. See Bridge.

PIERCEA. See Rivinia.

PIERIA (anc. geog.), a diſtrict of Macedonia, contained between the mouths of the rivers Ludias and Peneus; extended by Strabo beyond the Ludias, to the river Axios on the north, and on the ſouth no farther than the Aliacmon, along the weſt ſide of the Sinus Thermaicus.---Another *Pieria* of Syria, the north part of Seleucia, or the *Antiochena*, ſituated on the Sinus Iſſicus, and lying next Cilicia to the north-weſt.

PIERIDES, in fabulous hiſtory, the daughters of Pierus a Macedonian prince, preſuming to diſpute with the muſes for the prize of poetry, were turned into magpies. The name of *Pierides* was alſo given to the muſes, from mount Pieres in Theſſaly, which was conſecrated to them; or, according to others, from Pierus, a Theſſalian poet, who was the firſt who ſacrificed to them. See Pieris.

PIERINO del Vaga, an eminent Italian Painter, born of poor parents in Tuſcany, about the year 1500. He was placed apprentice with a grocer in Florence, and got ſome inſtructions from the painters to whom he was ſent with colours and pencils; but a painter named *Vaga* taking him to Rome, he was called *Del Vaga*, from living with him, his real name being *Buonacorſi*. He ſtudied anatomy with the ſciences neceſſary for his profeſſion; and had ſomewhat of every thing that was good in his compoſitions. After Raphael's death, he joined with Julio Romano and Franciſco Penni to finiſh the works in the Vatican which were left imperfect by their common Maſter; and to confirm their friendſhip married Penni's ſiſter. He gained the higheſt reputation by his performances in the palace of prince Doria in Genoa; but the multiplicity of his buſineſs, and the vivacity of his imagination, drained his ſpirits in the flower of his age; for he died in the year 1547. Of all Raphael's diſciples, Pierino kept the character of his maſter longeſt, *i. e.* his exterior character and manner of deſigning; for he fell very ſhort of the fineneſs of Raphael's thinking. He had a particular genius for the decoration of places according to their cuſtoms. His invention in that kind of painting was full of ingenuity; grace and order are everywhere to be met with, and his diſpoſitions, which are ordinary in his pictures, are wonderful in his ornaments: ſome of theſe he has made little, and ſome great, and placed them both with ſo much art, that they ſet off one another by compariſon and contraſt. His figures are diſpoſed and deſigned according to Raphael's guſto; and if Raphael gave him at firſt ſome ſlight ſketches of ornaments, as he did to Giovanni d'Udine, he executed them to admiration. The tapeſtries of the ſeven planets in ſeven pieces, which Pierino deſigned for Diana de Poitiers, and which were, when De Piles wrote, with Monſieur the firſt preſident at Paris, ſhows ſufficiently what he was, and that the above character does not exceed the truth.

PIERIS (anc. geog.), a mountain which is thought to have given name to Pieria of Macedonia; taking its name from Pierus a poet, who was the firſt that ſacrificed to the Muſes, thence called *Pierides*, if credit may be given to an ancient ſcholiaſt on Juvenal.

PIERRE d'Automne is a French name, tranſlated from the Chineſe, of a medicinal ſtone, celebrated in the eaſt for curing all diſorders of the lungs. Many imagine it had its name of the autumn ſtone from its being only to be made at that ſeaſon of the year; but it may certainly be made equally at all times. The Chineſe chemiſts refer the various parts of the body to the ſeveral ſeaſons of the year, and thus they refer the lungs to autumn. This is evident in their writings, and thus the ſtone for diſeaſes of the lungs came to be called *autumn ſtone*. It is prepared as follows: They put 30 pints of the urine of a ſtrong and healthy young man into a large iron pot, and ſet it over a gentle fire. When it begins to boil, they add to it, drop by drop, about a large tea-cup full of rape oil. They then leave it on the fire till the whole is evaporated to a thick ſubſtance like black mud. It is then taken out of the pot, and laid on a flat iron to dry, ſo that it may be powdered very fine. This powder is moiſtened with freſh oil, and the maſs is put into a double crucible, ſurrounded with coals, where it ſtands till it be thoroughly dried again. This is again powdered, and put into a china veſſel, which being covered with ſilk cloth and a double paper, they pour on it boiling water, which makes its way, drop by drop, through theſe coverings, till ſo much is got in as is ſufficient to reduce it to a paſte. This paſte is well mixed together in the veſſel it is kept in, and this is put into a veſſel of water, and the whole ſet over the fire. The matter thus becomes again dried in *balneo mariæ*, and is then finiſhed. *Obſerv. ſur les Cout. de l'Aſie*, p. 258.

Pierre (St), is a large river in North America, ſcarcely inferior to the Rhine or the Danube, and navigable almoſt to its ſource. Together with many other large ſtreams, it falls into the great river Miſſiſſippi.

Pierre (St), or *St Peter's*, the capital of Martinico, was built in 1665, in order to overawe the mutineers of the iſland who rebelled againſt its proprietors, the ſecond Weſt India company, who were at the ſame time the proprietors of all the French Antilles. It is ſituated on the weſtern ſide of the iſland. The town extends along the ſhore, and a battery that commands the road is erected on the weſt ſide, which is waſhed by the river Royolan, or St Peter. The town is divided into three wards; the middle, which is properly St Peter's, begins at the fort, and runs weſtward to the battery of St Nicholas. Under the walls of the ſecond ward ſhips at anchor ride more ſecurely than under the fort, on which account this ward is called the *Anchorage.* The third ward, called the *Gallery*, extends along the ſea ſide from Fort St Peter to the Jeſuits' River, and is the moſt populous part of the city. The houſes of St Peter's ward are neat, commodious, and elegant, particularly thoſe of the governor of the iſland, the intendant, and the other officers. The pariſh church of St Peter is a magnificent ſtone building which belonged to the Jeſuits, with a noble front of the Doric order. The church of the Anchorage, which belongs to the Jacobine friars, is likewiſe of ſtone. It is a place of conſiderable trade, and is built with tolerable regularity. The houſes are moſtly conſtructed of a grey pumice-ſtone or lava, which is found on the ſtrand; and the high ſtreet is, according to Dr Iſert, above an Engliſh mile in length. It is ſuppoſed to contain about 2000 houſes, and 30,000 inhabitants, including negroes. St Pierre, with the whole of the flouriſhing iſland of Martinico, was taken from the French in the month of March 1794, by the Britiſh land and ſea forces under the command of Sir Charles Grey and Sir John Jervis, and may perhaps continue annexed to the Britiſh crown: 125 veſſels loaded with the produce of the iſland, and of great value, were captured, 71 of which were in the harbour of St Pierre.

PIETISTS, a religious ſect ſprung up among the Proteſtants of Germany, ſeeming to be a kind of mean between the Quakers of England and the Quietiſts of the Romiſh church. They diſpiſe all ſorts of eccleſiaſtical polity, all ſchool theology, and all forms and ceremonies, and give themſelves up to contemplation and the myſtic theology. Many groſs errors are charged on the Pietiſts, in a book intitled *Manipulus Obſervationum Antipietiſticarum*: but they have much of the air of polemical exaggeration, and are certainly not at all juſt. Indeed there are Pietiſts of various kinds: Some running into groſs alluſions, and carrying their errors to the overturning of a great part of the Chriſtian doctrine, while others are only viſionaries; and others are very honeſt and good, though perhaps miſguided, people. They have been diſguſted with the coldneſs and formality of other churches, and have thence become charmed with the fervent piety of the Pietiſts, and attached to their party, without giving into the groſſeſt of their errors. See *Moſheim's. Eccl. Hiſtory*, vol. iv. p. 454.

Pietists, otherwiſe called the *Brethren and Siſters of the Pious and Chriſtian Schools*, a ſociety formed in the year 1678 by Nicholas Barre, and obliged by their engagements to devote themſelves to the education of poor children of both ſexes.

PIETOLA, anciently called *Andes*, is a place within two Italian miles of Mantua, famous for being the birth-place of Virgil.

PIETY, is a virtue which denotes veneration for the Deity, and love and tenderneſs to our friends. This diſtinguiſhed virtue, like many others, received among the Romans divine honours, and was made one of their gods. Acilius Glabrio firſt erected a temple to this divinity, which he did upon the ſpot on which a woman had fed with her own milk her aged father, who had been impriſoned by order of the ſenate, and deprived of all aliments. The ſtory is well known, and is given at length in authors which are in the hands of every ſchool-boy. See *Cicero de div.* 1. and *Valerius Maximus*, 5. c. 4. and our article *Filial Piety*, p. 238. col. 2d.

If piety was thus practiſed and thus honoured in Heathen antiquity, it ſurely ought not to be leſs ſo among Chriſtians to whom its nature is better defined, and to the practice of which they have motives of greater cogency. A learned and elegant writer has ſaid that the want of piety ariſes from the want of ſenſibility; and his obſervations and arguments are ſo juſt and ſo well expreſſed, that we cannot do better than tranſcribe them.

"It appears to me (ſays Dr Knox), that the mind of man, when it is free from natural defects and acquired corruption, feels no leſs a tendency to the indulgence of devotion than to virtuous love, or to any other of the more refined and elevated affections. But debauchery and exceſs contribute greatly to deſtroy all the ſuſceptible delicacy with which nature uſually furniſhes the heart; and, in the general extinction of our better qualities, it is no wonder that ſo pure a ſentiment as that of piety ſhould be one of the firſt to expire.

"It is certain that the underſtanding may be improved in a knowledge of the world, and in the arts of ſucceeding in it, while the heart, or whatever conſtitutes the ſeat of the moral and ſentimental feelings, is gradually receding from its proper and original perfection. Indeed experience ſeems to evince, that it is hardly poſſible to arrive at the character of a complete man of the world, without loſing many of the moſt valuable ſentiments of uncorrupted nature. A complete man of the world is an artificial being; he has diſcarded many of the native and laudable tendencies of his mind, and adopted a new ſyſtem of objects and propenſities of his own creation. Theſe are commonly groſs, coarſe, ſordid, ſelfiſh, and ſenſual. All, or either of theſe attributes, tend directly to blunt the ſenſe of every thing liberal, enlarged, diſintereſted; of every thing which participates more of an intellectual than of a ſenſual nature. When the heart is tied down to the earth by luſt and avarice, it is not extraordinary that the eye ſhould be ſeldom lifted up to heaven. To the man who ſpends his Sunday (becauſe he thinks the day fit for little elſe) in the counting houſe, in travelling, in the tavern, or in the brothel, thoſe who go to church appear as fools, and the buſineſs they go upon as nonſenſe. He is callous to the feelings of devotion; but he is tremblingly alive to all that gratifies his ſenſes or promotes his intereſt.

"It has been remarked of thoſe writers who have attacked Chriſtianity, and repreſented all religions merely as diverſified modes of ſuperſtition, that they were indeed, for the moſt part men of a metaphyſical and a diſputatious turn of mind, but uſually little diſtinguiſhed for benignity and generoſity. There was, amidſt their pretenſions to logical ſagacity, a cloudineſs of ideas, and a coldneſs of heart, which rendered them very unfit judges on a queſtion in which the heart is chiefly intereſted; in which the language of nature is more expreſſive and convincing, than all the dreary ſubtleties of the diſmal metaphyſicians. Even the reaſoning faculty, on which we ſo greatly value ourſelves, may be perverted by exceſſive refinement; and there is an abſtruſe, but vain and fooliſh philoſophy, which philoſophizes us out of the nobleſt parts of our noble nature. One of thoſe parts of us is our inſtinctive ſenſe of religion, of which not one of thoſe brutes which the philoſophers moſt admire, and to whoſe rank they wiſh to reduce us, is found in the ſlighteſt degreee to participate.

"Such philoſophers may be called, in a double ſenſe, the enemies of mankind. They not only endeavour to entice man from his duty, but to rob him of a moſt exalted and natural pleaſure. Such, ſurely, is the pleaſure of devotion. For when the ſoul riſes above this little orb, and pours its adorations at the throne of celeſtial Majeſty, the holy fervour which it feels is itſelf a rapturous delight. Neither is this a declamatory repreſentation, but a truth felt and acknowledged by all the ſons of men; except thoſe who have been defective in ſenſibility, or who hoped to gratify the pride or the malignity of their hearts by ſingular and pernicious ſpeculation.

"Indeed all diſputations, controverſial and metaphyſical writings on the ſubject of religion, are unfavourable to genuine piety. We do not find that the moſt renowned polemics in the church militant were at all more attentive than others to the common offices of religion, or that they were actuated by any peculiar degree of devotion. The truth is their religion centered in their heads, whereas its natural region is the heart. The heart! confined, alas! in colleges or libraries, unacquainted with all the tender charities of huſband, father, brother, friend; ſome of them have almoſt forgotten that they poſſeſs a heart. It has long ceaſed to beat with the pulſations of love and ſympathy, and has been engroſſed by pride on conquering an adverſary in the ſyllogiſtic combat, or by impotent anger on a defeat. With ſuch habits, and ſo defective a ſyſtem of feelings, can we expect that a doctor of the Sorbonne, or the diſputing profeſſor of divinity, ſhould ever feel the pure flame of piety that glowed in the boſoms of Mrs Rowe, Mrs Talbot, or Mr Nelſon?

"It is however certain that a devotional taſte and habit are very deſirable in themſelves excluſive of their effects in meliorating the morals and diſpoſition, and promoting preſent and future felicity. They add dignity, pleaſure, and ſecurity to any age: but to old age they are the moſt becoming grace, the moſt ſubſtantial ſupport, and the ſweeteſt comfort. In order to preſerve them, it will be neceſſary to preſerve our ſenſibility; and nothing will contribute ſo much to this purpoſe as a life of temperance, innocence, and ſimplicity."

Of piety, as it denotes love and tenderneſs to our friends, there have been many diſtinguiſhed inſtances both in ancient and modern times. See *Filial Piety*, *Fraternal* and *Parental Affection*, &c.

The following example of filial piety in China, taken from P. Du Halde's deſcription of that country, will not we truſt be diſagreeable to our readers. "In the commencement of the dynaſty of the Tang, Lou-taot-ſong, who was diſaffected to the government, being accuſed of a fault, which touched his life, obtained leave from thoſe who had him in cuſtody, to perform the duties of the Tao to one of his deceaſed friends. He managed matters ſo well that giving his keepers the ſlip, he fled to the houſe of Lou Nan-kin, with whom he had a friendſhip, and there hid himſelf. Lou Nan-kin, notwithſtanding the ſtrict ſearch that was made, and the ſeverity of the court againſt thoſe who conceal priſoners that have eſcaped, would not betray his friend. However, the thing coming to be diſcovered. Lou Nan-kin was impriſoned; and they were juſt on the point of proceeding againſt him, when his younger brother preſenting himſelf before the judge, *It is I, Sir,* ſaid he, *who have hidden the priſoner; it is I who ought to die, and not my elder brother.* The eldeſt maintained on the contrary, that his younger brother accuſed himſelf wrongfully, and was not at all culpable. The judge, who was a perſon of great ſagacity, ſifted both parties ſo effectually, that he not only diſcovered that the younger brother was innocent, but even made him confeſs it himſelf: *It is true, Sir,* ſaid the younger all in tears, *I have accuſed myſelf falſely; but I have very ſtrong reaſons for ſo doing. My mother has been dead for ſome time, and her corps is not yet buried; I have a ſiſter alſo who is marriageable, but is not yet diſpoſed of: theſe things which my brother is capable of managing, I am not, and therefore deſire to die in his ſtead. Vouchſafe to admit my teſtimony.* The commiſſioner gave an account of the whole affair to the court, and the emperor at his ſolicitation pardoned the criminal."

PIG, in zoology. See Sus.

Guinea-Pig. See Mus.

Pig of lead, the eighth part of a fother, amounting to 250 pounds weight.

PIGANIOL de la force (John Aymar de), a native of Auvergne, of a noble family, applied himſelf with ardour to the ſtudy of geography, and of the hiſtory of France. With the view of improving himſelf in this ſtudy he travelled, into different provinces; and, in the courſe of his travels, made ſome important obſervations on the natural hiſtory, the commerce, the civil and eccleſiaſtical government of each province. Theſe obſervations were of great uſe to him in compiling the works he has left behind him, of which the chief are, 1. An Hiſtorical and Geographical Deſcription of France; the largeſt edition of which is that of 1753, in 15 vol. 12mo. It is the beſt work which has hitherto appeared upon that ſubject, though it contains a great number of inaccuracies and even errors. 2 A deſcription of Paris, in 10 vol. 12mo; a work equally entertaining and inſtructive, and much more complete than the deſcription given by Germain Brice: beſides, it is written with an elegant ſimplicity. He publiſhed an abridgement of it in 2 vol. 12mo. 3. A deſcription of the Caſtle and Park of Verſailles, Marly, &c. in 2 vol. 12mo: it is very amuſing, and pretty well executed. Piganiol had alſo a concern with Abbé Nadal in the Journal of Trevoux. He died at Paris in February 1753, at the age of 80 years. This learned man was as much to be reſpected for his manners as for his talents. To a profound and varied knowledge he united great probity and honour, and all the politeneſs of a courtier.

PIGEON, in ornithology. See Columba.

Pigeon-Houſe is a houſe erected full of holes within for the keeping, breeding, &c. of pigeons, otherwiſe called a *dove cote*.

Any lord of manor in England, may build a pigeon-houſe on his land, but a tenant cannot do it without the lord's licence. When perſons ſhoot at or kill pigeons within a certain diſtance of the pigeon-houſe, they are liable to pay a forfeiture.

In order to erect a pigeon-houſe, to advantage, it will be neceſſary in the firſt place, to pitch upon a convenient ſituation; of which none is more proper than the middle of a ſpacious court-yard, becauſe pigeons are naturally of a timorous diſpoſition, and the leaſt noiſe they hear frightens them. With regard to the ſize of the pigeon-houſe, it muſt depend entirely upon the number of birds intended to be kept; but it is better to have it too large than too little; and as to its form, the round ſhould be preferred to the ſquare ones, becauſe rats cannot ſo eaſily come at them in the former as in the latter. It is alſo much more commodious; becauſe you may, by means of a ladder turning upon an axis, eaſily viſit all the neſts in the houſe without the leaſt difficulty; which cannot ſo eaſily be done in a ſquare houſe. In order to hinder rats from climbing up the outſide of the pigeon houſe, the wall ſhould be covered with tin plates to a certain height, about a foot and a half will be ſufficient; but they ſhould project out three or four inches at the top, to prevent their clambering any higher.

The pigeon-houſe ſhould be placed at no great diſtance from water, that the pigeons may carry it to their young ones; and their carrying it in their bills will warm it, and render it more wholeſome in cold weather. The boards that cover the pigeon-houſe ſhould be well joined together, ſo that no rain may penetrate through it: and the whole building ſhould be covered with hard plaſter, and white-waſhed within and without, white being the moſt pleaſing colour to pigeons. There muſt be no window, or other opening in the pigeon-houſe to the eaſtward; theſe ſhould always face the ſouth, for pigeons are very fond of the ſun, eſpecially in winter.

The neſts or covers in a pigeon houſe ſhould conſiſt of ſquare holes made in the walls of a ſize ſufficient to admit the cock and hen to ſtand in them. The firſt range of theſe neſts ſhould not be leſs than four feet from the ground, that the wall underneath being ſmooth, the rats may not be able to reach them. Theſe neſts ſhould be placed in quincunx order, and not directly over one-another. Nor muſt they be continued any higher than within three feet of the top of the wall: and the upper row ſhould be covered with a board projecting a conſiderable diſtance from the wall, for fear the rats ſhould find means to climb the outſide of the houſe.

M. Duhamel thinks that pigeons neither feed upon the green corn, not have bills ſtrong enough to ſearch for its ſeeds in the earth; but only pick up the grains that are not covered, which would infallibly become the prey of other animals, or be dried up by the ſun. "From the time of the ſprouting of the corn, ſays he, pigeons live chiefly upon the ſeeds of wild uncultivated plants, and therefore leſſen conſiderably the quantity of weeds that would otherwiſe ſpring up; as will appear from a juſt eſtimate of the quantity of grain neceſſary to feed all the pigeons of a well ſtocked dove-houſe." But Mr Worlidge and Mr Liſle allege facts in ſupport of the contrary opinion. The latter relates, that a farmer in his neighbourhood aſſured him he had known an acre ſowed with peas, and rain coming on ſo that they could not be harrowed in, every pea was fetched away in half a day's time by pigeons: and the former ſays, "It is to be obſerved, that where the flight of pigeons falls, there they fill themſelves and away, and return again where they firſt roſe, and ſo proceed over a whole piece of ground, if they like it. Although you cannot perceive any grain above the ground they know how to find it. I have ſeen them lie ſo much upon a piece of about two or three acres ſown with peas, that they devoured at leaſt three parts in four of the ſeed, which I am ſure, could not be all above the ſurface of the ground. That their ſmelling is their principal director, I have obſerved; having ſown a ſmall plat of peas in my garden, near a pigeon-houſe, and covered them ſo well that not a pea appeared above ground. In a few days, a parcel of pigeons were hard at work in diſcovering this hidden treaſure; and in a few days more I had not above two or three peas left out of about two quarts that were planted; for what they could not find before, they found when the buds appeared, notwithſtanding they were hoed in, and well covered. Their ſmelling alone directed them as I ſuppoſed, becauſe they followed the ranges exactly. The injury they do at harveſt on the peas, vetches, &c. is ſuch that we may rank them among the greateſt enemies the poor huſbandman meets withal; and the greater becauſe he may not erect a pigeon houſe, whereby to have a ſhare of his own ſpoils; none but the rich being allowed this privilege, and ſo ſevere a law being alſo made to protect theſe winged thieves, that a man cannot encounter them, even in defence of his own property. You have therefore no remedy againſt them, but to affright them away by noiſes or ſuch like. You may, indeed, ſhoot at them; but you muſt not kill them; or you may, if you can, take them in a net, cut off their tails, and let them go; by which means you will impound them: for when they are in their houſes, they cannot bolt or fly out of the tops of them but by the ſtrength of their tails; after the thus weakening of which, they remain priſoners at home."

Mr Worlidge's impounding the pigeons reminds us of a humorous ſtory of a gentleman who, upon a neighbouring farmer's complaining to him, that his pigeons were a great nuiſance to his land, and did ſad miſchief to his corn, replied, jokingly, Pound them, if you catch them treſpaſſing. The farmer, improving the hint, ſteeped a parcel of peas in an infuſion of *coculus indicus*, or ſome other intoxicating drug, and ſtrewed them upon his grounds. The pigeons ſwallowed them, and ſoon remained motionleſs on the field: upon which the farmer threw a net over them, incloſed them in it, and carried them to an empty barn, from whence he ſent the gentleman word that he had followed his directions with regard to the pounding of his pigeons and deſired him to come and releaſe them.

Carrier-Pigeon. See *Carrier-Pigeon* and Columba.

Pigeon (Peter Charles Francis), curate of St Peter du Regard, in the dioceſe of Bayeux, was one of the prieſts lately belonging to the king's houſe at Wincheſter. He was born in Lower Normandy, of honeſt and virtuous parents, and of a decent fortune. His inclinations early led him to embrace the eccleſiaſtical ſtate, from which neither the ſolicitations of his friends, nor the proſpect of a more ample fortune on the death of his elder brother, could withdraw him. Several of his ſchoolfellows and maſters, who are now reſident in the king's houſe at Wincheſter, bear the moſt ample teſtimony to his aſſiduity, regularity, piety, and the ſweetneſs of his diſpoſition, during the whole courſe of his education. The ſweetneſs of temper, in particular, was ſo remarkable, and ſo clearly depicted on his countenance, as to have gained him the eſteem and affection of ſuch of the inhabitants of Wincheſter as by any means had become acquainted with him. He was ſeven years employed in quality of vicar, or, as we ſhould call it *curate*, of a large pariſh in the dioceſe of *Seez*, where his virtues and talents had ample ſcope for exertion. His practice was to riſe at five o'clock every morning, and to ſpend the whole time till noon (the uſual time of dining for perſons in his ſtation) in prayer and ſtudy. The reſt of the day, till evening be devoted to viſiting the ſick, and other exterior duties of his function. In 1789, the year of the French Revolution, M. Pigeon was promoted to a curacy, or rather a rectory, in the dioceſe of Bayeux, called the *pariſh of St Peter du Regard*, near the town of Condè ſur Noereau. It was eaſy for him to gain the good will and the protection of his pariſhioners; but a Jacobin club in the above mentioned town ſeemed to have no other ſubject to deliberate upon than the various ways of haraſſing and perſecuting M. Pigeon and certain other prieſts in the neighbourhood, who had from motives of conſcience refuſed the famous civic oath. It would be tedious to relate the many cruelties which were at different times exerciſed upon him, and the imminent danger of loſing his life to which he was expoſed, by the blows that were inflicted on him, by his being thrown into water, and being obliged to wander in woods and other ſolitary places, without any food or place to lay his head, in order to avoid his perſecutors. We may form ſome judgment of the ſpirit of his perſecutors from the following circumſtance. Being diſappointed on a particular occaſion in the ſearch they were making after M. Pigeon, with the view of amuſing themſelves with his ſufferings, they made themſelves amends by ſeizing his mother, a reſpectable lady of 74 years of age, and his two ſiſters, whom they placed upon aſſes with their faces turned backwards, obliging them in deriſion to hold the tails of theſe animals. Thus they were conducted in pain and ignominy throughout the whole town of Condè, for no other alleged crime except being the neareſt relations of M. Pigeon. At length the decree for tranſporting all the eccleſiaſtics arrived; and this gentleman, with ſeveral others, after having been ſtripped of all their money, was ſhipped from Port Beſſin, and landed at Portſmouth, where he was ſhortly after received into the eſtabliſhment at Foxton, and upon that being diſſolved in order to make room, for priſoners of war, into the king's houſe at Wincheſter. Being of a ſtudious turn, he was accuſtomed, as many of his brethern alſo were, to betake himſelf to the neighbouring lanes and thickets for the ſake of greater ſolitude. With this view having about ten o'clock in the morning, Aug. 28. 1793, retired to a certain little valley, on the north-eaſt ſide of a place called *Oram's Arbour*, the ſame place where the county elections for Hampſhire are held, he was there found, between three and four o'clock in the afternoon, murdered, with the upper part of his ſkull abſolutely broken from the lower-part, and a large hedge-ſtake, covered with blood, lying by him, as were the papers in which he had been tranſcribing a manuſcript ſermon, with the hearing of which he had been much edified, and the ſermon itſelf which he was copying, together with his pen, imbrued in blood. His watch was carried away, though part of the chain, which had by ſome means been broken, was left behind. He was writing the word *paradiſe*, the laſt letters of which remained unwritten when the fatal blow was given him, which appears evidently to have been diſcharged upon him from a gap in a hedge which was immediately behind him. At firſt the ſuſpicion of this cruel murder fell upon the French democrats, who, to the number of 200, are priſoners of war, at the neighbouring town of Alresford, as one of that number, who had broken his parole, had about three weeks before, been taken up in Wincheſter, and both there and at Alresford had repeatedly threatened to murder his uncle, a prieſt, whom he underſtood to be then at Wincheſter, not without fervent wiſhes of having it in his power to murder the whole eſtabliſhment, conſiſting of more than 600 perſons. However, as no French priſoner was ſeen that day in the neighbourhood of Wincheſter, as none of them were known to have left Alresford, it is evidently reaſonable to acquieſce in the verdict of the coroner; namely, that the murder was committed by a perſon or perſons, unknown. The moſt noble marquis of Buckingham, whoſe munificence and kindneſs to thoſe conſcientious exiles, the emigrant French clergy, can only be conceived by thoſe who have been witneſſes of the ſame, with the truly reſpectable corps of the Buckinghamſhire militia, then quartered at Wincheſter, joined in paying the laſt mark of reſpect to the unfortunate deceaſed, by attending his funeral, which was performed at the Roman Catholic burying ground, called *St James's* near the ſaid city, on Saturday Auguſt 29. He was juſt 38 years of age when he was murdered.

PIGMENTS, preparations uſed by painters, dyers, &c. to impart colours to bodies, or to imitate particular colours. See Colour *Making*, and Dyeing.

PIGNEROL, is a town of Italy in the province of Piedmont, in E. Long. 7. 15. Lat. 44. 45, ſituated on the river Chizon, 10 miles ſouth-weſt of Turin, at the foot of the Alps, and the confines of Dauphiny. The town is ſmall, but populous, and extremely well fortified by the king of Sardinia, ſince the treaty of Utrecht. It is defended by a citadel, on the top of the mountain, near which is the caſtle of Perouſe, which was built at the entrance of the valley of that name.

PIGNUT, or *Earthnut*. See Bunium

PIGUS, in ichthyology, is the name of a ſpecies of leather mouthed fiſh, very much reſembling the nature of the common carp; being of the ſame ſhape and ſize, and its eyes, fins, and fleſhy palate, exactly the ſame from the gills to the tail there is a crooked dotted line;

the back and ſides are bluiſh, and the belly reddiſh. It is covered with large ſcales; from the middle of each of which their riſes a fine, pellucid, prickle, which is very ſharp. It is an excellent fiſh for the table, being perhaps preferable to the carp; and it is in ſeaſon in the months of March and April. It is caught in lakes in ſome parts of Italy, and is mentioned by Pliny, tho' without a name. Artedi ſays it is a ſpecies of cyprinus, and he calls it the *cyprinus*, called *pyclo* and *pygus*.

PI-HAHIROTH, (Moſes); underſtood to be a mouth or narrow paſs between two mountains, called *Chiroth*, or *Eiroth*, and lying not far from the bottom of the weſtern coaſt of the Arabian gulf; before which mouth the children of Iſrael encamped, juſt before their entering the Red Sea, (Wells).

PIISSKER, in ichthology, is a fiſh of the muſtela kind, commonly called the *foſſile muſtela*, or *foſſile fiſh*. They are generally found as long as an ordinary man's hand is broad, and as thick as one's finger; but they ſometimes grow much longer: the back is of grey with a number of ſpots and tranſverſe ſtreaks, partly black and partly blue; the belly is yellow, and ſpotted with red, white, and black; the white are the larger, the others look as if they were made with the point of a needle; and there is on each of the ſides a longitudinal black and white line. There are ſome fleſhy excreſcences at the mouth, which are expanded in ſwimming; and when out of the water, they are contracted. Theſe fiſhes run into caverns of the earth, in the ſides of rivers, in marſhy places, and penetrate a great way, and are often dug up at a diſtance from waters. Often, when the waters of brooks and rivers ſwell beyond their banks, and again cover them, they make their way out of the earth into the water; and when it deſerts them, they are often left in vaſt numbers upon the ground and become a prey to ſwine. It is thought to be much of the ſame kind with the fiſgum fiſh; and it is indeed poſſible that the pæcillia of Schonefeldt is the ſame.

PIKE, in ichthyology. See Esox.

The pike never ſwims in ſhoals as moſt other fiſh do, but always lies alone; and is ſo bold and ravenous, that he will ſeize upon almoſt any thing leſs than himſelf. Of the ravenous nature of this fiſh we ſhall give the following inſtances. At Rycott in Oxfordſhire, in the year 1749, in a moat ſurrounding the earl of Abingdon's ſeat, there was a jack or pike of ſuch a monſtrous ſize, that it had deſtroyed young ſwans feathers and all. An old cobb ſwan having hatched five young, ones after another was loſt till four were gone. At length an under gardener ſaw the fiſh ſeize the fifth. The old one fought him with her beak, and with the aſſiſtance of the gardener; releaſed it although he had got it under water. In the year 1765 a large pike was caught in the river Ouze, which weighed upwards of 28 pounds, and was ſold for a guinea. On gutting the fiſh, a watch with a black ribbon and two ſteel ſeals were found in its ſtomach, which by the maker's name, &c. was found to belong to a perſon who had been drowned about ſix weeks before. This fiſh breeds but once in a year, which is in March. It is found in almoſt all freſh waters; but is very different in goodneſs, according to the nature of the places where it lives. The fineſt pike are thoſe which feed in clear rivers; thoſe in ponds and meres are inferior to theſe, and the worſt of all are thoſe of the fen ditches. They are very plentiful in theſe laſt places, where the water is foul and coloured; and their food ſuch as frogs and the like, very plentiful, but very coarſe; ſo that they grow large, but are yellowiſh and high bellied, and differ greatly from thoſe which live in the clearer waters.

The fiſhermen have two principal ways of catching the pike: by the ledger, and by the walking-bait.

The ledger bait is fixed in one certain place, and may continue while the angler is abſent. This muſt be a live bait, a fiſh or frog: and among fiſh, the dace, roach, and gudgeon, are the beſt; of frogs, the only caution is to chooſe the largeſt and yelloweſt that can be met with. If the bait be a fiſh, the hook is to be ſtuck through the upper lip, and the line muſt be 14 yards at leaſt in length; the other end of this is to be tied to a bough of a tree, or to a ſtick driven into the ground near the pikes's haunt and all the line wound round a forked ſtick, except about half a yard. The bait will by this means keep playing ſo much under water, and the pike will ſoon lay hold of it.

If the bait be a frog then the arming wire of the hook ſhould be put in at the mouth, and out at the ſide; and with a needle and ſome ſtrong ſilk, the hinder-leg of one ſide is to be faſtened by one ſtitch to the wire-arming of the hook. The pike will ſoon ſeize this, and muſt have line enough to give him leave to get to his haunt and poach the bait.

The trolling for pike is a pleaſant method alſo of taking them: in this a dead bait ſerves, and none is ſo proper as a gudgeon.

This is to be pulled about in the water till the pike ſeizes it; and then it is to have line enough, and time to ſwallow it: the hook is ſmall for this ſport, and has a ſmooth piece of lead fixed at its end to ſink the bait; and the line is very long, and runs through a ring at the end of the rod, which muſt not be too ſlender at top.

The art of feeding pike, ſo as to make them very fat, is the giving them eels; and without this it is not to be done under a very long time; otherwiſe perch, while ſmall and their prickly fins tender, are the beſt food for them. Bream put into a pike pond are a very proper food: they will breed freely, and their young ones make excellent food for the pike, who will take care that they ſhall not increaſe over much. The numerous ſhoals of roaches and ruds, which are continually changing place, and often in floods get into the pike's quarters, are food for them for a long time.

Pike, when uſed to be fed by hand, will come up to the very ſhore, and take the food that is given them out of the fingers of the feeder. It is wonderful to ſee with what courage they will do this, after a while practiſing; and it is a very diverting ſight when there are ſeveral of them nearly of the ſame ſize, to ſee what ſtriving and fighting there will be for the beſt bits when they are thrown in. The moſt convenient place is near the mouth of the pond, and where there is about half a yard depth of water; for, by that means, the offal of the feedings will all lie in one place, and the deep water will ſerve for a place to retire into and reſt in, and will be always clean and in order.

Carp will be fed in the ſame manner as pike; and though by nature a fiſh as remarkably ſhy and timorous

rous as the pike is bold and fearleſs, yet by cuſtom they will come to take their food out of the perſon's hand; and will, like the pike, quarrel among one another for the niceſt bits.

PIKE, in war, an offenſive weapon, conſiſting of a wooden ſhaft, 12 or 14 feet long, with a flat ſteel head, pointed, called the *ſpear*. This weapon was long in uſe among the infantry; but now the bayonet, which is fixed on the muzzle of the firelock, is ſubſtituted in its ſtead. It is ſtill uſed by ſome of the officers of infantry, under the name of *ſponton*. The Macedonian phalanx was a battalion of pikemen. See PHALANX.

PILA MARINA, or the *ſea-ball*, in natural hiſtory, is the name of a ſubſtance very common on the ſhores of the Mediterranean, and elſewhere. It is generally found in the form of a ball about the ſize of the balls of horſe-dung, and compoſed of a variety of fibrillæ irregularly complicated. Various conjectures have been given of its origin by different authors. John Bauhine tells us, that it conſiſts of ſmall hairy fibres and ſtraws, ſuch as are found about the ſea plant called *alga vitriariorum*; but he does not aſcertain what plant it owes its origin to. Imperatus imagined it conſiſted of the exuviæ both of vegetable and animal bodies. Mercatus is doubtful whether it be a congeries of the fibrillæ of plants, wound up into a ball by the motion of the ſea water, or whether it be not the workmanſhip of ſome ſort of beetle living about the ſea ſhore, and analogous to our common dung beetle's ball, which it elaborates from dung for the reception of its progeny. Schreckius ſays it is compoſed of the filaments of ſome plant of the reed kind: and Welchius ſuppoſes it is compoſed of the pappous part of the flowers of the reed. Maurice Hoffman thinks it the excrement of the hippopotamus; and others think it that of the phoca or ſea calf. Klein, who had thoroughly and minutely examined the bodies themſelves, and alſo what authors had conjectured concerning them, thinks that they are wholly owing to, and entirely compoſed of, the capillaments which the leaves, growing to the woody ſtalk of the *alga vitriariorum*, have when they wither and decay. Theſe leaves, in their natural ſtate, are as thick as a wheat ſtraw, and they are placed ſo thick about the tops and extremities of the ſtalks, that they enfold, embrace, and lie one over another; and from the middle of theſe cluſters of leaves, and indeed from the woody ſubſtance of the plant itſelf, there ariſe ſeveral other very long flat, ſmooth, and brittle leaves. Theſe are uſually four from each tuft of the other leaves; and they have ever a common vagina, which is membranaceous and very thin. This is the ſtyle of the plant, and the *pila marina*, appears to be a cluſter of the fibres of the leaves of this plant, which cover the whole ſtalk, divided into their conſtituent fibres; and by the motion of the waves firſt broken and worn into ſhort ſhreds, and afterwards wound up together into a roundiſh or longiſh ball.

PILA, was a ball made in a different manner according to the different games in which it was to be uſed. Playing at ball was very common amongſt the Romans of the firſt diſtinction, and was looked upon as a manly exerciſe, which contributed both to amuſement and health. The pila was of four ſorts: 1ſt, *Follis* or *balloon*; 2d, *Pila Trigonalis*; 3d, *Pila Paganica*; 4th, *Harpaſtum*. All theſe come under the general name of pila. For the manner of playing with each of them, ſee the articles FOLLIS, TRIGONALIS.

PILASTER, in architecture. See there, nº 50, &c.

PILATE, or PONTIUS PILATE, was governor of Judea when our Lord was crucified. Of his family or country we know but little, though it is believed that he was of Rome, or at leaſt of Italy. He was ſent to govern Judea in the room of Gratus, in the year 26 or 27 of the vulgar era, and governed this province for ten years, from the 12th or 13th year of Tiberius to the 22d or 23d. He is repreſented both by Philo and Joſephus as a man of an impetuous and obſtinate temper, and as a judge who uſed to ſell juſtice, and to pronounce any ſentence that was deſired, provided he was paid for it. The ſame authors make mention of his rapines, his injuries, his murders, the torments that he inflicted upon the innocent, and the perſons he put to death without any form of proceſs. Philo, in particular, deſcribes him as a man that exerciſed an exceſſive cruelty during the whole time of his government, who diſturbed the repoſe of Judea, and gave occaſion to the troubles and revolt that followed after. St Luke (xiii. 1, 2, &c.) acquaints us, that Pilate had mingled the blood of the Galileans with their ſacrifices; and that the matter having been related to Jeſus Chriſt, he ſaid, "Think you that theſe Galileans were greater ſinners than other Galileans becauſe they ſuffered this calamity. I tell you nay; and if you do not repent, you ſhall all periſh in like manner. It is unknown upon what occaſion Pilate cauſed theſe Galileans to be ſlain in the temple while they were ſacrificing; for this is the meaning of that expreſſion of mingling their blood with their ſacrifices. Some think they were diſciples of Judas the Gaulonite, who taught that the Jews ought not to pay tribute to foreign princes; and that Pilate had put ſome of them to death even in the temple; but there is no proof of this fact. Others think that theſe Galileans were Samaritans, whom Pilate cut to pieces in the village of Tirataba †, as they were preparing to go up to mount Gerizim, where a certain impoſtor had promiſed to diſcover treaſures to them; but this event did not happen before the year 35 of the common era, and conſequently two years after the death of Jeſus Chriſt. At the time of our Saviour's paſſion, Pilate made ſome endeavours to deliver him out of the hands of the Jews. He knew they had delivered him up, and purſued his life with ſo much violence, only out of malice and envy (Matt. xxvii. 18.) His wife alſo, who had been diſturbed the night before with frightful dreams, ſent to tell him ſhe deſired him not to meddle in the affair of that juſt perſon (ib. 19.) He attempted to appeaſe the wrath of the Jews, and to give them ſome ſatisfaction, by whipping Jeſus Chriſt (John xix. 1. Matth. xxvii. 26.) He tried to take him out of their hands, by propoſing to deliver him or Barrabas, on the day of the feſtival of the paſſover. Laſtly, he had a mind to diſcharge himſelf from pronouncing judgment againſt him, by ſending him to Herod king of Galilee (Luke xxii. 7, 8.) When he ſaw all this would not ſatiſfy the Jews, and that they even threatened him in ſome manner, ſaying he could be no friend to the emperor if he let him go (John xix. 12, 15.), he cauſed water to be brought, waſhed his hands before

† Joſeph. Ant. lib. 18. c. 5.

all the people, and publicly declared himſelf innocent of the blood of that juſt perſon (Matt. xxvii. 23, 24.); yet at the ſame time he delivered him up to his ſoldiers, that they might crucify him. This was enough to juſtify Jeſus Chriſt, as Calmet obſerves, and to ſhow that he held him as innocent; but it was not enough to vindicate the conſcience and integrity of a judge, whoſe duty it was as well to aſſert the cauſe of oppreſſed innocence as to puniſh the guilty and criminal. He ordered to be put over our Saviour's croſs, as it were, an abſtract of his ſentence, and the motive of his condemnation (John xix. 19.), *Jeſus of Nazareth, king of the Jews*, which was written in Latin, Greek, and Hebrew. Some of the Jews found fault with it, and remonſtrated to Pilate that he ought to have written *Jeſus of Nazareth, who pretended to be king of the Jews*. But Pilate could not be prevailed with to alter it, and gave them this peremptory anſwer, *That what he had written he had written*.

Towards evening, he was applied to for leave to take down the bodies from the croſs, that they might not continue there the following day, which was the paſſover and the ſabbath-day (John xix. 31.) This he allowed, and granted the body of Jeſus to Joſeph of Arimathea, that he might pay his laſt duties to it, (ib. 33.) Laſtly, when the prieſts, who had ſolicited the death of our Savour, came to deſire him to ſet a watch about the ſepulchre, for fear his diſciples ſhould ſteal him away by night, he anſwered them, that they had a guard, and might place them there themſelves (Matt. xxvii. 65.) This is the ſubſtance of what the goſpel tells us concerning Pilate.

Juſtin Martyr, Tertullian, Euſebius, and after them ſeveral others both ancient and modern, aſſure us, that it was formerly the cuſtom for Roman magiſtrates to prepare copies of all verbal proceſſes and judicial acts which they paſſed in their ſeveral provinces, and to ſend them to the emperor. And Pilate, in compliance to this cuſtom, having ſent word to Tiberius of what had paſſed relating to Jeſus Chriſt, the emperor wrote an account of it to the ſenate, in a manner that gave reaſon to judge that he thought favourably of the religion of Jeſus Chriſt, and ſhowed that he would be willing they ſhould decree divine honours to him. But the ſenate was not of the ſame opinion, and ſo the matter was dropped. It appears by what Juſtin ſays of theſe acts, that the miracles of Jeſus Chriſt were mentioned there, and even that the ſoldiers had divided his garments among them. Euſebius inſinuates that they ſpoke of his reſurrection and aſcenſion. Tertullian and Juſtin refer to theſe acts with ſo much confidence as would make one believe they had them in their hands. However, neither Euſebius nor St Jerome, who were both inquiſitive, underſtanding perſons, nor any other author that wrote afterwards, ſeem to have ſeen them, at leaſt not the true and original acts; for as to what we have now in great number, they are not authentic, being neither ancient nor uniform. There are alſo ſome pretended letters of Pilate to Tiberius, giving a hiſtory of our Saviour, but they are univerſally allowed to be ſpurious.

Pilate being a man that, by his exceſſive cruelties and rapine, had diſturbed the peace of Judea during the whole time of his government, was at length depoſed by Vitellius the proconſul of Syria, in the 36th year of Jeſus Chriſt, and ſent to Rome to give an account of his conduct to the emperor. But though Tiberius died before Pilate arrived at Rome, yet his ſucceſſor Caligula baniſhed him to Vienne in Gaul, where he was reduced to ſuch extremity that he killed himſelf with his own hands. The evangeliſts call him governor, though in reality he was no more than procurator of Judea, not only becauſe governor was a name of general uſe, but becauſe Pilate in effect acted as one, by taking upon him to judge in criminal matters; as his predeceſſors had done, and other procurators in the ſmall provinces of the empire where there was no proconſul, conſtantly did. See *Calmet's Dictionary*, *Echard's Eccleſiaſtical Hiſtory*, and *Beauſobre's Annot.*

With regard to Pilate's wife, the general tradition is, that ſhe was named Claudia Procula or Proſcula; and in relation to her dream, ſome are of opinion that as ſhe had intelligence of our Lord's apprehenſion, and knew by his character that he was a righteous perſon, her imagination, being ſtruck with theſe ideas, did naturally produce the dream we read of; but others think that this dream was ſent providentially upon her, for the clearer manifeſtation of our Lord's innocence.

PILATRE DU ROSIER (Francis), was born at Metz the 30th of March 1756. He was firſt apprentice to an apothecary there, and afterwards went to Paris in queſt of farther improvement. He applied himſelf to the ſtudy of natural hiſtory and of natural philoſophy, and had already acquired ſome reputation, when the diſcovery of M. de Montgolfier had juſt aſtoniſhed the learned world. On the 25th of October 1783, he attempted an aerial voyage with the Marquis of Arlande. He performed ſeveral other excurſions in this way with brilliant ſucceſs, in the preſence of the royal family of France, of the king of Sweden, and of Prince Henry of Pruſſia. He then reſolved to paſs into England by means of his aerial vehicle, and for that purpoſe he repaired to Boulogne, whence he roſe about 7 o'clock in the morning of the 15th June 1785; but in half an hour after he ſet out, the balloon took fire, and the aeronaut, with his companion M. Romaine, were cruſhed to death by the fall of that machine, which was more ingenious, perhaps, than uſeful*. Pilatre's ſocial virtues and courage, which were very diſtinguiſhed, heightened the regret of his friends for his loſs. His merit as a chemiſt, and his experiments as an aeronaut, procured him ſome precuniary reward, and ſome public appointments. He had a penſion from the King, was intendant of Monſieur's cabinets of natural philoſophy, chemiſtry, and natural hiſtory, profeſſor of natural philoſophy, a member of ſeveral academies, and principal director of Monſieur's muſeum.

PILCHARD, in ichthyology, a fiſh which has a general likeneſs to the herring, but differs in ſome particulars very eſſential. The body of the pilchard is leſs compreſſed than that of the herring, being thicker and rounder: the noſe is ſhorter in proportion, and turns up; the under jaw is ſhorter. The back is more elevated; the belly leſs ſharp. The dorſal fin of the pilchard is placed exactly in the center of gravity, ſo that when taken up by it, the body preſerves an equilibrium, whereas that of the herring dips at the head. The ſcales of the pilchard adhere very cloſely, whereas thoſe of the herring very eaſily drop off. The pilchard is in general leſs than the herring; but it is fatter, or more full of oil.

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* See Aeroſtation, nº 34.

The pilchard appears in vaſt ſhoals off the Corniſh coaſts about the middle of July, diſappearing the beginning of winter, yet ſometimes a few return again after Chriſtmas. Their winter retreat is the ſame with that of the herring, and their motives for migrating the ſame†. They affect, during ſummer, a warmer latitude; for they are not found in any quantities on any of the Engliſh coaſts except thoſe of Cornwall, that is to ſay, from Fowey harbour to the Scilly iſles, between which places the ſhoals keep ſhifting for ſome weeks. The approach of the pilchard is known by much the ſame ſigns as thoſe that indicate the arrival of the herring. Perſons, called in Cornwall *huers*, are placed on the cliffs, to point to the boats ſtationed off the land the courſe of the fiſh. By the 1ſt of James I. c. 23, fiſhermen are empowered to go on the grounds of others to hue, without being liable to actions of treſpaſs, which before occaſioned frequent law-ſuits.

The emoluments that accrue to the inhabitants of that country are great, and are beſt expreſſed in the words of Dr W. Borlaſe, in his *Account of the Pilchard Fiſhery*. "It employs a great number of men on the ſea, training them thereby to naval affairs; employs men, women, and children, at land, in ſalting, preſſing, waſhing, and cleaning, in making boats, nets, ropes, caſks, and all the trades depending on their conſtruction and ſale. The poor are fed with the offals of the captures; the land with the refuſe of the fiſh and ſalt; the merchant finds the gains of commiſſion and honeſt commerce; the fiſherman, the gains of the fiſh. Ships are often freighted hither with ſalt, and into foreign countries with the fiſh, carrying off at the ſame time part of our tin. The uſual number of hogſheads of fiſh exported each year, for ten years, from 1747 to 1756 incluſive, from the four ports of Fowey, Falmouth, Penzance, and St Ives, in all amounts to 29,794; ſince it appears that Fowey has exported yearly 1732 hogſheads; Falmouth, 14,631 hogſheads and two-thirds; Penzance and Mounts-Bay, 12,149 hogſheads and one-third; St Ives, 1282 hogſheads. Every hogſhead for ten years laſt paſt, together with the bounty allowed for each when exported, and the oil made out of each, has amounted, one year with another at an average, to the price of L. 1 : 13 : 3; ſo that the caſh paid for pilchards exported has, at a medium, annually amounted to the ſum of L. 49,532, 10s." The numbers that are taken at one ſhooting out of the nets is amazingly great. Mr Pennant ſays, that Dr Borlaſe aſſured him, that on the 5th of October 1767, there were at one time incloſed in St Ives's Bay 7000 hogſheads, each hogſhead containing 35,000 fiſh, in all 245,000,000.

PILE, in heraldry, an ordinary in form of a wedge, contracting from the chief, and terminating in a point towards the bottom of the ſhield.

Pile, among the Greeks and Romans, was a pyramid built of wood, whereon were laid the bodies of the deceaſed to be burnt. It was partly in the form of an altar, and differed in height according to the quality of the perſon to be conſumed. Probably it might originally be conſidered as an altar, on which the dead were conſumed as a burnt-offering to the infernal deities. The trees made uſe of in the erection of a funeral pile were ſuch as abounded in pitch or roſin, as being moſt combuſtible; if they uſed any other wood, it was ſplit that it might the more eaſily catch fire. Round the pile were placed cypreſs boughs to hinder the noiſome ſmell. See Funeral.

Pile, in building, is uſed for a large ſtake rammed into the ground in the bottom of rivers, or in marſhy land, for a foundation to build upon.

Pile is alſo uſed among architects for a maſs of building.

Pile, in coinage, denotes a kind of puncheon, which, in the old way of coining with the hammer, contained the arms or other figure and inſcription to be ſtruck on the coin. See Coinage.

Accordingly we ſtill call the arms ſide of a piece of money the *pile*, and the head the *croſs*; becauſe in ancient coin, a croſs uſually took the place of the head in ours.

Pile-Engine, a very curious machine invented by Mr Vauloue for driving the piles of Weſtminſter-bridge. It is repreſented Plate CCCXCIII. A is a great upright ſhaft or axle, on which are the great wheel B, and the drum C, turned by horſes joined to the bars S, S. The wheel B turns the trundle X, on the top of whoſe axis is the fly O, which ſerves to regulate the motion, and alſo to act againſt the horſes, and to keep them from falling when the heavy ram Q is diſcharged to drive the pile P down into the mud in the bottom of the river. The drum C is looſe upon the ſhaft A, but is locked to the wheel B by the bolt Y. On this drum the great rope HH is wound; one end of the rope being fixed to the drum, and the other to the follower G, to which it is conveyed over the pulleys I and K. In the follower G is contained the tongs F, that takes hold of the ram Q by the ſtaple R, for drawing it up. D is a ſpiral or fuſy fixed to the drum, on which is wound the ſmall rope T that goes over the pulley U, under the pulley V, and is faſtened to the top of the frame at 7. To the pulley-block V is hung the counterpoiſe W, which hinders the follower T from accelerating as it goes down to take hold of the ram; for as the follower tends to acquire velocity in its deſcent, the line T winds downwards upon the fuſy, on a larger and larger radius, by which means the counterpoiſe W acts ſtronger and ſtronger againſt it; and ſo allows it to come down with only a moderate and uniform velocity. The bolt Y locks the drum to the great wheel, being puſhed upward by the ſmall lever 2, which goes through a mortiſe in the ſhaft A, turns upon a pin in the bar 3, fixed to the great wheel B, and has a weight 4, which always tends to puſh up the bolt Y through the wheel into the drum. L is the great lever turning on the axis *m*, and reſting upon the forcing bar 5, 5, which goes through a hollow in the ſhaft A, and bears up the little lever 2.

By the horſes going round, the great rope H is wound about the drum C, and the ram Q is drawn up by the tongs F in the follower G, until the tongs come between the inclined planes E; which, by ſhutting the tongs at the top, opens it at the foot, and diſcharges the ram which falls down between the guides *bb* upon the pile P, and drives it by a few ſtrokes as far into the mud as it will go; after which, the top part is ſawed off cloſe to the mud by an engine for that purpoſe.

Immediately

† See Clupea.

Immediately after the ram is diſcharged, the piece 6 upon the follower G takes hold of the ropes *aa*, which raiſe the end of the lever L, and cauſe its end N to deſcend and preſs down the forcing bar 5 upon the little lever 2, which, by pulling down the bolt Y, unlocks the drum C from the great wheel B; and then the follower being at liberty, comes down by its own weight to the ram; and the lower ends of the tongs ſlip over the ſtaple R, and the weight of their heads cauſes them to fall outward, and ſhut upon it. Then the weight 4 puſhes up the bolt Y into the drum, which locks it to the great wheel, and ſo the ram is drawn up as before.

As the follower comes down, it cauſes the drum to turn backward, and unwinds the rope from it, whilſt the horſes, great wheel, trundle, and fly, go on with an uninterrupted motion; and as the drum is turning backward, the counterpoiſe W is drawn up, and its rope T wound upon the ſpiral fuſy D.

There are ſeveral holes in the under ſide of the drum, and the bolt Y always takes the firſt one that it finds when the drum ſtops by the falling of the follower upon the ram; until which ſtoppage the bolt has not time to ſlip into any of the holes.

This engine was placed upon a barge on the water, and ſo was eaſily conveyed to any place deſired. The ram was a ton weight; and the guides *bb*, by which it was let fall, were 30 feet high.

A new machine for driving piles has been invented lately by Mr S. Bunce of Kirby ſtreet, Hatten ſtreet, London. It will drive a greater number of piles in a given time than any other; and can be conſtructed more ſimply to work by horſes than Mr Vauloué's engine above deſcribed.

Plate cccxciii.

Fig. 1 and 2 repreſent a ſide and front ſection of the machine. The chief parts are A, fig. 1, which are two endleſs ropes, or chains connected by croſs pieces of iron B (ſee fig. 2) correſponding with two croſs grooves cut diametrically oppoſite in the wheel C (fig. 1.), into which they are received; and by which means the rope or chain A is carried round. FHK is a ſide-view of a ſtrong wooden frame moveable on the axis H. D is a wheel, over which the chain paſſes and turns within at the top of the frame. It moves occaſionally from F to G upon the centre H, and is kept in the poſition F by the weight I fixed to the end K. Fig. 3. L is the iron ram, which is connected with the croſs pieces by the hook M. N is a cylindrical piece of wood ſuſpended at the hook at O, which by ſliding freely upon the bar that connects the hook to the ram, always brings the hook upright upon the chain when at the bottom of the machine, in the poſition of GP. See fig. 1.

When the man at S turns the uſual crane-work, the ram being connected to the chain, and paſſing between the guides, is drawn up in a perpendicular direction; and when it is near the top of the machine, the projecting bar Q of the hook ſtrikes againſt a croſs piece of wood at R (fig. 1.); and conſequently diſcharges the ram, whilſt the weight I of the moveable frame inſtantly draws the upper wheel into the poſition ſhown at F, and keeps the chain free of the ram in its deſcent. The hook, while deſcending, is prevented from catching the chain by the wooden piece N. For that piece being ſpecifically lighter than the iron weight below, and moving with a leſs degree of velocity cannot come in contact with the iron till it is at the bottom and the ram ſtops. It then falls and again connects the hook with the chain, which draws up the ram, as before.

Mr Bunce has made a model of this machine, which performs perfectly well; and he obſerves, that, as the motion of the wheel C is uninterrupted, there appears to be the leaſt poſſible time loſt in the operation.

Pile-Worms, are a kind of worms found in the piles of the ſea-dikes in Holland. They are of very various ſizes; for ſome of the young ones are not above an inch or two in length, while others have been found thirteen or fourteen inches long. The heads of theſe creatures are covered with two hard ſhells or hemicrania; which together form a figure reſembling an augre; and with which they bore the wood. The beſt remedy againſt them is, to perforate the pile with many ſmall holes about an inch aſunder; then it muſt be done over with a varniſh in the hotteſt ſun; and, while the varniſh is hot, brick-duſt muſt be ſtrewed over it: and this being ſeveral times repeated, the pile will be covered with a ſtrong cruſt abſolutely impenetrable to all inſects.

FILES, in medicine, the ſame with hæmorrhoids. See Medicine, n° 240, &c.

PILEUS, in Roman antiquity, was the ordinary cap or hat worn at public ſhows and ſacrifices, and by the freedmen. It was one of the common rewards aſſigned to ſuch gladiators as were ſlaves, in token of their obtaining freedom.

PILEWORT (*Ranunculus ficaria*, Lin.), the root. This is a very ſmall plant, found in moiſt meadows and by hedge ſides. The roots conſiſt of ſlender fibres with ſome little tubercles among them, which are ſuppoſed to reſemble the hæmorrhoids. From thence it has been concluded, that this root muſt needs be of wonderful efficacy for the cure of that diſtemper: to the taſte, it is little other than mucilaginous; and although ſtill retained in ſeveral of the foreign pharmacopœias, it is hardly in uſe in this country.

PILGRIM, one who travels through foreign countries to viſit holy places, and to pay his devotion to the relicks of dead ſaints. See Pilgrimage.

The word is formed from the Flemiſh *pelgrim*, or Italian *pelegrino*, which ſignifies the ſame; and thoſe originally from the Latin *peregrinus*, a "ſtranger or traveller."

PILGRIMAGE, a kind of religious diſcipline, which conſiſts in taking a journey to ſome holy place in order to adore the relicks of ſome deceaſed ſaint. Pilgrimages began to be made about the middle ages of the church; but they were moſt in vogue after the end of the 11th century, when every one was for viſiting places of devotion, not excepting kings and princes themſelves; and even biſhops made no difficulty of being abſent from their churches on the ſame account. The places moſt viſited were Jeruſalem, Rome, Compoſtella (a), and Tours; but the greateſt numbers now reſort to Loretto, in order to viſit the chamber of the

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(a) It deſerves to be remarked here, that in the year 1428, under the reign of Henry VI. abundance of licences

Pilgrimage.

bleſſed virgin, in which ſhe was born, and brought up her ſon Jeſus till he was 12 years of age. For the pilgrimage of the followers of Mahomet, ſee MAHOMETANISM, p. 465.

In every country where popery was eſtabliſhed, pilgrimages were common; and in thoſe countries which are ſtill popiſh, they continue. In England, the ſhrine of St Thomas à Becket was the chief reſort of the pious; and in Scotland, St Andrew's; where, as tradition informs us, was depoſited a leg of the holy apoſtle. In Ireland they ſtill continue; for, from the beginning of May till the middle of Auguſt every year, crowds of popiſh penitents from all parts of that country reſort to an iſland near the centre of *Lough-fin*, or *White-Lake*, in the county of Donnegal, to the amount of 3000 or 4000. Theſe are moſtly of the poorer ſort, and many of them are proxies for thoſe who are richer; ſome of which, however, together with ſome of the prieſts and biſhops on occaſion, make their appearance there. When the pilgrim comes within ſight of the holy lake, he muſt uncover his hands and feet, and thus walk to the water-ſide, and is taken to the iſland for ſixpence. Here there are two chapels, and 15 other houſes; to which are added confeſſionals, ſo contrived, that the prieſt cannot ſee the perſon confeſſing. The penance varies according to the circumſtances of the penitent; during the continuance of which (which is ſometimes three, ſix, or nine days) he ſubſiſts on oatmeal, ſometimes made into bread. He traverſes ſharp ſtones on his bare knees or feet, and goes through a variety of other forms, paying ſixpence at every different confeſſion. When all is over, the prieſt bores a gimblet-hole through the pilgrim's ſtaff near the top, in which he faſtens a croſs peg; gives him as many holy pebbles out of the lake as he cares to carry away, for amulets to be preſented to his friends, and ſo diſmiſſes him, an object of veneration to all other papiſts not thus initiated; who no ſooner ſee the pilgrim's croſs in his hands, than they kneel down to get his bleſſing.

There are, however, other parts of Ireland ſacred to extraordinary worſhip and pilgrimage; and the number of holy wells, and miraculous cures, &c. produced by them is very great. That ſuch things ſhould exiſt in this enlightened age, and in a Proteſtant country, is indeed ſtrange; but our wonder ceaſes, when we reflect that it is among the loweſt, and perhaps the worſt of the people. They who carry external religion to an extreme, and place that confidence in ceremony which belongs only to the ſpirit of it, are ſeldom diſtinguiſhed either for their wiſdom or their virtue. We do not deny, however, that they who carry matters to the other extreme, may be equally deſtitute of real knowledge and genuine morality.

Dr Johnſon, in his *Raſſelas*, gives us ſome obſervations on pilgrimage, which are ſo much to the purpoſe, that we think we cannot do better than lay them before our readers. "Pilgrimage (ſaid Imlac, into whoſe mouth the obſervations are put), like many other acts of piety, may be reaſonable or ſuperſtitious according to the principles upon which it is performed. Long journeys in ſearch of truth are not commanded. Truth, ſuch as is neceſſary to the regulation of life, is always found where it is honeſtly ſought: change of place is no natural cauſe of the increaſe of piety, for it inevitably produces diſſipation of mind. Yet ſince men go every day to view the fields where great actions have been performed, and return with ſtronger impreſſions of the event, curioſity of the ſame kind may naturally diſpoſe us to view that country whence our religion had its beginning: and I believe no man ſurveys thoſe awful ſcenes without ſome confirmation of holy reſolutions. That the Supreme Being may be more eaſily propitiated in one place than in another, is the dream of idle ſuperſtition; but that ſome places may operate upon our own minds in an uncommon manner, is an opinion which hourly experience will juſtify. He who ſuppoſes that his vices may be more ſucceſsfully combated in Paleſtine, will, perhaps, find himſelf miſtaken; yet he may go thither without folly: he who thinks they will be more freely pardoned, diſhonours at once his reaſon and religion."

Pilgrimage, Pilkington.

PILKINGTON (Lætitia), a famous poetical genius, the daughter of Dr Van Lewin, a phyſician of Dublin, where ſhe was born in 1712. She was married very young to the Rev. Matthew Pilkington, a poet alſo of no inconſiderable merit; and theſe two wits, as is often the caſe, lived very unhappily together. They were at length totally ſeparated, on the huſband accidentally diſcovering a gentleman in her bedchamber at two o'clock in the morning; a circumſtance which ſhe accounted for in a very unſatisfactory manner. The ſtory is told at large in her Memoirs; where ſhe ſays, "Lovers of learning, I am ſure, will pardon me, as I ſolemnly declare it was the attractive charms of a new book, which the gentleman would not lend me, but conſented to ſtay till I read it through, that was the ſole motive of my detaining him." As there are not wanting ſome who form objections to marrying learned wives, the chance of ſuch literary aſſignations may perhaps be added to the liſt of them. After this unlucky adventure, Mrs Pilkington came to London; and having recourſe to her pen for ſubſiſtence, through the means of Colley Cibber, ſhe lived ſome time on the contributions of the great. She was however thrown into the Marſhelſea for debt; and being ſet at liberty, opened a pamphlet ſhop. She raiſed at length a handſome ſubſcription for her Memoirs; which are written with great ſprightlineſs and wit, containing ſeveral entertaining anecdotes of dean Swift, with whom ſhe was intimate, as well as many pretty

little

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cences were granted from the crown of England to captains of Engliſh ſhips, for carrying numbers of devout perſons to the ſhrine of St James of Compoſtella in Spain; provided, however, that thoſe pilgrims ſhould firſt take an oath not to take any thing prejudicial to England, nor to reveal any of its ſecrets, nor to carry out with them any more gold or ſilver than what would be ſufficient for their reaſonable expences. In this year there went out thither from England, on the ſaid pilgrimage, the following number of perſons. From London 280, Briſtol 200, Weymouth 122, Dartmouth 90, Yarmouth 60, Jerſey 60, Plymouth 40, Exeter 30, Poole 24, Ipſwich 20, in all 926 perſons.

little pieces of her poetry. This ingenious but unhappy woman is ſaid at laſt to have killed herſelf with drinking at Dublin, in 1750.

PILL, in pharmacy, a form of medicine reſembling a little ball, to be ſwallowed whole; invented for ſuch as cannot take bitter and ill-taſted medicinal draughts; as alſo to keep in readineſs for occaſional uſe without decaying. See PHARMACY-*Index*.

PILLAR, in architecture. See ARCHITECTURE.

PILLAR, in the manege, is the centre of the ring, or manege-ground, round which a horſe turns, whether there be a pillar in it or not. Beſides this, there are pillars on the circumference or ſides of the manege-ground, placed at certain diſtances, by two and two, from whence they are called the *two pillars*, to diſtinguiſh them from that of the centre. The uſe of the pillar in the centre is for regulating the extent of ground, that the manege upon the volts may be performed with method and juſtneſs, and that they may work in a ſquare, by rule and meaſure, upon the four lines of the volts; and alſo to break unruly high-mettled horſes, without endangering the rider. The two pillars are placed at the diſtance of two or three paces one from the other; and the horſe is put between thoſe, to teach him to riſe before and yerk out behind, and put himſelf upon raiſed airs, &c. either by the aids or chaſtiſements.

Pompey's PILLAR. See ALEXANDRIA, p. 393.

PILLARS, in antiquarian topography, are large ſingle ſtones ſet up perpendicularly. Thoſe of them which are found in Britain have been the work of the Druids; but as they are the moſt ſimple of all monuments, they are unqueſtionably more ancient than druidiſm itſelf. They were placed as memorials recording different events; ſuch as remarkable inſtances of God's mercies, contracts, ſingular victories, boundaries, and ſometimes ſepulchres. Various inſtances of theſe monuments erected by the patriarchs occur in the Old Teſtament: ſuch was that raiſed by Jacob at Luz, afterwards by him named *Bethel*; ſuch alſo was the pillar placed by him over the grave of Rachel. They were likewiſe marks of execrations and magical taliſmans.

Theſe ſtones, from having long been conſidered as objects of veneration, at length were by the ignorant and ſuperſtitious idolatrouſly worſhipped; wherefore, after the introduction of Chriſtianity, ſome had croſſes cut on them, which was conſidered as ſnatching them from the ſervice of the devil. Vulgar ſuperſtition of a later date has led the common people to conſider them as perſons transformed into ſtone for the puniſhment of ſome crime, generally that of ſabbath-breaking; but this tale is not confined to ſingle ſtones, but is told alſo of whole circles: witneſs the monuments called the *hurlers* in Cornwall, and *Rollorick ſtones* in Warwickſhire. The firſt are by the vulgar ſuppoſed to have been once men, and thus transformed as a puniſhment for playing on the Lord's day at a game called *hurling*; the latter, a pagan king and his army.

At Wilton, where the earl of Pembroke has a very magnificent houſe, there is a pillar of one piece of white Egyptian granite, which was brought from the temple of Venus Genetrix at Rome, near 14 feet high and 22 inches diameter, with an inſcription to Aſtarte or Venus.

PILLORY (*colliſtrigium*, "collum ſtringens;" *pilloria*, from the French *pilleur*, i. e. *depeculator*, or *pilori*; derived from the Greek πυλη, *janua*, a "door," becauſe one ſtanding on the pillory puts his head as it were through a door, and οραω, *video*), is an engine made of wood to puniſh offenders, by expoſing them to public view, and rendering them infamous. There is a *ſtatute of the pillory*, 51 Hen. III. And by ſtatute it is appointed for bakers, foreſtallers, and thoſe who uſe falſe weights, perjury, forgery, &c. 3 *Inſt.* 219. Lords of leets are to have a pillory and tumbrel, or it will be the cauſe of forfeiture of the leet; and a village may be bound by preſcription to provide a pillory, &c. 2 *Hawk.* P. C. 73.

PILOT, the officer who ſuperintends the navigation, either upon the ſea-coaſt or on the main ocean. It is, however, more particularly applied by our mariners to the perſon charged with the direction of a ſhip's courſe on or near the ſea-coaſt, and into the roads, bays, rivers, havens, &c. within his reſpective diſtrict.

Pilots of ſhips, taking upon them to conduct any ſhip from Dover, &c. to any place up the River Thames, are to be firſt examined and approved by the maſter and wardens of the ſociety of Trinity Houſe, &c. or ſhall forfeit 10 l. for the firſt offence; 20 l. for the ſecond, and 40 l. for every other offence; one moiety to the informer, the other to the maſter and wardens; but any maſter or mate of a ſhip may pilot his own veſſel up the river: and if any ſhip be loſt through the negligence of any pilot, he ſhall be for ever after diſabled to act as a pilot. 3 Geo. I. c. 13. Alſo the lord-warden of the cinque ports may make rules for the government of pilots, and order a ſufficient number to ply at ſea to conduct ſhips up to the Thames: 7 Geo. I. c. 21. No perſon ſhall act as a pilot on the Thames, &c. (except in collier ſhips) without a licence from the maſter and wardens of Trinity Houſe at Deptford, on pain of forfeiting 20 l. And pilots are to be ſubject to the government of that corporation; and pay ancient dues, not exceeding 1 s. in the pound, out of wages, for the uſe of the poor thereof. Stat. 5 Geo. II. c. 20.

By the former laws of France, no perſon could be received as pilot till he had made ſeveral voyages and paſſed a ſtrict examination; and after that, on his return in long voyages, he was obliged to lodge a copy of his journal in the admirality; and if a pilot occaſioned the loſs of a ſhip, he had to pay 100 livres fine, and to be for ever deprived of the exerciſe of pilotage; and if he did it deſignedly, be puniſhed with death. *Lex Mercat.* 70. 71.

The laws of Oleron ordain, That if any pilot deſignedly miſguide a ſhip, that it may be caſt away, he ſhall be put to a rigorous death, and hung in chains: and if the lord of a place, where a ſhip be thus loſt, abet ſuch villains in order to have a ſhare of the wreck, he ſhall be apprehended, and all his goods forfeited for the ſatisfaction of the perſons ſuffering; and his perſon ſhall be faſtened to a ſtake in the midſt of his own manſion, which, being fired on the four corners, ſhall be burned to the ground, and he with it. *Leg. Ol.* c. 25. And if the fault of a pilot be ſo notorious, that the ſhip's crew ſee an apparent wreck, they may lead him to the hatches, and ſtrike off his head; but the common law denies this haſty execution: an ignorant pilot is ſentenced to paſs thrice under the ſhip's keel by the laws of Denmark. *Lex Mercat*. 70.

The regulations with regard to pilots in the Britiſh navy are as follow: "The commanders of the king's ſhips, in order to give all reaſonable encouragement to ſo uſeful a body of men as pilots, and to remove all their objections to his majeſty's ſervice, are ſtrictly charged to treat them with good uſage, and an equal reſpect with warrant-officers.

"The purſer of the ſhip is always to have a ſet of bedding provided on board for the pilots; and the captain is to order the boatſwain to ſupply them with hammocks, and a convenient place to lie in, near their duty, and apart from the common men; which bedding and hammocks are to be returned when the pilots leave the ſhip.

"A pilot, when conducting one of his majeſty's ſhips in pilot water, ſhall have the ſole charge and command of the ſhip, and may give orders for ſteering, ſetting, trimming, or furling the ſails; tacking the ſhip; or whatever concerns the navigation: and the captain is to take care that all the officers and crew obey his orders. But the captain is diligently to obſerve the conduct of the pilot; and if he judges him to behave ſo ill as to bring the ſhip into danger, he may remove him from the command and charge of the ſhip, and take ſuch methods for her preſervation as ſhall be judged neceſſary; remarking upon the log-book, the exact hour and time when the pilot was removed from his office, and the reaſons aſſigned for it.

"Captains of the king's ſhips, employing pilots in foreign parts of his majeſty's dominions, ſhall, after performance of the ſervice, give a certificate thereof to the pilot, which being produced to the proper naval officer, he ſhall cauſe the ſame to be immediately paid; but if there be no naval-officer there, the captain of his majeſty's ſhip ſhall pay him, and ſend the proper vouchers, with his bill, to the navy-board, in order to be paid as bills of exchange.

"Captains of his majeſty's ſhips, employing foreign pilots to carry the ſhips they command into or out of foreign ports, ſhall pay them the rates due by the eſtabliſhment or cuſtom of the country, before they diſcharge them; whoſe receipts being duly vouched, and ſent, with a certificate of the ſervice performed, to the navy-board, they ſhall cauſe them to be paid with the ſame exactneſs as they do bills of exchange." *Regulations and Inſtructions of the Sea-ſervice*, &c.

Plate CCXCII. *Pilot-Fiſh*, or *Gaſteroſteus Ductor*, in ichthyology, is a ſpecies of the gaſteroſteus, and is found in the Mediterranean and in the Atlantic ocean, chiefly towards the equator. Cateſby, who gives a figure of it in its natural ſize, together with a ſhort deſcription, calls it *perca marina ſectaria*, or rudder-fiſh. One of them, which Gronovius deſcribes, was about four inches in length, and its greateſt breadth little more than an inch: the head is about the third of the body, and covered, excepting the ſpace between the ſnout and the eye, with ſcales ſcarcely perceptible, and covering one another like tiles; the iris of the eye is a ſilver grey; the jaws are of equal ſize, and furniſhed as well as the palate with ſmall teeth diſpoſed in groups; there is alſo a longitudinal row of teeth on the tongue. The trunk of the pilot-fiſh is oblong, a little rounded, but it appears quadrangular towards the tail, becauſe at this place the lines are thicker, and form a kind of membranaceous projection. The back fin is long, and furniſhed with ſeven radii; on the fore-part of this fin are three moveable prickles very ſhort; the fins on the breaſt have each of them 20 radii, forked at their extremity; the abdominal fins have ſix; that of the anus has 17 branches, of which the firſt is longeſt; this fin is preceded by a ſmall moveable prickle; that of the tail is thick, large, and forked. The pilot-fiſh is of a browniſh colour, changing into gold; a tranſverſal black belt croſſes the head; a ſecond paſſes over the body at the place of the breaſt; a third near the moveable prickles of the back; three others near the region of the anus; and a ſeventh at the tail.

Seafaring people obſerve, that this fiſh frequently accompanies their veſſels; and as they ſee it generally towards the fore part of the ſhip, they imagined that it was guiding and tracing out the courſe of the veſſel, and hence it received the name of the *pilot-fiſh*.

Oſbec tells us, that they are ſhaped like thoſe mackerels which have a tranſverſal line acroſs the body. "Sailors (continues he) give them the name of *pilots*, becauſe they cloſely follow the dog-fiſh, ſwimming in great ſhoals round it on all ſides. It is thought that they point out ſome prey to the dog-fiſh; and indeed that fiſh is very unwieldy. They are not only not touched, but alſo preſerved by it againſt all their enemies. Pſalm cvi. ver. 2. 'Who can utter the mighty acts of the Lord? Who can ſhow forth all his praiſe?' This ſcarce and remarkable fiſh I had an opportunity of deſcribing: it is *Scomber cæruleo-albus cingulis tranſverſis nigris ſex, dorſo monopterygio*. See the *Memoirs of the Swediſh Academy of Sciences for the year* 1755, vol. xvi. p. 71. of the Swediſh edition."

It likewiſe follows the ſhark, apparently for the purpoſe of devouring the remains of its prey. It is pretended that it acts as its pilot. The manner in which it attends the ſhark, according to M. Daubenton, may have given riſe to this name. It is ſaid to ſwim at the height of a foot and a half from the ſnout of this voracious animal, to follow and imitate all its movements, and to ſeize with addreſs every part of its prey which the ſhark allows to eſcape, and which is light enough to buoy up towards the ſurface of the water. When the ſhark, which has its mouth below, turns to ſeize any fiſh, the pilot-fiſh ſtarts away; but as ſoon as the ſhark recovers his ordinary ſituation, it returns to its former place. Barbut informs us, that theſe fiſhes propagate their ſpecies like the ſhark. He adds, that in the gulph of Guinea thoſe fiſhes follow ſhips for the ſake of the offals and human excrements; and hence the Dutch give them the name of *dung-fiſh*. It is remarkable, that though ſo ſmall they can keep pace with ſhips in their ſwifteſt courſe.

PILTEN, a diviſion of Courland, which lies in Courland properly ſo called, derives its name from the ancient caſtle or palace of Pilten, built by Valdemar II. king of Denmark about the year 1220, when he founded a biſhop's ſee in this country for the more effectual converſion of its Pagan inhabitants. This diſtrict afterwards ſucceſſively belonged to the Germans, then again to the king of Denmark, the duke of Courland, and to Poland; and by virtue of the inſtrument of regency drawn up for this diſtrict in the year 1717, the government is lodged in ſeven Poliſh ſenators or counſellors, from whom an appeal lies to the king. The biſhop of Samogitia alſo ſtyles himſelf biſhop of Pilten.

The moſt remarkable part of this diſtrict is the promontory of Domeſneſs, which projects northward into the gulf of Livonia. From this cape a ſand-bank runs four German miles farther into the ſea, half of which lies under water, and cannot be diſcerned. To the eaſt of this promontory is an unfathomable abyſs, which is never obſerved to be agitated. For the ſafety of veſſels bound to Livonia, two ſquare beacons have been erected on the coaſt, near Domeſneſs church, oppoſite to the ſand bank, and facing each other. One of theſe is twelve fathoms high, and the other eight; and a large fire is kept burning on them from the firſt of Auguſt to the firſt of January. When the mariners ſee theſe fires appear as one in a direct line, they may conclude that they are clear of the extremity of the ſand bank, and conſequently out of danger; but if they ſee both beacons, they are in danger of running upon it. The diſtrict of Pilten contains ſeven pariſhes, but no towns worthy of notice. The inhabitants are chiefly of the Lutheran perſuaſion.

PILUM, a miſſive weapon uſed by the Roman ſoldiers, and in a charge darted upon the enemy. Its point, we are told by Polybius, was ſo long and ſmall, that after the firſt diſcharge it was generally ſo bent as to be rendered uſeleſs. The legionary ſoldiers made uſe of the pilum, and each man carried two. The pilum underwent many alterations and improvements, inſomuch that it is impoſſible with any preciſion to deſcribe it. Julius Scaliger laboured much to give an accurate account of it, and would have eſteemed ſucceſs on this head amongſt the greateſt bleſſings of his life. This weapon appears, however, to have been ſometimes round, but moſt commonly ſquare, to have been two cubits long in the ſtaff, and to have had an iron point of the ſame length hooked and jagged at the end. Marius made a material improvement in it; for during the Cimbrian war, he ſo contrived it, that when it ſtuck in the enemies ſhield it ſhould bend down in an angle in the part where the wood was connected with the iron, and thus become uſeleſs to the perſon who received it.

PIMENTO, or, as Mr Edward writes, PIEMENTO, in botany, or JAMAICA PEPPER, or *Allſpice*, a ſpecies of the myrtus. See MYRTUS.

“The pimento trees grow ſpontaneouſly, and in great abundance, in many parts of Jamaica, but more particularly on hilly ſituations near the ſea, on the northern ſide of that iſland; where they form the moſt delicious groves that can poſſibly be imagined; filling the air with fragrance, and giving reality, tho' in a very diſtant part of the globe, to a great poet's deſcription of thoſe balmy gales which convey to the delighted voyager

‘Sabean odours from the ſpicy ſhore
‘Of Araby the bleſt.
‘Chear'd with the grateful ſmell, old ocean ſmiles.’

“This tree is purely a child of nature, and ſeems to mock all the labours of man in his endeavours to extend or improve its growth: not one attempt in fifty to propagate the young plants, or to raiſe them from the ſeeds, in parts of the country where it is not found growing ſpontaneouſly, having ſucceeded. The uſual method of forming a new pimento plantation (in Jamaica it is called a *walk*) is nothing more than to appropriate a piece of woodland, in the neighbourhood of a plantation already exiſting, or in a country where the ſcattered trees are found in a native ſtate, the woods of which being fallen, the trees are ſuffered to remain on the ground till they become rotten and periſh. In the courſe of twelve months after the firſt ſeaſon, abundance of young pimento plants will be found growing vigorouſly in all parts of the land, being without doubt produced from ripe berries ſcattered there by the birds, while the fallen trees, &c. afford them both ſhelter and ſhade. At the end of two years it will be proper to give the land a thorough cleanſing, leaving ſuch only of the pimento trees as have a good appearance, which will then ſoon form ſuch groves as thoſe I have deſcribed, and, except perhaps for the firſt four or five years, require very little attention afterwards.

“Soon after the trees are in bloſſom, the berries become fit for gathering; the fruit not being ſuffered to ripen on the tree, as the pulp in that ſtate, being moiſt and glutinous, is difficult to cure, and when dry becomes black and taſteleſs. It is impoſſible, however, to prevent ſome of the ripe berries from mixing with the reſt; but if the proportion of them be great, the price of the commodity is conſiderably injured.

“It is gathered by the hand; one labourer on the tree, employed in gathering the ſmall branches, will give employment to three below (who are generally women and children) in picking the berries; and an induſtrious picker will fill a bag of 70lbs. in the day.

“The returns from a pimento walk in a favourable ſeaſon are prodigious. A ſingle tree has been known to yield 150lbs. of the raw fruit, or one cwt. of the dried ſpice; there being commonly a loſs in weight of one third in curing; but this, like many other of the minor productions, is exceedingly uncertain, and perhaps a very plenteous crop occurs but once in five years.”

PIMPINELLA, BURNET SAXIFRAGE; a genus of the digynia order, belonging to the pentandria claſs of plants. There are ſeven ſpecies; the moſt remarkable of which are, 1. The major, or greater burnet ſaxifrage, growing naturally in chalky woods, and on the ſides of the banks near hedges, in ſeveral parts of England. The lower leaves of this ſort are winged; the lobes are deeply ſawed on their edges, and ſit cloſe to the midrib, of a dark green. The ſtalks are more than a foot high, dividing into four or five branches. The lower part of the ſtalk is garniſhed with winged leaves, ſhaped like thoſe at the bottom, but ſmaller: thoſe upon the branches are ſhort and trifid; the branches are terminated by ſmall umbels of white flowers, which are compoſed of ſmaller umbels or rays. The flowers have five heart-ſhaped petals, which turn inward, and are ſucceeded by two narrow, oblong, channelled ſeeds. 2. The aniſum, or common aniſe, is an annual plant, which grows naturally in Egypt; but is cultivated in Malta and Spain, from whence the ſeeds are anually imported into Britain. The lower leaves of this plant are divided into three lobes, which are deeply cut on their edges; the ſtalk riſes a foot and a half high, dividing into ſeveral ſlender branches, garniſhed with narrow leaves, cut into three or four narrow ſegments, terminated by pretty large looſe umbels, compoſed of ſmaller umbels or rays, which ſtand on pretty long footſtalks. The flowers are ſmall, and of a yellowiſh white; the ſeeds are oblong and ſwelling.—The former ſpecies requires no culture; the latter is too tender to be cultivated for profit in this country. However, the ſeeds will come up if ſown in the beginning of April upon a warm border. When they come up, they ſhould be thinned, and kept clear of weeds, which is all the culture they require.

Uſes. Both theſe ſpecies are uſed in medicine. The roots of pimpinella have a grateful, warm, very pungent taſte, which is entirely extracted by rectified ſpirit: in diſtillation the menſtruum ariſes, leaving all that it had taken up from the root united into a pungent aromatic reſin. This root promiſes, from its ſenſible qualities, to be a medicine of conſiderable utility, though little regarded in common practice: the only officinal compoſition in which it is an ingredient is the *pulvis ari compoſitus*. Stahl, Hoffman, and other German phyſicians, are extremely fond of it; and recommend it as an excellent ſtomachic, reſolvent, detergent, diuretic, diaphoretic, and alexipharmac. They frequently gave it, and not without ſucceſs, in ſcorbutic and cutaneous diſorders, foulneſs of the blood and juices, tumors and obſtructions of the glands, and diſeaſes proceeding from a deficiency of the fluid ſecretions in general. Boerhaave directs the uſe of this medicine in aſthmatic and hydropic caſes, where the ſtrongeſt reſolvents are indicated: the form he prefers is a watery infuſion; but the ſpirituous tincture poſſeſſes the virtues of the root in much greater perfection.

Aniſeeds have an aromatic ſmell, and a pleaſant warm taſte, accompanied with a degree of ſweetneſs. Water extracts very little of their flavour; rectified ſpirit the whole.

Theſe ſeeds are in the number of the four greater hot ſeeds: their principal uſe is in cold flatulent diſorders, where tenacious phlegm abounds, and in the gripes to which young children are ſubject. Frederic Hoffman ſtrongly recommends them in weakneſs of the ſtomach, diarrhœas, and for ſtrengthening the tone of the viſcera in general; and thinks they well deſerve the appellation given them by Helmont, *inteſtinorum ſolamen*. The ſmaller kind of aniſeeds brought from Spain are preferred.

PIMPLE, in medicine, a ſmall puſtule ariſing on the face. By mixing equal quantities of the juice of houſe-leek, *ſedum minus*, paſſed through paper, and of ſpirit of wine rectified by itſelf, a white coagulum of a very volatile nature is formed, which Dr Bughart commends for curing pimples of the face; and ſays, that the thin liquor ſeparated from it with ſugarcandy is an excellent remedy for thick viſcid phlegm in the breaſt.

PIN, in commerce, a little neceſſary inſtrument made of braſs wire, chiefly uſed by women in adjuſting their dreſs.

In the year 1543, by ſtatute 34 and 35 of Henry VIII. cap. vi. it was enacted, "That no perſon ſhall put to ſale any pinnes but only ſuch as ſhall be double headed, and have the heads ſoldered faſt to the ſhank of the pins, well-ſmoothed, the ſhank well-ſhapen, the points well and round filed, canted, and ſharpened." From the above extract it would appear that the art of pin-making was but of late invention, probably introduced from France; and that pin manufactories ſince that period have wonderfully improved.

Though pins are apparently ſimple, their manufacture is, however, not a little curious and complex. We ſhall therefore give our readers an account of it from Ellis's *Campagna* of London.

"When the braſs-wire, of which the pins are formed, is firſt received at the manufactory, it is generally too thick for the purpoſe of being cut into pins. The firſt operation therefore is that of winding it off from one wheel to another with great velocity, and cauſing it to paſs between the two, through a circle in a piece of iron of ſmaller diameter: the wire being thus reduced to its proper dimenſions, is ſtraitened by drawing it between iron pins, fixed in a board in a zig-zig manner, but ſo as to leave a ſtraight line between them: afterwards it is cut into lengths of three or four yards, and then into ſmaller ones, every length being ſufficient to make ſix pins; each end of theſe is ground to a point, which was performed when I viewed the manufactory by boys who ſat each with two ſmall grinding ſtones before him, turned by a wheel. Taking up a handful, he applies the ends to the coarſeſt of the two ſtones, being careful at the ſame time to keep each piece moving round between his fingers, ſo that the points may not become flat: he then gives them a ſmoother and ſharper point, by applying them to the other ſtone, and by that means a lad of 12 or 14 years of age is enabled to point about 16,000 pins in an hour. When the wire is thus pointed, a pin is taken off from each end, and this is repeated till it is cut into ſix pieces. The next operation is that of forming the heads, or, as they term it, *head-ſpinning*; which is done by means of a ſpinning-wheel, one piece of wire being thus with aſtoniſhing rapidity wound round another, and the interior one being drawn out, leaves a hollow tube between the circumvolutions: it is then cut with ſheers; every two circumvolutions or turns of the wire forming one head; theſe are ſoftened by throwing them into iron pans, and placing them in a furnace till they are red-hot. As ſoon as they are cold, they are diſtributed to children, who ſit with anvils and hammers before them, which they work with their feet, by means of a lathe, and taking up one of the lengths, they thruſt the blunt end into a quantity of the heads which lie before them, and catching one at the extremity, they apply them immediately to the anvil and hammer, and by a motion or two of the foot, the point and the head are fixed together in much leſs time than it can be deſcribed, and with a dexterity only to be acquired by practice; the ſpectator being in continual apprehenſion for the ſafety of their fingers ends. The pin is now finiſhed as to its form, but ſtill it is merely braſs; it is therefore thrown into a copper, containing a ſolution of tin and the leys of wine. Here it remains for ſome time; and when taken out aſſumes a white though dull appearance; in order therefore to give it a poliſh, it is put into a tub containing a quantity of bran, which is ſet in motion by turning a ſhaft that runs through its centre, and thus by means of friction it becomes perfectly bright. The pin being complete, nothing remains but to ſeparate it from the bran, which is performed by a mode exactly ſimilar to the winnowing of corn; the bran flying off and leaving the pin behind fit for immediate ſale. I was the more pleaſed with this manufactory, as it appeared to afford employment to a number of children of both ſexes, who are thus not only prevented from acquiring the habits of idleneſs and vice, but are on the contrary initiated in their early years in thoſe of a beneficial and virtuous induſtry." See NEEDLES.

PINACIA, among the Athenians, were tablets of braſs inſcribed with the names of all thoſe citizens in each tribe who were duly qualified and willing to be judges of the court of Areopagus. Theſe tablets were caſt into a veſſel provided for the purpoſe, and the ſame number of beans, an hundred being white and all the reſt black, were thrown into another. Then the names of the candidates and the beans were drawn out one by one, and they whoſe names were drawn out together with the white beans were elected judges or ſenators. In Solon's time there were only four tribes, each of which choſe 100 ſenators; but the number of tribes afterwards increaſing, the number of ſenators or judges increaſed to ſo many hundreds more.

PINANG, the Chineſe name of the *Areca Catechu*, Lin. See ARECA.

PINCHBECK. See ZINC.

PINDAR, the prince of lyric poets, was born at Thebes, about 520 years B. C. He received his firſt muſical inſtructions from his father, who was a flute-player by profeſſion; after which, according to Suidas, he was placed under Myrtis, a lady of diſtinguiſhed abilities in lyric poetry. It was during this period that he became acquainted with the poeteſs Corinas, who was likewiſe ſtudent under Myrtis. Plutarch tells us, that Pindar profited from the leſſons which Corinna, more advanced in her ſtudies, gave him at this ſchool. It is very natural to ſuppoſe, that the firſt poetical effuſions of a genius ſo full of fire and imagination as that of Pindar would be wild and luxuriant; and Lucian has preſerved ſix verſes, ſaid to have been the exordium of his firſt eſſay; in which he crowded almoſt all the ſubjects for ſong which ancient hiſtory and mythology then furniſhed. Upon communicating this attempt to Corinna, ſhe told him ſmiling, that he ſhould ſow with the hand, and not empty his whole ſack at once. Pindar, however, ſoon quitted the leading ſtrings of theſe ladies, his poetical nurſes, and became the diſciple of Simonides, now arrived at extreme old age: after which he ſoon ſurpaſſed all his maſters, and acquired great reputation over all Greece, but, like a true prophet, he was leſs honoured in his own country than elſewhere; for at Thebes he was frequently pronounced to be vanquiſhed, in the muſical and poetical conteſts, by candidates of inferior merit.

The cuſtom of having theſe public trials of ſkill in all the great cities of Greece was now ſo prevalent, that but little fame was to be acquired by a muſician or poet any other way than by entering the liſts; and we find, that both Myrtis and Corinna publicly diſputed the prize with him at Thebes. He obtained a victory over Myrtis, but was vanquiſhed five different times by Corinna. The judges, upon occaſions like theſe, have been frequently accuſed of partiality or ignorance, not only by the vanquiſhed, but by poſterity: and if the merit of Pindar was pronounced inferior to that of Corinna five ſeveral times, it was ſays Pauſanias, becauſe the judges were more ſenſible to the charms of beauty than to thoſe of muſic and poetry (A). Was it not ſtrange, ſaid the Scythian Anacharſis, that the Grecian artiſts were never judged by artiſts, their peers?

Pindar, before he quitted Thebes, had the vexation to ſee his Dithyrambics traduced, abuſed, and turned into ridicule, by the comic poets of his time; and Athenæus tells us, that he was ſeverely cenſured by his brother lyrics, for being a lipogrammatiſt, and compoſing an ode from which he had excommunicated the letter S. Whether theſe cenſures proceeded from envy or contempt cannot now be determined: but they were certainly uſeful to Pindar, and it was neceſſary that he ſhould be laſhed for ſuch puerilities. Thebes ſeems to have been the purgatory of our young bard: when he quitted that city, as his judgement was matured, he avoided moſt of the errors for which he had been chaſtiſed, and ſuddenly became the wonder and delight of all Greece. Every hero, prince, and potentate, deſirous of laſting fame, courted the muſe of Pindar.

He ſeems frequently to have been preſent at the four great feſtivals, of the Olympian, Pythian, Nemean, and Iſthmian games, as may be inferred from ſeveral circumſtances and expreſſions in the odes which he compoſed for the victors in them all. Thoſe at Olympia, who were ambitious of having their atchievements celebrated by Pindar, applied to him for an ode, which was firſt ſung in the Prytaneum or town-hall of Olympia, where there was a banqueting room, ſet apart for the entertainment of the conquerors. Here the ode was rehearſed by a chorus, accompanied by inſtruments. It was afterwards performed in the ſame manner at the triumphal entry of the victor into his own country, in proceſſions, or at the ſacrifices that were made with great pomp and ſolemnity on the occaſion.

Pindar, in his ſecond Iſthmian ode, has apologized for the mercenary cuſtom among poets, of receiving money for their compoſitions. "The world (ſays he) is grown intereſted, and thinks in general with the Spartan philoſopher Ariſtodemus, that *money only makes the man*: a truth which this ſage himſelf experienced, having with his riches loſt all his friends." It is ſuppoſed that Pindar here alludes to the avarice of Simonides who firſt allowed his muſe to ſell her favours to the higheſt bidder.

(A) Pauſanias ſays, that Corinna was one of the moſt beautiful women of her time, as he judged by a picture of her which he ſaw at Tanagris at the place where the public exerciſes were performed. She was repreſented with her head ornamented by a riband as a memorial of the victories ſhe had obtained over Pindar at Thebes.

There is no great poet in antiquity whoſe moral character has been leſs cenſured than that of Pindar. Plutarch has preſerved a ſingle verſe of his *Epicedium* or *Dirge* that was ſung at his funeral; which ſhort and ſimple as it is, implies great praiſe: *This man was pleaſing to ſtrangers, and dear to his fellow-citizens.* His works abound with precepts of the pureſt morality: and it does not appear that he ever traduced even his enemies; comforting himſelf, for their malignity, by a maxim which he inſerted in his firſt *Pythic*, and which afterwards became proverbial, *That it is better to be envied than pitied.*

Pauſanias ſays, that the character of poet was truly conſecrated, in the perſon of Pindar, by the god of verſe himſelf; who was pleaſed, by an expreſs oracle, to order the inhabitants of Delphos to ſet apart for Pindar one half of the firſt-fruit offerings brought by the religious to his ſhrine, and to allow him a conſpicuous place in his temple, where in an iron chair he uſed to ſit and ſing his hymns in honour of that god. This chair was remaining in the time of Pauſanias, ſeveral centuries after, and ſhown to him as a relick not unworthy of the ſanctity and magnificence of that place.

But though Pindar's muſe was penſioned at Delphos, and well paid by princes and potentates elſe-where, ſhe ſeems, however, ſometimes to have ſung the ſpontaneous ſtrains of pure friendſhip. Of this kind were, probably, the verſes beſtowed upon the muſician Midas, of Agrigentum in Sicily, who had twice obtained the palm of victory by his performance on the flute at the Pythic games (b). It is in his 12th Pythic ode that Pindar celebrates the victory of Midas *over all Greece, upon that inſtrument which Minerva herſelf had invented* (c).

Fabricius tells us, that Pindar lived to the age of 90; and according to the chronology of Dr Blair, he died 435 years B. C, aged 86. His fellow-citizens erected a monument to him in the Hippodrome at Thebes, which was ſtill ſubſiſting in the time of Pauſanias; and his renown was ſo great after his death, that his poſterity derived very conſiderable honours and privileges from it. When Alexander the Great attacked the city of Thebes, he gave expreſs orders to his ſoldiers to ſpare the houſe and family of Pindar. The Lacedemonians had done the ſame before this period; for when they ravaged Bœotia and burned the capital, the following words were written upon the door of the poet: *Forbear to burn this houſe, it was the dwelling of Pindar.* Reſpect for the memory of this great poet continued ſo long, that, even in Plutarch's time, the beſt part of the ſacred victim at the Theoxenian feſtival was appropriated to his deſcendants.

PINDARIC ode, in poetry, an ode, formed in imitation of the manner of Pindar. See Poetry, n° 136, &c.

PINDUS (anc. geog.), not a ſingle mountain, but a chain of mountains, inhabited by different people of Epirus and Theſſaly; ſeparating Macedonia, Theſſaly and Epirus: An extenſive chain, having Macedonia to the north, the Perehœbi to the weſt, the Dolopes to the ſouth, and the mountain itſelf of Theſſaly (Strabo).

Pindus, a Doric city of Ætolia, ſituated on the cognominal river, which falls into the Cephilius (Strabo).

PINE, in botany. See Pinus.

Pine-Apple. See Bromelia.

PINEA, or pigne, in commerce; is a term uſed in Peru and Chili, for a kind of light, porous maſſes, or lumps, formed of a mixture of mercury and ſilver-duſt from the mines. The ore, or mineral, of ſilver, when dug out of the veins of the mine, is firſt broken and then ground in mills for the purpoſe, driven by water with iron peſtles, each of 200 pounds weight. The mineral, when thus pulverized, is next ſifted, and then worked, up with water into a paſte; which, when half dry, is cut into pieces, called *cuerpos*, a foot long, weighing each about two thouſand five hundred pounds.

Each piece or cuerpo is again kneaded up with ſea-ſalt, which, diſſolving, incorporates with it. They then add mercury, from 10 to 20 pounds for each cuerpo, kneading the paſte afreſh until the mercury be incorporated therewith. This office, which is exceedingly dangerous on account of the noxious qualities of the mercury, is always made the lot of the poor Indians. This amalgamation is continued for eight or nine days; and ſome add lime, lead, or tin ore, &c. to forward it; and in ſome mines, they are obliged to uſe fire. To try whether or no the mixture and amalgamation be ſufficient, they waſh a piece in water; and if the mercury be white, it is a proof that it has had its effect; if black, it muſt be ſtill farther worked. When finiſhed, it is ſent to the lavatories, which are large baſons that empty ſucceſſively into one another. The paſte, &c. being laid in the uppermoſt of theſe, the earth is then waſhed from it into the reſt by a rivulet turned upon it; an Indian, all the while, ſtirring it with his feet, and two other Indians doing the like in the other baſons. When the water runs quite clear, out of the baſons, the mercury and ſilver are found at bottom incorporated. This matter they call *pella*, and of this they form the pineas, by expreſſing as much of the mercury as they can; firſt, by putting it in woollen bags, and preſſing and beating it ſtrongly; then, by ſtamping it in a kind of wooden mould, of an octagonal form, at bottom whereof is a braſs plate pierced full of little holes. The matter, when taken out of the mould, is laid on a trivet, under which is a large veſſel full of water; and the whole being covered with an earthen head, a fire is made around it.

(b) This Midas is a very different perſonage from his long-eared majeſty of Phrygia, whoſe deciſion in favour of Pan had given ſuch offence to Apollo; as is manifeſt, indeed, from his having been cotempary with Pindar.

(c) The moſt extraordinary part of this muſicians performance that can be gathered from the ſcholiaſt upon Pindar, was his finiſhing the ſolo, without a reed or mouth-piece, which broke accidentally while he was playing. The legendary account given by the poet in this ode, of the occaſion upon which the flute was invented by Minerva, is diverting: "It was (ſays he) to imitate the howling of the Gorgons, and the hiſſing of their ſnakes, which the goddeſs had heard when the head of Meduſa (one of theſe three anti-graces), was cut off by Perſues."

The mercury ſtill remains in the maſs and is thus reduced into fumes, and, at length condenſing, it is precipitated into the water, leaving behind it a maſs of ſilver grains of different figures, which, only joining or touching at the extremes, render the matter very porous and light. This, therefore, is the pinea, or pigne, which the workmen endeavour to ſell ſecretly to veſſels trading to the South ſea; and from which thoſe, who have ventured to engage in ſo dangerous a commerce, have made ſuch vaſt gains. Indeed the traders herein muſt be very careful; for the Spaniſh miners are arrant knaves, and to make the pignes weigh the more, they often fill the middle with ſand or iron.

PINEAL gland. See ANATOMY.

PINEAU (Severin du), who died at Paris in 1619, was a native of Chartres, and firſt ſurgeon to the king of France. He was very ſkilful in lithotomy; and has left behind him, 1. A diſcourſe concerning the Extraction of the Stone in the Bladder, publiſhed in 1610 in 8vo. 2. A treatiſe *De Virginitatis Notis*, printed at Leyden 1641, in 12mo. This laſt performance, however uſeful it may be to men of ſcience, we would not venture to recommend to the peruſal of young people, on account of ſome particulars which it was perhaps unneceſſary to expoſe to the eyes of the public.

PINEAU (Gabriel du), was born at Angers in 1573, where he followed the profeſſion of a lawyer with a reputation above his years. He went afterwards to Paris, and pled with eclat before the parliament and great council. Upon his return to Angers, he became a counſellor in the preſidial court. He was conſulted by all the neighbouring provinces, and had an active hand in all the great affairs of his time. Mary de Medicis conferred upon him the office of maſter of requeſts, and in her diſgrace wiſhed to ſupport herſelf by his credit and counſels; but Du Pineau, always attentive to what he owed on the one hand to the mother of his king, and on the other to the king himſelf, never ceaſed to inſpire that princeſs with ſentiments of peace.

In 1632 Louis XIII. by way of reward, appointed him mayor and captain-general of the city of Angers; a ſituation in which he merited the flattering title of *Father of the People*. He had no reſpect of perſons; for he was equally acceſſible to the poor and the great. This worthy citizen died the 15th of October 1644, at the age of 71. His houſe was a kind of academy, where regular conferences were held, and attended by young officers, advocates, and other literary characters. In thoſe conferences every one freely ſtated the difficulties which occurred to him upon ſubjects either of law or hiſtory; and when Pineau ſpoke, all was made clear; but he was always the laſt in delivering his ſentiments, becauſe he perceived that too much deference was paid to his opinion. His writings are, 1. Latin notes, in addition to thoſe of Du Moulin, upon the canon law, and printed along with the works of that eminent lawyer by the care of Francis Pinſon. 2. Commentaries, obſervations, and conſultations, upon ſeveral important queſtions reſpecting the laws both of Anjou and of France, with ſome diſſertations upon different ſubjects. &c. reprinted in 1725 in 2 vols. fol. by the care of Livoniere, who has enriched them with very uſeful remarks. The editor ſays, that "Du Pineau is a little inferior to the celebrated Du Moulin on the civil law, but that he is more accurate than the other upon the canon law."—Menage made theſe two verſes upon his death.

Pinellus periit, Themidis pius ille ſacerdos,
In proprio judex limine perpetuus.

PINEDA (John) who was born at Seville of a noble family, entered into the ſociety of Jeſuits in 1572. He taught philoſophy and divinity in ſeveral colleges; and devoted his time to the ſtudy of the Holy Scriptures. That he might render that ſtudy the eaſier, he made himſelf maſter of the oriental languages. We have of his writings, 1. Two volumes of Commentaries upon the book of Job, in folio. 2. Two upon Eccleſiaſtes. 3. A General Hiſtory of the Church, in Spaniſh, 4 vols. in folio. 4. A Hiſtory of Ferdinand III, in the ſame language, in folio. He died in 1637, much regretted by the members of his ſociety, and by the public in general.

PINELLI (John Vincent), born at Naples, was ſon of Count Pinelli, a noble Genoeſe, who had ſettled in that city, and had acquired a handſome fortune in the way of trade. After receiving a liberal education he quitted the place of his nativity, and repaired to Padua, where he took up his reſidence at the age of 24. Being a great lover of ſcience, he gave a preference to that city on account of its famous univerſity, which brought to it a number of learned men. He had an excellent library, which conſiſted of a choice collection of books and manuſcripts, and which he continued to enrich till the hour of his death. His literary correſpondence, not only in Italy, but through the moſt of Europe, procured him all the new works which were worthy of a place in his collection. The authors themſelves were often forward to pay their reſpects to him. In many cities of Italy he had perſons employed to ſearch, at leaſt once a month, the ſtalls of thoſe artificers who make uſe of old parchments, ſuch as lute-makers, ſieve-wrights, and others; and by this means he had the good fortune often to ſave from deſtruction ſome valuable fragments. His paſſion for knowledge embraced all the ſciences; but hiſtory, medals, antiquities, natural hiſtory, and particularly botany, were his favourite ſtudies. He was conſulted from all quarters, and the extent of his acquaintance with the learned world was very great. He correſponded with Juſtice Lipſius, Joſeph Scaliger, Sigonius, Poſſevin, Peter Pithou, and a great many others, who have all paid the higheſt compliments to his erudition. Inſenſible to all the pleaſures of life, and acquainted only with thoſe of the mind, he had a great diſlike to plays, entertainments, ſhows, and every thing which moſt excites the curioſity of other men. During the ſpace of 43 years that he lived at Padua, he was never known to be out of the city but twice; once on occaſion of a plague which infeſted it; and afterwards on a voyage to Naples, which he made at the earneſt ſolicitation of his friends. In ſhort, Pinelli was generous, ſympathizing, and compaſſionate, particularly to men of letters, whoſe wants he often anticipated. His zeal for the progreſs and advancement of ſcience rendered him very communicative of his knowledge and of his books; but this was always done with judgment and diſcretion. He died in 1601, aged 68, without having publiſhed any work. Paul Gualdo, who has written Pinelli's life, does not ſpecify the number of volumes of which his rich library conſiſted: he only informs us, that when it was tranſported by ſea to Naples, it was packed up in 130 cheſts, of which 14 contained manuſcripts; but did not go wholly to his heirs. The ſenate of Venice cauſed their ſeal to be ſet upon the manuſcripts, and took away whatever concerned the affairs of the republic, to the number of 200 pieces.—"I compare (ſays preſident de Thou) Pinelli to Titus Pomponius; for, as that illuſtrious Roman was called *Attick*, Pinelli alſo bore the title of *Venetian*, on account of the great affection which the republic of Venice had for him.

PINET (Antony du), lord of Noroy, lived in the 16th century, and was a native of Beſançon. He was ſtrongly attached to the proteſtant religion, and a bitter enemy to the church of Rome. His book, intitled *La Conformité des Egliſes Reformés de France*, and *de l'Egliſe primitive*, printed at Lyons, 1564, in 8vo; and the notes which he added to the French tranſlation of the Fees of the Pope's Chancery, which was printed at Lyons, in 8vo, 1564, and reprinted at Amſterdam in 1700, in 12mo, plainly diſcover his ſentiments. He publiſhed the laſt mentioned performance under this title: *Taxe des parties caſuelles de la boutique du Pape*, in Latin and French, with ſome notes taken from decrees, councils, and canons, in order to aſcertain the diſcipline anciently obſerved in the church. In the epiſtle dedicatory, he aſſumes the tone of a declared enemy to the court of Rome. He apologizes for having preſented this book "to a ſociety ſo holy as yours (the proteſtants), in which are heard only hymns, pſalms, and praiſes to the Lord our God: but it is proper to ſhow to the villain his villainy, and the fool his folly, leſt one ſhould be thought to reſemble them." We ſee by this ſpecimen, that Pinet had no more politeneſs in his ſtyle than in his manners. His tranſlation of Pliny's Natural Hiſtory, printed at Lyons, in 2 vol. folio, 1566, and at Paris, 1608, was formerly much read. Though there are a good many errors in it, it is yet very uſeful at preſent, eſpecially for thoſe who underſtand Pliny's Latin, on account of the tranſlator's reſearches, and a great number of marginal notes. Pinet alſo publiſhed Plans of the principal fortreſſes in the world, at Lyons, 1564, in folio.

Groſier's General Deſcription of China, vol. i. p. 92.

PING-LEANG FOU, a city of China in the Province of Chen-ſi. It is one of the moſt conſiderable cities of the weſtern part of the province, and is ſituated on the river Kin-ho. The air here is mild; and the agreeable views which the ſurrounding mountains preſent, added to the ſtreams which water the country, render it a very delightful reſidence. It has under its juriſdiction three cities of the ſecond claſs and ſeven of the third. In this diſtrict is a valley ſo deep and narrow, that it is almoſt impervious to the light: a large highway, paved with ſquare ſtones, runs through it.

PINGUICULA, BUTTERWORT; a genus of the monogynia order, belonging to the diandria claſs of plants. There are four ſpecies; of which the moſt remarkable is the vulgaris, or common butterwort, growing commonly on bogs or low moiſt grounds in England and Scotland. Its leaves are covered with ſoft, upright pellucid prickles, ſecreting a glutinous liquor. The flowers are pale red, purple, or deep violet colour, and hairy within. If the freſh gathered leaves of this plant are put into the ſtrainer through which warm milk from the cow is poured, and the milk ſet by for a day or two to become aceſcent, it acquires a conſiſtency and tenacity, and neither whey nor cream ſeparate from it. In this ſtate it is an extremely grateful food, and as ſuch is uſed by the inhabitants of the north of Sweden. There is no further occaſion to have recourſe to the leaves; for half a ſpoonful of this prepared milk, mixed with freſh warm milk, will convert it to its own nature, and this again will change another quantity of freſh milk, and ſo on without end. The juice of the leaves kills lice; and the common people uſe it to cure the cracks or chops in cows udders. The plant is generally ſuppoſed injurious to ſheep, by occaſioning in them that diſeaſe called the *rot*. But from experiments made on purpoſe, and conducted with accuracy, it appears, that neither ſheep, cows, goats, horſes, or ſwine will feed upon this plant.

Wherever this plant, called alſo *Yorkſhire ſanicle*, is found, it is a certain indication of a boggy ſoil. From the idea that the country people have of its noxious operation on ſheep, this plant has been called the *white rot*; ſince as they imagine it gives them the rot whenever they eat it, which they will not do but from great neceſſity.

The Laplanders, like the Swedes with the milk of cows, receive that of the rein-deer upon the freſh leaves of this plant, which they immediately ſtrain off and ſet aſide till it becomes ſomewhat aceſcent; and the whole acquires in a day or two the conſiſtence of cream without ſeparating the ſerum, and thus becomes an agreeable food. When thus prepared a ſmall quantity of the ſame has the property of rennet in producing the like change on freſh milk.

PINGUIN, or PENGUIN, in ornithology, a genus of birds of the order of palmipedes; diſtinguiſhed by Mr Latham by the following characters. The bill is ſtrong, ſtrait, more or leſs bending towards the point, and furrowed on the ſides; the noſtrils are linear, and placed in the furrows; the tongue is covered with ſtrong ſpines, pointing backwards; the wings are ſmall, very like fins, and covered with no longer feathers than the reſt of the body, and are uſeleſs in flight; the body is clothed with thick ſhort feathers, having broad ſhafts, and placed as compactly as the ſcales of fiſhes; the legs are ſhort, thick, and placed very near the vent; the toes are four, and are all placed forwards, the interior are looſe, and the reſt are webbed; the tail is very ſtiff, conſiſting of broad ſhafts ſcarcely webbed.

It is agreed that Pinguins are inhabitants of ſouthern latitudes only; being, as far as is yet known, found only on the coaſts of South America from Port Deſire to the Straits of Magellan; and Frezier ſays they are found on the weſtern ſhore as high as Conception. In Africa they ſeem to be unknown, except on a ſmall iſle near the Cape of Good Hope, which takes its name from them. They are found in vaſt numbers on land during the breeding ſeaſon; for they ſeldom come on ſhore but at that time: they form burrows under ground like rabbits; and the iſles they frequent are perfectly undermined by them.

Their attitude on land is quite erect, and on that account they have been compared by ſome to pygmies, by others to children with white bibs. They are very tame, and may be driven like a flock of ſheep. In water they are remarkably active, and ſwim with vaſt ſtrength, aſſiſted by their wings, which ſerve inſtead of fins. Their food in general is fiſh; not but that they will eat graſs like geeſe.

Mr Latham remarks, that this genus appears to hold the ſame place in the ſouthern diviſion of the earth that the awks do in the northern; and that, however authors may differ in opinion on this head, they ought not to be confounded with one another. The pinguin is never ſeen but in the temperate and frigid zones ſouth of the equator, while the awk only appears on the parallel latitudes north of the equator; for neither of theſe genera have yet been obſerved within the tropics. Forſter, in his voyage (vol. i. page 92.), ſays, he ſaw one for the firſt time in lat. 48. ſouth, nor are they ever met with nearer than 40 degrees ſouth. *Id. Introd. Diſc. on Pinguins, Comment. Got.* vol. 3d.

The wings of the pinguin are ſcarcely any thing elſe than mere fins, while the awk has real wings and gills, though they be but ſmall. The former has four toes on each foot, the latter only three. While ſwimming, the pinguin ſinks wholly above the breaſt, the head and neck only appearing out of the water; while the awk, like moſt other birds, ſwims on the ſurface. There are ſeveral other peculiarities which ſerve to diſtinguiſh the two genera, but what we have mentioned are doubtleſs ſufficient.

Latham's Synopſis. "The bodies of the pinguin tribe (ſays our author) are commonly ſo well and cloſely covered with feathers that no wet can penetrate; and as they are in general exceſſively fat, theſe circumſtances united ſecure them from cold. They have often been found above 700 leagues from land; and frequently on the mountains of ice, on which they ſeem to aſcend without difficulty, as the ſoles of their feeet are very rough and ſuited to the purpoſe." Mr Latham enumerates nine different ſpecies of this genus, beſides two varieties of the black-footed pinguin or diomedea.

1. The firſt, which is a very beautiful ſpecies, our author calls the *creſted* pinguin. The birds of this ſpecies are 23 inches long; the bill is three inches long, and of a red colour, with a dark furrow running along on each ſide to the tip; the upper mandible is curved at the end, the under is obtuſe; the irides are of a dull red; the head, neck, back, and ſides are black. Over each eye there is a ſtripe of pale yellow feathers, which lengthens into a creſt behind, nearly four inches long; the feathers on each ſide of the head, above this ſtripe, are longer than the reſt, and ſtand upward, while thoſe of the creſt are decumbent but can be erected on each ſide at pleaſure; the wings, or rather fins, are black on the outſide, edged with white; on the inſide they are white; the breaſt and all the under parts are alſo white; the legs are orange, and the claws are duſky. The female has a ſtreak of pale yellow over the eye, but it is not prolonged into a creſt behind as in the male.

This ſpecies inhabits Falkland's Iſlands, and was likewiſe met with in Kerguelen's Land, or Iſle of Deſolation, as well as at Van Diemen's Land, and New Holland, particularly in Adventure Bay. They are called *hopping pinguins* and *jumping jacks*, from their action of leaping quite out of the water, on meeting with the leaſt obſtacle, for three or four feet at leaſt; and indeed, without any ſeeming cauſe they often do the ſame, appearing chiefly to advance by that means. This ſpecies ſeems to have a greater air of livelineſs in its countenance than others, yet is in fact a very ſtupid bird, ſo much ſo as to ſuffer itſelf to be knocked on the head with a ſtick when on land. Forſter ſays he found them difficult to kill, and when provoked, he adds, they ran at the ſailors in flocks, and pecked their legs, and ſpoiled their clothes. When angered too they erect their creſts in a beautiful manner. Theſe birds make their neſts among thoſe of the pelican tribe, living in tolerable harmony with them; and lay ſeldom more than one egg, which is white, and larger than that of a duck. They are moſtly ſeen by themſelves, ſeldom mixing with other pinguins, and often met with in great numbers on the outer ſhores, where they have been bred. They are frequently ſo regardleſs as to ſuffer themſelves to be taken by the hand. The females of this ſpecies lay their eggs in burrows, which they eaſily form of themſelves with their bills, throwing out the dirt with their feet. In theſe holes the eggs are depoſited on the bare earth. The general time of ſitting is in October; but ſome of the ſpecies, eſpecially in the colder parts, do not ſit till December, or even January. How long they ſit is not known.

Plate cccxcvi. 2. The ſecond ſpecies mentioned by Latham is the *patagonian*. It is diſtinguiſhed by this name not only becauſe it is found on that coaſt, but alſo becauſe it exceeds in bulk the common pinguins as much as the natives are ſaid to do the common race of men. It was firſt diſcovered by Captain Macbride, who brought one of them from Falkland Iſlands off the Straits of Magellan. The length of the ſtuffed ſkin of this particular bird meaſured four feet three inches, and the bulk of the body ſeemed to exceed that of a ſwan. The bill was four inches and a half long, ſlender, ſtraight bending on the end of the upper mandible, with no noſtrils. The tongue half the length of the bill, and ſingularly armed with ſtrong ſharp ſpikes pointing backwards. The plumage is moſt remarkable, the feathers lying over one another with the compactneſs of the ſcales of a fiſh; their texture equally extraordinary; the ſhafts broad and very thin; the vanes unwebbed; the head, throat, and hind part of the neck, are of a deep brown colour; from each ſide of the head to the middle of the fore part of the neck are two lines of bright yellow, broad above, narrow beneath, and uniting half way down; from thence the ſame colour widens towards the breaſt fading away till it is loſt in pure white, of which colour is the whole under ſide of the body, a duſky line dividing it from the colour of the upper part. The whole back is of a very deep aſh-colour almoſt duſky; but the end of each feather is marked with a blue ſpot, thoſe about the junction of the wings larger and paler than the others. The wings are in this ſpecies, as in all the others, extremely ſhort in reſpect to the ſize of the bird; hang down and have the appearance of fins, whoſe office they perform; their length is only 14 inches; on the outſide they are duſky, and covered with ſcale-like feathers, or at beſt, with ſuch whoſe ſhafts are ſo broad and flat as ſcarce to be diſtinguiſhed from ſcales; thoſe on the ridge of the wings conſiſting entirely of ſhaft; the larger, or quill feathers, have ſome very ſhort webs. The tail conſiſts of 30 brown feathers, or rather thin ſhafts, reſembling ſplit whale-bone; flat on the upper ſide, concave on the under, and the webs ſhort unconnected, and briſtly. From the knees to the end of the claws ſix inches, covered with ſtrong pentangular black ſcales; the fore toe ſcarce an inch long, and the others ſo remarkably ſhort, as to evince the neceſſity of that ſtrength of the tail, which ſeems intended as a ſupport to the bird in its erect attitude; in the ſame manner as that of the woodpecker is when it clings to the ſides of trees: between the toes is a ſtrong ſemilunar membrane, continued up even part of the claws; the middle claw is near an inch long, and the inner edge very ſharp and thin; the interior toe is ſmall, and placed very high. The ſkin is extremely tough and thick; which, with the cloſeneſs of the feathers, guards it effectually in the element wherein it is ſo converſant.

This ſpecies, which was, as we have ſeen, firſt met with in Falkland Iſlands has ſince been ſeen in Kerguelen's Land, New Georgia, and New Guinea. M. Bougainville caught one, which ſoon became ſo tame as to follow and know the perſon who had care of it: it fed on fleſh fiſh, and bread; but after a time grew lean, pined away, and died. The chief food, when at large, is thought to be fiſh; the remains of which, as well as crabs, ſhell-fiſh, and moluſcæ were found in the ſtomach this ſpecies is the fatteſt of the tribe; and therefore moſt ſo in January when they moult. They are ſuppoſed to lay and ſit in October They are met with in the moſt deſerted places. Their fleſh is black, though not very unpalatable. This has been conſidered as a ſolitary ſpecies, but has now and then been met with in conſiderable flocks. They are found in the ſame places as the papuan pinguins, and not unfrequently mixed with them; but in general ſhow a diſpoſition of aſſociating with their own ſpecies.

3. The third ſpecies is denominated *papuan*. It is about 2½ feet long being a little bigger than that which is called the *Cape pinguin*. This ſpecies inhabits the Iſle of Papos, or New Guinea; and has been met with at Falkland Iſles and Kerguelen's Land; it is often found among the patagonian pinguins.

4. The antarctic pinguin is about 25 inches long, and weighs about 11½ pounds. The bill is upwards of 2½ inches long; the upper parts of the body are black, the under are gloſſy white; beneath the chin there is a narrow ſtreak of a blackiſh colour, paſſing backward towards the hind head, a little bent about the region of the ears; the wings are much the ſame as in the other ſpecies; the tail is cuneiform; the feathers, or rather briſtles, of which it is compoſed are black and in number 32; the legs are of a fleſh colour, and the ſoles of the feet are black.

"This ſpecies (ſays Latham) inhabits the ſouth ſea, from 48 degrees to the antarctic circle; and is frequently found on the ice mountains and iſlands, on which it aſcends; it is a pretty numerous ſpecies. Our laſt voyagers found them in plenty on the Iſle of Deſolation. And it was obſerved, that in an iſland they touched at, not greatly diſtant, the rocks were almoſt covered with pinguins and ſhags; the firſt moſt probably of this ſort.

5. For the black-footed pinguin, or diomedea demerſa, ſee Diomedea.

6. The magellanic ſpecies is about the ſize of the antarctic pinguin. They are about 2 feet and ſometimes 2½ feet long, and weigh 11 pounds. The bill is black, having a tranſverſe band acroſs near its tip; the head and neck are black, except a few markings here and there; the upper parts of the body and wings are of the ſame colour; the under parts of both are white from the breaſt, except a narrow band of black paſſing at a little diſtance within the white on the breaſt, and downwards on each ſide, beneath the wings quite to the thighs; the legs are of a reddiſh colour, irregularly ſpotted on the thighs; and the claws are black. This ſpecies, which is very numerous inhabits the Straits of Magellan, Staten Land, Terra del Fuego, and Falkland iſlands. Far from being timid, theſe birds will often attack a man and peck his legs. As food they are not at all unpalatable. They often mix with ſea-wolves among the ruſhes, burrowing in holes like a fox. They ſwim with prodigious ſwiftneſs. They lay their eggs in collective bodies, reſorting, in incredible numbers to certain ſpots, which their long reſidence has freed from graſs, and to which were given the name of towns.—Penroſe obſerves, that they compoſed their neſts of mud, a foot in height, and placed as near one another as may be. It is poſſible that they may have different ways of neſting, according to the places they inhabit; or perhaps the manners of this may be blended with thoſe of another. "Here, (ſays he, *i. e.* in the places they frequent), during the breeding ſeaſon, we were preſented with a ſight which conveyed a moſt dreary, and I may ſay awful idea of the deſertion of theſe iſlands by the human ſpecies:—a general ſtillneſs prevailed in theſe towns; and whenever we took our walks among them in order to provide ourſelves with eggs, we were regarded indeed with ſide-long glances, but we carried no terror with us.

"The eggs are rather larger than thoſe of a gooſe, and laid in pairs. When we took them once, and ſometimes twice in a ſeaſon, they were as often replaced by the bird; but prudence would not permit us to plunder too far, leſt a future ſupply in the next year's brood might be prevented." They lay ſome time in November driving away the albatroſſes, which have hatched their young in turn before them. The eggs were thought palatable food, and were preſerved good for three or four months.

7. The collared pinguin is a very little leſs than the papuan, being 18 inches long. The bill, which is black, is ſimilar to that of the patagonian pinguin; the irides are black; the eye is ſurrounded with a bare ſkin of a blood colour, of an oval ſhape, and three times as large as the eye itſelf; the head, throat, hind part of the neck, and ſides, back, wings, and tail, are all black; the fore part of the neck, breaſt, belly, and thighs, are white extending round the neck, where the white begins like a collar, except that it does not quite meet at the back part; the legs are black.

This ſpecies inhabits New Guinea. It was alſo ſeen by Dr Forſter near Kerguelen's Land; and again on two iſles adjoining to the iſland of South Georgia.

1. For the red-footed pinguin, or phaeton demerſus, ſee Phaeton.

9. The *ſmall*, or, as Latham calls it, the *little pinguin*, is about the ſize of a teal, being 15 inches long. The bill, which is of a duſky colour, is about $1\frac{1}{2}$ long, and ſhaped like that of the phaeton demerſus: the upper parts of the bird from the head to the tail appear to be of a cinereous blue colour, of which colour are the ends of the feathers; the baſe of them, however, is brown black, and the ſhafts of each of the ſame colour; the under parts from chin to vent are white; the wings are duſky above and white beneath; the tail, which is exceedingly ſhort, conſiſts of 16 ſtiff feathers, which are ſcarcely perceptible; the legs are of a dull red colour; the webs are duſky, and the claws are black.

This ſpecies is pretty commonly found among the rocks on the ſouthern parts of New Zealand, but they are moſt frequent at Duſky Bay. They make deep burrows on the ſides of the hills, in which they lay their eggs: theſe holes are ſo thick in ſome parts, that a perſon is ſcarcely able to walk three or four ſteps without falling into one of them up to the knees. The inhabitants of Queen Charlotte's Sound kill them with ſticks, and, after ſkinning them, eſteem the fleſh as good food. They are known at New Zealand by the name of *korora*.---"Theſe birds (ſays Latham), I have found to vary both in ſize and colour: ſome are much ſmaller than others, quite black above, and meaſure only 13 inches in length; others are rather larger, and of a plain lead-colour on the upper parts, and the wings black, though all are white, or nearly ſo, beneath. The legs in theſe two laſt are marked with black at the ends of the toes; and the claws are black."

PINION, in mechanics, an arbor, or ſpindle, in the body whereof are ſeveral notches, which catch the teeth of a wheel that ſerves to turn it round, or it is a leſſer wheel that plays in the teeth of a larger.

PINK, a name given to a ſhip with a very narrow ſtern; whence all veſſels, however ſmall, whoſe ſterns are faſhioned in this manner, are called *pink ſterned*.

Pink, in botany. See Dianthus.

Plate CCXCII.

PINNA, in zoology; a genus belonging to the order of vermes teſtacea. See Mytilus, n° 6. The animal is a ſlug. The ſhell is bivalve, fragile, and furniſhed with a beard; gapes at one end; the valves hinge without a tooth. They inhabit the coaſts of Provence, Italy, and the Indian ocean. The largeſt and moſt remarkable ſpecies inhabits the Mediterranean. It is blind, as are all of the genus; but furniſhed with very ſtrong calcareous valves. The ſcuttle-fiſh (*ſepia*), an inhabitant of the ſame ſea, is a deadly foe to this animal: as ſoon as the pinna opens its ſhell, he ruſhes upon her like a lion; and would always devour her, but for another animal whom ſhe protects within her ſhell, and from whom in return ſhe receives very important ſervices. It is an animal of the crab-kind (ſee Cancer, n° 15.), naked like the hermit and very quick-ſighted. This cancer or crab the pinna receives into her covering; and when ſhe opens her valves in queſt of food, lets him out to look for prey. During this the ſcuttle fiſh approaches; the crab returns with the utmoſt ſpeed and anxiety to his hoſteſs, who being thus warned of the danger ſhuts her doors, and keeps out the enemy. That very ſagacious obſerver Dr Haſſelquiſt, in his voyage towards Paleſtine, beheld this curious phenomenon, which tho' well known to the ancients had eſcaped the moderns. Ariſtotle (*Hiſt.* lib. 5. c. 15.) relates, that the pinna kept a guard to watch for her: That there grew to the mouth of the pinna a ſmall animal, having claws, and ſerving as a caterer, which was like a crab, and was called the *pinnophylax*. Pliny (lib. 9. 51.) ſays, the ſmalleſt of all the kinds is called the *pinnoteres*, and therefore liable to injury; this has the prudence to hide itſelf in the ſhells of oyſters. Again, lib. 9. 66. he ſays, the pinna is of the genus of ſhell-fiſh; it is produced in muddy waters, always erect, nor ever without a companion, which ſome call the *pinnoteres*, others the *pinnophylax*. This ſometimes is a ſmall ſquill, ſometimes a crab, that follows the pinna for the ſake of food. The pinna upon opening its ſhell, expoſes itſelf as a prey to the ſmalleſt kind of fiſhes; for they immediately aſſault her, and, growing bolder upon finding no reſiſtance, venture in. The guard watching its time gives notice by a bite; upon which the pinna, cloſing its ſhell, ſhuts in, kills, and gives part of whatever happens to be there to its companion.

> The pinna and the crab together dwell,
> For mutual ſuccour, in one common ſhell.
> They both to gain a livelihood combine;
> That takes the prey, when this has given the ſign.
> From hence this crab, above his fellows fam'd,
> By ancient Greeks was *pinnoteres* nam'd.---Oppian.

The pinnæ marinæ differ leſs from muſcles in the ſize of their ſhells than in the fineneſs and number of certain brown threads which attach them to the rocks, hold them in a fixed ſituation, ſecure them from the rolling of the waves, eſpecially in tempeſts, and aſſiſt them in laying hold of ſlime. See Mytilus, p. 611. note (b). Theſe threads, ſays Rondelet, are as fine, compared with thoſe of muſcles, as the fineſt flax is compared with tow. M de Reaumur ſays, that theſe threads are nearly as fine and beautiful as ſilk from the ſilk-worm, and hence he calls them the *ſilk-worms of the ſea*. Stuffs, and ſeveral kinds of beautiful manufacture, are made of theſe threads at Palermo; in many places they are the chief object of fiſhing, and become a ſilk proper for many purpoſes. It requires a conſiderable number of the pinnæ marinæ for one pair of ſtockings. Nothing can equal the delicacy of this ſingular thread. It is ſo fine, that a pair of ſtockings made of it can be eaſily contained in a ſnuff-box of an ordinary ſize. In 1754, a pair of gloves or ſtockings of theſe materials was preſented to Pope Benedict XIV. which, notwithſtanding their extreme fineneſs, ſecured the leg both from cold and heat. A robe of the ſame ſingular materials was the gift of the Roman emperor to the Satraps of Armenia. See *Procopius de Edif.* lib. 3. c. 1. A great many manufacturers are employed in manufacturing theſe threads into various ſtuffs at Palermo and other places.

The men who are employed in fiſhing up the pinna marina, inform us, that it is neceſſary to break the tuft of threads. They are fiſhed up at Toulon, from the depth of 15, 20, and ſometimes more than 30, feet, with an inſtrument called a cramp, This is a kind of fork of iron, of which the prongs are perpendicular with reſpect to the handle. Each of them is about eight feet in length, and there is a ſpace between them of about ſix inches; the length of the handle is in proportion to the depth of the water; the pinnæ are ſeized, ſeparated from the rock, and raiſed to the ſurface by means of this inſtrument. The tuft of ſilk iſſues directly from the body of the animal; it comes from the ſhell at the place where it opens, about four or five inches from the ſummit or point in the large pinnæ.

M. de Reaumur, *Mem. de l'Acad. des Sciences*, 1711, page 216, and 1717, page 177, conſiders the pinna as the moſt proper of all ſhell-fiſh to elucidate the formation of pearls. It produces many of them of different colours, as grey or lead coloured, red, and ſome of a blackiſh colour, and in the form of a pear.

M. d'Argenville diſtinguiſhes three kinds of the pinnæ: 1*ſt*, The large kind, which are red within, and which have reddiſh mother-of-pearl, ſimilar to the ſubſtance of the ſhell itſelf. There are of thoſe ſhells which weigh near 15 pounds. This is the *oſtura* of the Venetians.

2*d*, The ſmaller kind. Some of theſe are ſlender, *papyraceous*, of the colour of horn, a little ſhaded with pale red.

3*d*, The kind called *perna*. Theſe are adorned with points in the channels of their ſhell; but what is very ſingular, the edges of the ſhell are thicker at the openings than at the joining of the valves.

The animal which lodges in the pinnæ marina rarely ſhows itſelf becauſe the valves are ſeldom opened. Its head is below, its largeſt extremity oppoſite; it is kept in the ſhell by four vigorous muſcles, placed at the extremities of the valves; the ſhell has no hinges, but a flat and blackiſh ligament, which is equal in length to one half of the ſhell. See PINNOTERUS and PEARL.

PINNACE, a ſmall veſſel navigated with oars and ſails, and having generally two maſts, which are rigged like thoſe of a ſchooner.

PINNACE is alſo a boat uſually rowed with eight oars. See the article BOAT.

PINNACLE, in architecture, the top or roof of an houſe, terminating in a point. This kind of roof among the ancients was appropriated to temples; their ordinary roofs were all flat, or made in the platform way.

PINNATED LEAVES, in botany. See BOTANY, p. 445. nº 232.

PINNATIFID, do. p. 442. nº 103.

PINNOTERUS, or PINNOPHYLAX, is a kind of crab-fiſh, furniſhed with very good eyes. It is ſaid to be the companion of the pinna marina. They live and lodge together in the ſame ſhell, which belongs to the latter. When it has occaſion to eat, it opens its valves, and ſends out its faithful purveyor to procure food. If during their labour the pinnoterus perceives the polypus, it immediately returns to warn its blind friend of the danger, when, by ſhutting its valves, it eſcapes the rage of its enemy; but when the pinnoterus loads itſelf with booty without moleſtation, it makes a gentle noiſe at the opening of the ſhell, and when admitted the two friends feaſt on the fruits of its induſtry. See PINNA, &c.

PINT (*pinta*), a veſſel, or meaſure, uſed in eſtimating the quantity of liquids, and even ſometimes of dry things.—Budæus derives the word from the Greek πινθα; others from the German *pint*, a little meaſure of wine; Nicod from the Greek πινειν, "to drink."

The *Engliſh pint* is twofold; the one for wine meaſure, the other for beer and ale-meaſure. See MEASURE.

PINTADA, a ſpecies of PROCELLARIA.

PINTLES, certain pints or hooks faſtened upon the back part of the rudder, with their points downwards, in order to enter into, and reſt upon, the *googings*, fixed in the ſternpoſt, to hang the rudder. See HELM.

PINTOR (Peter), born at Valentia in Spain, in the year 1420, was phyſician to Alexander VI. whom he followed to Rome, where he practiſed with great ſucceſs. He has left behind him two performances of conſiderable merit, 1. *Aggregator Sententiarum Doctorum de Curatione in Peſtilentia*, printed at Rome 1499, in folio. 2. *De Morbo Fædo & Occulto his Temporibus Affligenti*, &c. printed at Rome, 1500. in 4to, black letter; a book extremely ſcarce, unknown to Luiſini and Aſtruc, and which traces the venereal diſeaſe to the year 1460. Pintor died at Rome in 1503, aged 83 years.

PINTURICCIO (Bernardino), a celebrated Italian painter, born at Peruſia in 1454. He was the diſciple of Peter Perugino, under whom he became ſo good an artiſt, that he employed him on many occaſions as his aſſiſtant. He principally painted hiſtory and groteſque; but he alſo excelled in portraits, among which thoſe of pope Pius II. and Innocent VIII. of Giulia Farneſe, Cæſar Borgia, and queen Iſabella of Spain, are particularly diſtinguiſhed. The moſt memorable performance of Pinturiccio is the hiſtory of Pius II. painted in ten compartments in the hiſtory of Siena; in which undertaking, Raphael, then a young man and bred under the ſame maſter, aſſiſted him ſo far as to ſketch out cartoons of many parts of the compoſition. The ſtory of his death is worth relating, eſpecially as it illuſtrates his character. The laſt work he was engaged in was a *Nativity* for the monaſtery of St Francis at Siena: the monks accommodated him with a chamber to work in, which they cleared of all the furniture, except one old trunk or cheſt that appeared too rotten to move; but Pinturiccio, naturally poſitive and peeviſh, inſiſting on its being taken away, the monks willing to gratify him, complied. It was no ſooner ſtirred than one of the planks burſting, out tumbled 500 pieces of gold, which had been ſecreted there for many years. The monks were overjoyed at finding this treaſure, and the painter proportionably mortified at loſing his chance of the diſcovery by his indiſcreet obſtinacy: it affected his ſpirits ſo much he ſurvived but a few months, and it was that generally conſidered as the cauſe of his death.

PINUS, the PINE-TREE; a genus of the monodelphia order, belonging to the monœcia claſs of plants. The pine-tree was well known to the ancients, and has been deſcribed and celebrated both by their philoſophers and poets. Pliny enumerates no leſs than ſix ſpecies of trees of this genus; and it is mentioned by Virgil both in his Eclogues, his Georgics, and his Æneid; by Horace in his Odes; by Ovid in his Metamorphoſes; by Statius; and by Catullus, &c. Macrobius relates a pleaſant anecdote concerning the cones of of pine-trees, which in common language were called *poma pinea*, "pine-apples." There lived in the Auguſtan age one Vatinius, who by ſome means had irritated the Roman people ſo much that they pelted him with ſtones. When he entertained them with gladiators, to ſave himſelf from ſuch treatment for the future he procured an edict from the ediles, that no perſon ſhould throw any thing but apples in the amphitheatre. It accidentally happened that at this time Caſcellius, eminent for his wit as well as knowledge of the law was conſulted on the queſtion, whether a pine-apple (the cone of the pine) was legally included in the term *pomum*, "an apple?" It is an apple (ſaid he) if you intend to fling it at Vatinius*. A deciſion by which the edict in his favour did not much mend his ſituation: for Martial repreſents it dangerous to come under this tree, becauſe the cones in his time were of ſo great a ſize and weight, probably enlarged by cultivation for ages.

Nuces Pineæ.
Poma ſumus Cybeles: procul hinc diſcede, viator,
Ne cadat in miſerum noſtra ruina caput †.

There are generally reckoned 14 ſpecies of this genus; of which the moſt remarkable are theſe following:

1. The *pinea*, *pineaſter*, or wild pine, grows naturally on the mountains in Italy and the ſouth of France. It grows to the ſize of a large tree; the branches extend to a conſiderable diſtance; and while the trees are young, they are fully garniſhed with leaves, eſpecially where they are not ſo cloſe as to exclude the air from thoſe within; but as they advance in age, the branches appear naked, and all thoſe which are ſituated below become unſightly in a few years; for which reaſon they are now much leſs in eſteem than formerly.

2. The *pinus pinea*, or ſtone pine, is a tall evergreen tree, native of Italy and Spain. It delights in a ſandy loam, though like moſt others it will grow well in almoſt any land. Reſpecting the uſes of this ſpecies, Hanbury tells us that "the kernels are eatable, and by many preferred to almonds. In Italy they are ſerved up at table in their deſerts.—They are exceeding wholeſome, being good for coughs, colds, conſumptions, &c. on which account only this tree deſerves to be propagated." Hanbury continues: "It may be very proper here to take notice of a very great and dangerous miſtake Mr Miller has committed, by ſaying, under this article of ſtone-pine, that ſeeds kept in the cones will be good and grow if they are ſown ten or twelve years after the cones have been gathered from the trees; whereas the ſeeds of this ſort, whether kept in the cones or taken out, are never good after the firſt year; and though ſometimes a few plants will come up from the ſeeds that are kept in the cones from two years before, yet this is but ſeldom; neither muſt a tenth part of a crop be expected. This caution is the more neceſſary, as ſeveral gentlemen who had cones, upon reading Mr Miller's book, and finding the ſeeds would take no damage when kept there, deferred the work for a ſeaſon or two, when they thought they ſhould have more conveniency either of men or ground for their purpoſe; and were afterwards wholly diſappointed, no plants appearing, the ſeeds being by that time ſpoiled and worth nothing."

3. The *rubra*, commonly called the *Scots fir* or *pine*. It is common throughout Scotland, whence its name; though it is alſo found in moſt of the other countries of Europe. M. du Hamel, of the Royal Academy of Sciences, mentions his having received ſome ſeeds of it from St Domingo in the Weſt Indies; and thence concludes, that it grows indifferently in the temperate, frigid, and torrid zones. The wood of this tree is the red or yellow deal, which is the moſt durable of any of the kinds yet known. The leaves of this tree are much ſhorter and broader than thoſe of the former ſort, of a greyiſh colour, growing two out of one ſheath; the cones are ſmall, pyramidal, and end in narrow points; they are of a light colour, and the ſeeds are ſmall.

4. The *pinus picea*, or yew-leaved fir, is a tall evergreen and a native of Scotland, Sweden, and Germany. This ſpecies includes the ſilver fir and the balm of Gilead fir. The firſt of theſe is a noble upright tree. Mr Marſham ſays, "The talleſt trees I have ſeen were ſpruce and ſilver firs in the valleys in Switzerland. I ſaw ſeveral firs in the dockyards in Venice 40 yards long; and one of 39 yards was 18 inches diameter at the ſmall end. I was told they came from Switzerland."

Treatiſe on Planting and Ornamental Gardening

The branches are not very numerous, and the bark is ſmooth and delicate. The leaves grow ſingly on the branches, and their ends are ſlightly indented. Their upper ſurface is of a fine ſtrong green colour, and their under has an ornament of two white lines running lengthwiſe on each ſide the midrib: on account of which ſilvery look this ſort is called the *ſilver fir*. The cones are large, and grow erect; and, when the warm weather comes on, they ſoon ſhed their ſeeds; which ſhould be a caution to all who wiſh to raiſe this plant, to gather the cones before that happens.

The balm of Gilead fir has of all the ſorts been moſt coveted, on account of the great fragrance of its leaves; though this is not its only good property: for it is a very beautiful tree, naturally of an upright growth, and the branches are ſo ornamented with their balmy leaves, as to exceed any of the other ſorts in beauty. The leaves, which are very cloſely ſet on the branches, are broad; and their ends are indented. Their upper ſurface, when healthy, is of a fine dark-green colour, and their under has white lines on each ſide the midrib lengthwiſe, nearly like thoſe of the ſilver fir. Theſe leaves when bruiſed are very finely ſcented; and the buds, which ſwell in the autumn for the next year's ſhoot, are very ornamental all winter, being turgid, and of a fine brown colour: and from theſe alſo exudes a kind of fine turpentine, of the ſame kind of (though heightened) fragrancy. The tree being wounded in any part, emits plenty of this turpentine; and Hanbury ſays, "it is ſuppoſed by many to be the ſort from whence the balm of Gilead is taken, which occaſions this tree being ſo called. But this is a miſtake; for the true balm of Gilead is taken from a kind of terebinthus: though I am informed, that what has been collected from this tree has been ſent over to England from America (where it grows naturally), and often ſold in the ſhops for the true ſort."

The ſilver fir is very hardy, and will grow in any ſoil or ſituation, but always makes the greateſt progreſs in rich loamy earth. The balm of Gilead fir muſt be planted in deep, rich, good earth; nor will it live long in any other. The ſoil may be a black mould, or of a ſandy nature, if it be deep enough, and if the roots have room enough to ſtrike freely.

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* Saturn. lib. 2. cap. 6.

† Lib. 13, Ep. 25.

5. The *pinus abies*, or European ſpruce fir, a native of the northern parts of Europe and of Aſia, includes the Norway ſpruce and long-coned Corniſh fir. The former of theſe is a tree of as much beauty while growing as its timber is valuable when propagated on that account. Its growth is naturally like the ſilver, upright: and the height it will aſpire to may be eaſily conceived, when we ſay that the white deal, ſo much coveted by the joiners, &c. is the wood of this tree; and it may perhaps ſatisfy the curious reader to know, that from this fir pitch is drawn. The leaves are of a dark green colour; they ſtand ſingly on the branches, but the younger ſhoots are very cloſely garniſhed with them. They are very narrow; their ends are pointed; and they are poſſeſſed of ſuch beauties as to excite admiration. The cones are eight or ten inches long, and hang downwards.

Ibid,

The better the ſoil is, the faſter will the ſpruce fir grow, though it will thrive very well in moſt of the Engliſh lands. In ſtrong loamy earth it makes a ſurpriſing progreſs; and it delights in freſh land of all ſorts, which never has been worn out by ploughing, &c. though it be ever ſo poor. The long-coned Corniſh fir differs ſcarcely in any reſpect from the Norway ſpruce, except that the leaves and the cones are larger.

6. The *pinus Canadenſis*, American or Newfoundland ſpruce fir, a native of Canada, Pennſylvania, and other parts of North America, includes three varieties. The white Newfoundland ſpruce, the red Newfoundland ſpruce, and the black Newfoundland ſpruce. Theſe, however, differ ſo little, that one deſcription is common to them all. They are of a genteel upright growth, though they do not ſhoot ſo freely or grow ſo faſt in Britain as the Norway ſpruce. The leaves are of the ſame green, and garniſh the branches in the ſame beautiful manner as thoſe of that ſpecies; only they are narrower, ſhorter, and ſtand cloſer. The greateſt difference is obſervable in the cones; for theſe are no more than about an inch in length, and the ſcales are cloſely placed. In the cones, indeed, conſiſts the difference of theſe three ſorts: thoſe of the white ſpecies are of a very light brown colour; thoſe of the red ſpecies more of a nut brown or reddiſh colour; and thoſe of the black ſpecies of a dark or blackiſh colour. Beſides this, there is ſcarcely any material difference; though it is obſervable, that this trifling variation ſeems to be pretty conſtant in the plants raiſed from the like ſeeds. Theſe ſorts will often flower, and produce cones when only about five or ſix feet high: and indeed look then very beautiful: but this is a ſign of weakneſs in the plant, which it does not often fairly get over.

7. The *pinus balſamea*, or hemlock fir, a native of Virginia and Canada, poſſeſſes as little beauty as any of the fir tribe; though, being rather ſcarce in proportion, it is deemed valuable. It is called by ſome the *yew-leaved fir*, from the reſemblance of the leaves to thoſe of the yew-tree. It is a tree of low growth, with but few branches; and theſe are long and ſlender, and ſpread abroad without order. The leaves do not garniſh the branches ſo plentifully as thoſe of any other ſort of fir. The cones are very ſmall and rounded; they are about half an inch long; and the ſcales are looſely arranged. They are ſent from America to Europe, by which plants are raiſed; though this caution ſhould be given to the planter, that this tree is fond of moiſt rich ground, and in ſuch a kind of ſoil will make the greateſt progreſs.

8. The *pinus orientalis*, or oriental fir, a native of the Eaſt, is a low but elegant tree. The leaves are very ſhort and nearly ſquare. The fruit is exceeding ſmall, and hangs downward; and the whole tree makes an agreeable variety with the other kinds.

9. The *ſtrobus*, Lord Weymouth's pine, or North American white pine. This grows ſometimes to the height of 100 feet and upwards, and is highly valued on account of its beauty. The bark of the tree is very ſmooth and delicate, eſpecially when young; the leaves are long and ſlender, five growing out of one ſheath; the branches are pretty cloſely garniſhed with them, and thus make a fine appearance. The cones are long, ſlender and very looſe, opening with the firſt warmth of the ſpring; ſo that if they are not gathered in winter, the ſcales open and let out the ſeeds. The wood of this ſort is eſteemed for making maſts for ſhips. In Queen Anne's time there was a law made for the preſervation of theſe trees, and for the encouragement of their growth in America. Within theſe laſt 50 years they have been propagated in Britain in conſiderable plenty.

With reſpect to the culture of this ſpecies, Mr Hanbury, after ſome more general directions, continues thus, "I have known gentlemen, who, in attempting to raiſe theſe trees, have ſeen the young plants go off without perceiving the cauſe; and the more watering and pains they have taken, have found the plants perſiſt in this way more and more, to their great mortification and aſtoniſhment. In the ſpring following theſe plants ſhould be pricked out in beds half a foot aſunder each way; and here they may ſtand two years, when they may be either finally planted out, or removed into the nurſery, at the diſtance of one foot aſunder, and two feet in the rows. If care has been taken of them in the nurſery, they may be removed at a conſiderable height with great aſſurance of ſucceſs: for it is much eaſier to make this pine grow than any of the other ſorts: ſo that where they are wanted for ornament in parks, open places, &c. a ſhow of them may be made in a little time.

"The ſoil the Weymouth pine delights in moſt is a ſandy loam; but it likes other ſoils of an inferior nature: and although it is not generally to be planted on all lands like the Scotch fir, yet I have ſeen it luxuriant and healthy, making ſtrong ſhoots, on blue and red clays, and other ſorts of ſtrong ground. On ſtony and and ſlaty ground, likewiſe, I have ſeen ſome very fine trees; ſo that I believe whoever is deſirous of having plantations of this pine, need not be curious in the choice of his ground."

10. The *pinus tæda*, or ſwamp-pine, is a tall evergreen tree, a native of the ſwamps of Virginia and Canada. There are ſeveral varieties of this genus which Hanbury enumerates and deſcribes: ſuch as, 1ſt, The three-leaved American ſwamp-pine. 2d, The two-leaved American pine. 3d, The yellow American pine, the yellow tough pine, and the tough pine of the plains;

among which there is but little variety. 4th, The baſtard pine. 5th, The frankincenſe pine. And, 6th, The dwarf pine.

"There are many (continues our author) other ſorts of American pines, which we receive from thence with the like cant names of thoſe of the above, which I have choſen to retain, as they will probably be continued to be ſent over; and that the gardener receiving them as ſuch may beſt know what to do with them. In many of thoſe ſorts I ſee at preſent no material difference; ſo am induced to think they are the ſame, ſent over with different names. Some of the ſorts abovementioned differ in very few reſpects; but I have choſen to mention them, as a perſon may be ſupplied with the ſeeds from Pennſylvania, Jerſey, Virginia, Carolina, &c. where they all grow naturally: and having once obtained the ſeeds, and from them plants, they will become pleaſing objects of his niceſt obſervations."

11. The *pinus cedrus*, ranked by Tournefort and others under larix, famous for its duration, is that popularly called by us the *cedar of Lebanon*, by the ancients *cedrus magna* or the *great cedar*; alſo *cedrelate*, *κεδρελατη*; and ſometimes the Phœnician or Syrian cedar, from the country where it grows in its greateſt perfection. It is a coniferous evergreen, of the bigger ſort, bearing large roundiſh cones of ſmooth ſcales, ſtanding erect, the leaves being ſmall, narrow, and thick ſet.—They ſometimes counterfeit cedar, by dying wood of a reddiſh hue: but the ſmell diſcovers the cheat, that of true cedar being very aromatic. In ſome places, the wood of the cajou-tree paſſes under the name of cedar, on account of its reddiſh colour and its aromatic ſmell, which ſomewhat reſemble that of ſantal. Cedar-wood is reputed almoſt immortal and incorruptible; a prerogative which it owes chiefly to its bitter taſte, which the worms cannot endure. For this reaſon it was that the ancients uſed cedar tablets to write upon, eſpecially for things of importance, as appears from that expreſſion of Perſius, *Et cedru digna locutus.* A juice was alſo drawn from cedar, with which they ſmeared their books and writings, or other matters, to preſerve them from rotting; which is alluded to by Horace: by means of which it was that Numa's books, written on papyrus, were preſerved entire to the year 535, as we are informed by Pliny.

Solomon's temple, as well as his palace, were both of this wood. That prince gave king Hiram ſeveral cities for the cedars he had furniſhed him on theſe occaſions. Cortes is ſaid to have erected a palace at Mexico, in which were 7000 beams of cedar, moſt of them 120 feet long, and twelve in circumference, as we are informed by Herrera. Some tell us of a cedar felled in Cyprus 130 feet long, and 18 in diameter. It was uſed for the main-maſt in the galley of king Demetrius. Le Bruyn aſſures us, that the two biggeſt he ſaw on mount Lebanon, meaſured, one of them 57 palms, and the other 47, in circumference. In the temple of Apollo at Utica, there were cedar trees near 2000 years old; which yet were nothing to that beam in an oratory of Diana at Seguntum in Spain, ſaid to have been brought thither 200 years before the deſtruction of Troy. Cedar is of ſo dry a nature, that it will not endure to be faſtened with iron nails, from which it uſually ſhrinks; ſo that they commonly faſten it with pins of the ſame wood.

"The ſtatue (ſays Hanbury) of the great goddeſs at Epheſus was made of this material; and, if this tree abounded with us in great plenty, it might have a principal ſhare in our moſt ſuperb edifices. The effluvia conſtantly emitted from its wood are ſaid to purify the air, and make rooms wholeſome. Chapels and places ſet apart for religious duties, being wainſcotted with this wood, inſpire the worſhippers with a more ſolemn awe. It is not obnoxious to worms; and emits an oil which will preſerve cloth or books from worms or corruption. The ſaw-duſt will preſerve human bodies from putrefaction; and is therefore ſaid to be plentifully uſed in the rites of embalming, where practiſed."

It is remarkable that this tree is not to be found as a native in any other part of the world than mount Libanus, as far as hath yet been diſcovered. What we find mentioned in Scripture of the lofty cedars can be nowiſe applicable to the common growth of this tree; ſince, from the experience we have of thoſe now growing in England, as alſo from the teſtimony of ſeveral travellers who have viſited thoſe few remaining trees on mount Libanus, they are not inclined to grow very lofty, but on the contrary extend their branches very far; to which the alluſion made by the Pſalmiſt agrees very well, when he is deſcribing the flouriſhing ſtate of a people, and ſays, "They ſhall ſpread their branches like the cedar-tree."

Rauwolf, in his Travels, ſays, there were not at that time (i. e. anno 1574) upon mount Libanus more than 26 trees remaining, 24 of which ſtood in a circle; and the other two, which ſtood at a ſmall diſtance, had their branches almoſt conſumed with age; nor could he find any younger tree coming up to ſucceed them, though he looked about diligently for ſome. Theſe trees (he ſays) were growing at the foot of a ſmall hill, on the top of the mountains, and amongſt the ſnow. Theſe having very large branches, commonly bend the tree to one ſide, but are extended to a great length, and in ſo delicate and pleaſant order, as if they were trimmed and made even with great diligence, by which they are eaſily diſtinguiſhed, at a great diſtance, from fir-trees. The leaves (continues he) are very like to thoſe of the larch-tree, growing cloſe together in little branches upon ſmall brown ſhoots.

Maundrel, in his Travels, ſays, there were but 16 large trees remaining when he viſited the mountain, ſome of which were of a prodigious bulk, but that there were many more young ones of a ſmaller ſize: he meaſured one of the largeſt, and found it to be 12 yards ſix inches in girth, and yet ſound, and 37 yards in the ſpread of its boughs. At about five or ſix yards from the ground it was divided into five limbs, each of which was equal to a great tree. What Maundrel hath related was confirmed by a gentleman who was there in the year 1720, with this difference only, viz. in the dimenſions of the branches of the largeſt tree, which he meaſured, and found to be 22 yards diameter. Now, whether Mr Maundrel meant 37 yards in circumference of the ſpreading branches, or the diameter of them, cannot be determined by his words; yet either of them well agrees with this laſt account.

12. There is another ſpecies, viz. the *larch-tree*, which the old botaniſts ranked under larix, with deciduous leaves, and oval obtuſe cones. It grows naturally upon the Alps and Apennines, and of late has been very much propagated in Britain. It is of quick growth, and the trunk riſes to 50 feet or more; the branches are ſlender, their ends generally hanging downward, and are garniſhed with long narrow leaves which ariſe in cluſters from one point, ſpreading open above like the hairs of a painter's bruſh: they are of a light green, and fall away in autumn. In the month of April the male flowers appear, which are diſpoſed in form of ſmall cones; the female flowers are collected into oval obtuſe cones, which in ſome ſpecies have bright purple tops, and in others they are white: theſe differences are accidental; the cones are about an inch long, obtuſe at their points; the ſcales are ſmooth, and lie over each other: under each ſcale there are generally lodged two ſeeds, which have wings. There are other two varieties of this tree, one of which is a native of America, and the other of Siberia. The cones of the American kind which have been ſent to Britain ſeem in general to be larger than thoſe of the common ſort.

“Many encomiums (ſays Hanbury when ſpeaking of this ſpecies) have been beſtowed on the timber of the larch: and we find ſuch a favourable account of it in ancient authors, as ſhould induce us to think it would be proper for almoſt any uſe. Evelyn recites a ſtory of Witſen, a Dutch writer, that a ſhip built of this timber and cypreſs had been found in the Numidian ſea, twelve fathoms under water, ſound and entire, and reduced to ſuch a hardneſs as to reſiſt the ſharpeſt tool, after it had lain ſubmerged above 1400 years. Certain it is this is an excellent wood for ſhip and houſe-building. At Venice this wood is frequently uſed in building their houſes, as well as in Switzerland, where theſe trees abound: ſo that, without all doubt, the larch excels for maſts for ſhips, or beams for houſes, doors, windows, &c. particularly as it is ſaid to reſiſt the worm.

“In Switzerland (A) their houſes are covered with boards of this wood cut out a foot ſquare; and, as it emits a reſinous ſubſtance, it ſo diffuſes itſelf into every joint and crevice, and becomes ſo compact and cloſe, as well as ſo hardened by the hair, as to render the covering proof againſt all weather. But as ſuch covering for houſes would cauſe great devaſtation in caſe of fire, the buildings are confined to a limited diſtance by an order of police from the magiſtrates. The wood, when firſt laid on the houſes, is ſaid to be very white: but this colour, in two or three years is changed, by means of the ſun and reſin, to a black, which appears like a ſmooth ſhining varniſh.”

Of the common larch there are ſeveral varieties. The flowers which the commoneſt ſort exhibits early in the ſpring are of a delicate red colour; another ſort produces white flowers at the ſame ſeaſon, and theſe have a delightful effect among thoſe of the red ſort; whilſt another, called the *Black Newfoundland larix*, increaſes the variety, though by an aſpect little differing from the others. There are alſo larches with greeniſh flowers, pale red, &c. all of which are accidental varieties from ſeeds. Theſe varieties are eaſily diſtinguiſhed, even when out of blow: the young ſhoots of the white-flowering larch are of the lighteſt green, and the cones when ripe are nearly white. The red flowering larch has its ſhoots of a reddiſh caſt, and the cones are of a brown colour; whilſt the cones and ſhoots of the black Newfoundland larch are in the ſame manner proportionally tinged. The cones, which are a very great ornament to ſeveral ſorts of the pines, are very little to theſe. Their chief beauty conſiſts in the manner of their growth, the nature and beauty of their pencilled leaves and fair flowers; for the cones that ſucceed them are ſmall, of a whitiſh, a reddiſh, or a blackiſh brown colour, and make no figure.

The pinus cedrus and pinus larix are propagated by ſowing in March on a bed of light earth expoſed to the morning ſun. The ſeed muſt be covered half an inch thick with fine light earth, and the beds watered at times when the weather is dry. In about ſix weeks the plants will appear; they muſt at this time be carefully guarded from the birds, ſhaded from the ſun and winds, and kept very clear of weeds. In the latter end of April the following year, they may be removed into beds of freſh earth, placing them at ten inches diſtance every way. They are to be kept here two years, and ſuch of them as ſeem to bend muſt be tied up to a ſtake to keep them upright. They may afterwards be planted in the places where they are to remain. They thrive well on the ſides of barren hills, and make a very pretty figure there.

Reſpecting the uſes of this tree, Dr Pallas, in his *Flora Roſſica* informs us, that if it is burnt, and the wood conſumed, the internal part of the wood diſtils copiouſly a drying reddiſh gum, a little leſs glutinous than gum arabic, ſomewhat of a reſinous taſte, but wholly ſoluble in water. At the inſtigation of M. Kinder, this gum has lately been ſold in the Ruſſian ſhops under the name of *gummi Orenburgenſis*, but which our author thinks ſhould be called *gummi uralienſe* or *laricis*. It is eat by the Woguli as a dainty, and is ſaid to be nutritious and antiſcorbutic. Some manna was gathered from the green leaves, but it could never be condenſed. The Ruſſians uſe the boletus laricinus as an emetic in intermittents, and to check the leucorrhœa. At Baſchir and Siberia the inhabitants ſprinkle the dry powder on the wounds of oxen and horſes, as a detergent and anthelmintic. The

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(A) “Between Bex and Bevieux (ſays Coxe in his *Travels in Switzerland*), I obſerved the larch in great plenty. Painters, from the time of Pliny to that of Raphael, truſted their works to this wood, which the Roman naturaliſt ſtiles *immortale lignum*. The wood is reckoned excellent for all works which are to lie under water: and the borderers on the lake of Geneva prefer it for building their veſſels. In theſe parts I ſaw moſt beautiful woods of cheſnut. Haller ſays that they extend ſome leagues: he alſo informs us, that they are found in other parts of Switzerland, and even in deſert places in ſome of the tranſalpine parts. Accident muſt have brought them thither, as it appears from Pliny that theſe trees were firſt introduced into Europe from Sardis.”

The nuts of the pinus cembra, the ſame author aſſerts, are eat as luxuries in Ruſſia, and are even exported with the ſame view. The unripe cones give a very fragrant oil, termed balſamic. The inhabitants of Siberia uſe the tender tops, and even the bark rubbed off in the ſpring, as an antiſcorbutic. The kernels of the nuts of the amygdalus nana give a very pleaſing flavour to brandy; and, when preſſed, afford a bitter oil in large quantities. The way of deſtroying the bitter is by digeſting it in the ſun with ſpirit of wine, and it then becomes ſweet and extremely agreeable.

From the larch-tree is extracted what we erroneouſly call *Venice turpentine.* This ſubſtance, or natural balſam, flows at firſt without inciſion; when it has done dropping, the poor people who wait in the fir woods make inciſions at about two or three feet from the ground into the trunks of the trees, into which they fix narrow troughs about 20 inches long. The end of theſe troughs is hollowed like a ladle; and in the middle is a ſmall hole bored for the turpentine to run into the receiver which is placed below it. As the gummy ſubſtance runs from the trees, it paſſes along the ſloping gutter or trough to the ladle, and from thence runs through the holes into the receiver The people who gather it viſit the trees morning and evening from the end of May to September, to collect the turpentine out of the receivers. When it flows out of the tree, Venice turpentine is clear like water, and of a yellowiſh white; but, as it grows older, it thickens and becomes of a citron colour. It is procured in the greateſt abundance in the neighbourhood of Lyons, and in the valley of St Martin near St Lucern in Switzerland.

Though we have already noticed the manner of cultivating ſome of the particular ſpecies of this genus, and have alſo remarked the uſes of ſome of them, we ſhall finiſh the article with a few general obſervations on the culture and uſes of the whole.

Culture. All the ſorts of pines are propagated by ſeeds produced in hard woody cones. The way to get the ſeeds out of theſe cones is to lay them before a gentle fire, which will cauſe the cells to open, and then the ſeeds may be eaſily taken out. If the cones are kept entire, the ſeeds will remain good for ſome years; ſo that the ſureſt way of preſerving them is to let them remain in the cones till the time for ſowing the ſeeds. If the cones are kept in a warm place in ſummer, they will open and emit the ſeeds; but if they are not expoſed to the heat, they will remain cloſe for a long time. The beſt ſeaſon for ſowing the pines is about the end of March. When the ſeeds are ſown, the place ſhould be covered with the nets to keep off the birds; otherwiſe, when the plants begin to appear with the huſk of the ſeed on the top of them, the birds will peck off the tops, and thus deſtroy them.

Uſes. From the firſt ſpecies is extracted the common turpentine, much uſed by farriers, and from which is drawn the oil of that name. The proceſs of making pitch, tar, reſin, and turpentine, from theſe trees is very familiar. In the ſpring time, when the ſap is moſt free in running, they pare off the bark of the pine tree, to make the ſap run down into a hole which they cut at the bottom to receive it. In the way, as it runs down, it leaves a white matter like cream, but a little thicker. This is very different from all the kinds of reſin and turpentine in uſe, and it is generally ſold to be uſed in the making of flambeaux inſtead of white bees wax. The matter that is received in the hole at the bottom is taken up with ladles, and put in a large baſket. A great part of this immediately runs through, and this is the common turpentine. This is received into ſtone or earthen pots, and is ready for ſale. The thicker matter, which remains in the baſket, they put into a common alembic, adding a large quantity of water. They diſtil this as long as any oil is ſeen ſwimming upon the water. This oil they ſeparate from the ſurface in large quantities, and this is the common oil or ſpirit of turpentine. The remaining matter at the bottom of the ſtill is common yellow reſin. When they have thus obtained all that they can from the ſap of the tree, they cut it down, and, hewing the wood into billets, they fill a pit dug in the earth with theſe billets, and, ſetting them on fire, there runs from them, while they are burning, a black thick matter. This naturally falls to the bottom of the pit, and this is the tar. The top of the pit is covered with tiles, to keep in the heat; and there is at the bottom a little hole, out at which the tar runs like oil. If this hole be made too large, it ſets the whole quantity of the tar on fire; but, if ſmall enough, it runs quietly out.

The tar, being thus made, is put up in barrels; and if it be to be made into pitch, they put it into large boiling veſſels, without adding any thing to it. It is then ſuffered to boil a while, and being then let out, is found when cold to be what we call pitch.

A decoction of the nuts or ſeeds of the firſt ſpecies in milk, or of the extremities of the branches pulled in ſpring, is ſaid, with a proper regimen, to cure the moſt inveterate ſcurvy. The wood of this ſpecies is not valued; but that of the Scots pine is ſuperior to any of the reſt. It is obſerved of the Scots pine, that when planted in bogs, or in a moiſt ſoil, though the plants make great progreſs, yet the wood is white, ſoft, and little eſteemed; but when planted in a dry ſoil, though the growth of the trees is there very ſlow, yet the wood is proportionably better. Few trees have been applied to more uſes than this The talleſt and ſtraighteſt are formed by nature for maſts to the navy. The timber is reſinous, durable, and applicable to numberleſs domeſtic purpoſes, ſuch as flooring and wainſcotting of rooms, making of beds, cheſts, tables, boxes, &c. From the trunk and branches of this, as well as moſt others of the pine tribe, tar and pitch is obtained. By inciſion, barras, Burgundy pitch, and turpentine, are acquired and prepared. The reſinous roots are dug out of the ground in many parts of the Highlands, and, being divided into ſmall ſplinters, are uſed by the inhabitants to burn inſtead of candles.—At Loch-Broom, in Roſs-ſhire, the fiſhermen make ropes of the inner bark; but hard neceſſity has taught the inhabitants of Sweden, Lapland, and Kamtſchatka, to convert the ſame into bread. To effect this, they, in the ſpring ſeaſon, make choice of the talleſt and faireſt trees; then ſtripping off carefully the outer bark, they collect the ſoft, white, ſucculent interior bark, and dry it in the ſhade. When they have occaſion to uſe it, they firſt toaſt it at the fire, then grind, and after ſteeping the flour in warm water to take off the reſinous taſte, they make it into thin cakes, which are baked for uſe. On this ſtrange food the poor inhabitants are ſometimes conſtrained to live for a whole year; and, we are told, through cuſtom become at laſt even fond of it. Linnæus remarks, that this ſame bark bread will fatten ſwine; and humanity obliges us to wiſh, that men might never be reduced to the neceſſity of robbing them of ſuch a food. The interior bark, of which the abovementioned bread is made, the Swediſh boys frequently peel off the trees in the ſpring, and eat raw with greedy appetite. From the cones of this tree is prepared a diuretic oil, like the oil of turpentine, and a reſinous extract, which has ſimilar virtues with the balſam of Peru. An infuſion or tea of the buds is highly commended as an antiſcorbutic. The farina, or yellow powder, of the male-flowers, is ſometimes in the ſpring carried away by the winds, in ſuch quantities, where the trees abound, as to alarm the ignorant with the notion of its raining brimſtone. The tree lives to a great age; Linnæus affirms to 400 years.

PIONEERS, in the art of war, are ſuch as are commanded in from the country, to march with an army for mending the ways, for working on intrenchments and fortifications, and for making mines and approaches. The Engliſh ſoldiers are likewiſe employed for all theſe purpoſes. Moſt of the foreign regiments of artillery have half a company of pioneers, well inſtructed in that important branch of duty. Some regiments of infantry and cavalry have three or four pioneers each, provided with aprons, hatchets, ſaws, ſpades, and pick-axes. Each pioneer muſt have an ax, a ſaw, and an apron; a cap with a leather crown, and a black bears-ſkin front, on which is to be the king's creſt in white, on a red ground; and the number of the regiment is to be on the back part of it.

PIP, or Pep, a diſeaſe among poultry, conſiſting of a white thin ſkin, or film, that grows under the tip of the tongue, and hinders their feeding. It uſually ariſes from want of water, or from the drinking puddle-water, or eating filthy meat. It is cured by pulling off the film with the fingers, and rubbing the tongue with ſalt. Hawks are particularly liable to this diſeaſe, eſpecially from feeding on ſtinking fleſh.

PIPE, in building, &c. a canal, or conduit, for the conveyance of water and other liquids. Pipes for water, water-engines, &c. are uſually of lead, iron, earth, or wood: the latter are uſually made of oak or elder. Thoſe of iron are caſt in forges; their uſual length is about two feet and a half: ſeveral of theſe are commonly faſtened together by means of four ſcrews at each end, with leather or old hat between them, to ſtop the water. Thoſe of earth are made by the potters; theſe are fitted into one another, one end being always made wider than the other. To join them the cloſer, and prevent their breaking, they are covered with tow and pitch: their length is uſually about that of the iron pipes. The wooden pipes are trees bored with large iron augres, of different ſizes, beginning with a leſs, and then proceeding with a larger ſucceſſively; the firſt being pointed, the reſt being formed like ſpoons, increaſing in diameter, from one to ſix inches or more: they are fitted into the extremities of each other (as repreſented fig. 2.), and are ſold by the foot.

Plate.
CCCXVIII.

Wooden pipes are bored as follows. The machine repreſented fig. 1. is put in motion by the wheel A, which is moved by a current of water; upon the axle of this wheel is a cog wheel B, which cauſes the lanterns C, D, to turn horizontally, whoſe common axis is conſequently in a perpendicular direction. The lantern D turns at the ſame time two cog-wheels, E and F: the firſt, E, which is vertical, turns the augre which bores the wood; and the ſecond, F, which is horizontal, cauſes the carriage bearing the piece to advance by means of the arms H, I, which takes hold of the notches in the wheel K. The firſt, H, by means of the notches, draws the wheel towards F; and the other, I, puſhes the under-poſt of the wheel in an oppoſite direction; both which motions tend to draw the carriage towards F, and conſequently cauſe the augre to pierce the wood. The augre being from 9 to 12 feet in length, and of a proportionable bigneſs, it will be neceſſary to have two pieces, as L, L, to ſupport its weight, and cauſe it to enter the piece to be bored with the ſame uniformity.

For the conſtruction of leaden pipes, ſee the article Plumbery.

Air Pipes. See *Air-Pipes.*

Pipes of an Organ. See Organ.

Bag-Pipe. See *Bag-Pipe.*

Horn-Pipe. See Hornpipe.

Tobacco Pipe, a machine uſed in the ſmoking of tobacco, conſiſting of a long tube, made of earth or clay, having at one end a little caſe, or furnace, called the *bowl*, for the reception of the tobacco, the fumes whereof are drawn by the mouth through the other end. Tobacco-pipes are made of various faſhions; long, ſhort, plain, worked, white, varniſhed, unvarniſhed, and of various colours, &c. The Turks uſe pipes three or four feet long, made of ruſhes, or of wood bored, at the end whereof they fix a kind of a pot of baked earth, which ſerves as a bowl, and which they take off after ſmoking.

Pipe, alſo denotes a veſſel or meaſure for wine, and things meaſured by wine-meaſure. See Barrel and Measure.

Pipe, in mining, is where the ore runs forwards endwiſe in a hole, and doth not ſink downwards or in a vein.

Pipe, *Pipa*, in law, is a roll in the exchequer, called alſo the *great roll*. See the next article.

Pipe-Office, in England, is an office wherein a perſon called the *clerk of the pipe*, makes out leaſes of crown-lands, by warrant from the lord-treaſurer, or commiſſioners of the treaſury, or chancellor of the exchequer. The clerk of the pipe makes out alſo all accounts of ſheriffs, &c. and gives the accountants their *quietus eſt*. To this office are brought all accounts which paſs the remembrancer's office, and remain there, that if any ſtated debt be due from any perſon, the ſame may be drawn down into the great roll of the pipe: upon which the comptroller iſſues out a writ, called the *ſummons of the pipe*, for recovery thereof; and if there be no goods or chattels, the clerk then draws down the debts to the lord treaſurer's remembrancer, to write eſtreats againſt their lands. All tallies which vouch the payment of any ſum contained in ſuch accounts are examined and allowed by the chief ſecondary of the pipe. Beſides the chief clerk in this office, there are eight attorneys or ſworn clerks, and a comptroller.

Pipe Fiſh, in ichthyology. See Syngnathus.

Sea-Pipes, in zoology, are univalve ſhells, of an oblong figure, terminating in a point, ſometimes a little bending, and ſometimes ſtraight. Sea ears, figures of which we have given along with the ſea-pipes, are alſo univalve flat ſhells, reſembling in ſhape the ear of a man. In ſea ears it is not uncommon to find ſmall pearls, the ſeeds of which are often found in the middle of their cavities, which are of the fineſt naker or mother-of-pearl colour. There are ridges on both ſides; thoſe without form a kind of volute or ſpire, terminating in an eye. In theſe ſhells there is a row of round holes, ſix of which generally go quite through.

There is a ſhell of this kind, which is longer in proportion to its width, and much leſs common. There is yet another, very fine and thin, of a dirty grey colour, neither nakered nor perforated as the others are; the inner rim is ſpiral, and at ſome diſtance from the outer.

The ſea-pipes are diſtinguiſhed from ſea-worms by having their pipes ſingle; whereas the others form an aſſemblage of pipes joined together. The ſea worms, from the number and junction of their parts, are multivalves. The ſhells of pipes called *dentales* and *antales* are diſtinguiſhed from each other only by their ſize, the antales being much the leaſt. The *ſea pencil*, or *watering ſpout*, is the moſt remarkable ſhell of this tribe, and muſt be conſidered as having a ſpecific character either by its form, which is ſtraight, or the ſingularity of its ſuperior extremity, which is perforated like the ſpout of a watering pot.

In Plate CCCXCII. the ſhell, fig. 1. pierced with many holes, is found with its natural covering. It is finely nakered within, and in the middle of its hollow or cavity contains many ſmall pearls. Fig. 2. is placed on its upper ſide to ſhow its ſpots, which are red upon a ground of the pureſt white; the ridges are prominent; the rim and the eye are irregular and notched. Fig. 4. the ſingularity of this ſhell conſiſts in its being neither nakered nor perforated, and in turning very much up near the eye of its ſpire or contour. Fig. 5. is a pencil or watering ſpout; at the head is a kind of ruff, and within it is formed like the end of a watering ſpout, perforated with many holes, which, when the fiſh is alive, are filled with very fine threads, like the hairs of a painter's pencil. Fig. 6. are called dentals from their reſemblance of elephants teeth; the point or apex is white, and the other extremity green. They are both ribbed and nakered, and are diſtinguiſhed from each other only by ſome excreſcences which appear on the uppermoſt. Fig. 7. are two ſmall ſhells of the dental figure, called for diſtinction antales. They are perfectly ſmooth; one is white, and the other reddiſh.

PIPER, in ichthyology. See Trigla.

Piper, *Pepper*; a genus of the trigynia order, belonging to the diandria claſs of plants. There are 20 ſpecies, of which the moſt remarkable is the firiboa, with oval, heart-ſhaped, nerved leaves, and reflexed ſpikes. This is the plant which produces the pepper ſo much uſed in food. It is a ſhrub whoſe root is ſmall, fibrous, and flexible; it riſes into a ſtem, which requires a tree or a prop to ſupport it. Its wood has the ſame ſort of knots as the vine; and when it is dry, it exactly reſembles the vine-branch. The leaves, which have a ſtrong ſmell and a pungent taſte, are of an oval ſhape; but they diminiſh towards the extremity, and terminate in a point. From the flower-buds, which are white, and are ſometimes placed in the middle and ſometimes at the extremity of the branches, are produced ſmall berries reſembling thoſe of the currant-tree. Each of theſe contains between 20 and 30 corns of pepper; they are commonly gathered in October, and expoſed to the ſun ſeven or eight days. The fruit, which was green at firſt, and afterwards red, when ſtripped of its covering aſſumes the appearance it has when we ſee it. The largeſt, heavieſt, and leaſt ſhrivelled, is the beſt.

The pepper plant flouriſhes in the iſlands of Java, Sumatra (a), and Ceylon, and more particularly on the Malabar coaſt. It is not ſown, but planted; and great nicety is required in the choice of the ſhoots. It produces no fruit till the end of three years; but bears ſo pentifully the three ſucceeding years, that ſome plants yield between ſix and ſeven pounds of pepper. The bark then begins to ſhrink; and the ſhrub declines ſo faſt, that in 12 years time it ceaſes bearing.

The culture of pepper is not difficult: it is ſufficient to plant it in a rich ſoil, and carefully to pull up the weeds that grow in great abundance round its roots, eſpecially the three firſt years. As the ſun is highly neceſſary to the growth of the pepper plant, when it is ready to bear, the trees that ſupport it muſt be lopped to prevent their ſhade from injuring the fruit. When the ſeaſon is over, it is proper to crop the head of the plant. Without this precaution, there would be too much wood, and little fruit.

The pepper exported from Malabar, which was formerly entirely in the hands of the Portugueſe, and is at preſent divided between the Dutch, Britiſh, and French, amounts to about 10,000,000 weight. Betel, or betle, is a ſpecies of this genus. See Betel. It is a creeping and climbing plant like the ivy; and its leaves a good deal reſemble thoſe of the citron, though they are longer and narrower at the extremity. It grows in all parts of India, but thrives beſt in moiſt places. The natives cultivate it as we do the vine, placing props for it to run and climb upon; and it is a common practice to plant it againſt the tree which bears the areca nut.

At all times of the day, and even in the night, the Indians chew the leaves of the betel, the bitterneſs of which is corrected by the areca that is wrapped up in them. There is conſtantly mixed with it the chinam, a kind of burnt lime made of ſhells. The rich frequent-

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(a) See a copious account of the mode of cultivating pepper in Sumatra, in Mr Marſden's *Hiſtory of Sumatra*, or in the *New Annual Regiſter* for 1783, p. 147.

ſy add perfumes, either to gratify their vanity or their ſenſuality.

It would be thought a breach of politeneſs among the Indians to take leave for any long time, without preſenting each other with a purſe of betel. It is a pledge of friendſhip that relieves the pain of abſence. No one dares to ſpeak to a ſuperior unleſs his mouth is perfumed with betel; it would even be rude to neglect this precaution with an equal. The women of gallantry are the moſt laviſh in the uſe of betel, as being a powerful incentive to love. Betel is taken after meals; it is chewed during a viſit; it is offered when you meet, and when you ſeparate; in ſhort, nothing is to be done without betel. If it is prejudicial to the teeth, it aſſiſts and ſtrengthens the ſtomach. At leaſt, it is a general faſhion that prevails throughout India.

London Medical Journal, vol. viii. part iii. p. 276, &c.

The *piper amalago*, or black pepper, and the *piper inequale*, or long pepper of Jamaica, with ſome other ſpecies, are indigenous, and known by the names of *joint wood*, or *peppery elders*. The firſt bears a ſmall ſpike, on which are attached a number of ſmall ſeeds of the ſize of muſtard. The whole of the plant has the exact taſte of the Eaſt India black pepper. The long pepper buſh grows taller than the amalago. The leaves are broad, ſmooth, and ſhining. The fruit is ſimilar to the long pepper of the ſhops, but ſmaller. The common people in Jamaica ſeaſon their meſſes with the black pepper. To preſerve both, the fruit may be ſlightly ſcalded when green, then dried, and wrapped in paper. Perhaps hereafter they may be deemed worthy of attention.

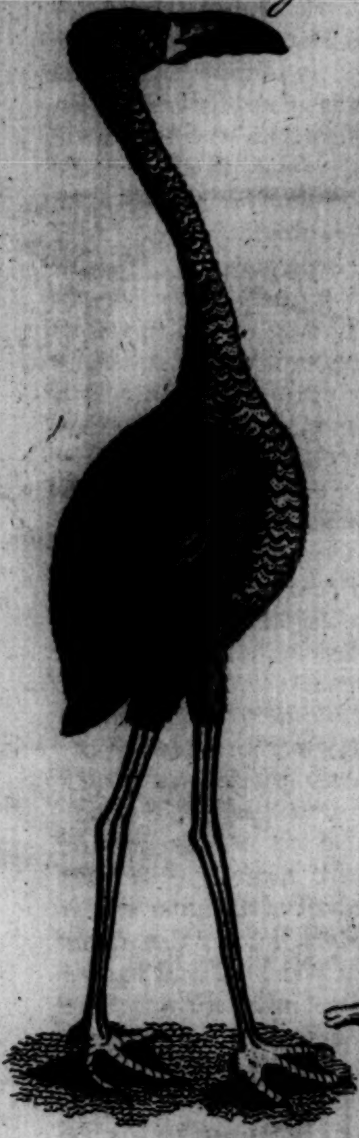
PIPRA, in ornithology; a genus of birds of the order of *paſſeres*. Latham gives it the name of *manakin*, and ſo does Buffon, who informs us that it was beſtowed upon them by the Dutch ſettlers in Surinam. Latham deſcribes 25 different ſpecies, and five varieties. The general character of the genus is, that the bill is ſhort, ſtrong, hard, and ſlightly incurvated, and the noſtrils are naked. The middle toe is connected to the outer as far as the third joint: this character, however, is not altogether univerſal, ſome of the ſpecies differing in this particular. The tail is ſhort. This genus has a conſiderable reſemblance to the genus *parus*, or titmouſe. They are ſuppoſed to inhabit South America only; but this is not true, for Mr Latham aſſures us that he has ſeen many of thoſe ſpecies which he has deſcribed which came from other parts, but which neverthele ſs certainly belong to this genus.—Buffon differs widely in his arrangement from Mr Latham, and only enumerates ſix diſtinct ſpecies. Without particularizing thoſe differences, however, we ſhall give from Buffon the following elegant account of the genus in general: "The natural habits common to them all were not known, and the obſervations which have been made are ſtill inſufficient to admit an exact detail. We ſhall only relate the remarks communicated to us by Sonini of Manoncour, who ſaw many of theſe birds in their native climates. They inhabit the immenſe foreſts in the warm parts of America, and never emerge from their receſſes to viſit the cleared grounds or the vicinity of the plantations. They fly with conſiderable ſwiftneſs, but always at a ſmall height, and to ſhort diſtances; they never perch on the ſummits of trees, but on the middle branches; they feed upon ſmall wild fruits, and alſo eat inſects. They generally occur in ſmall bodies of eight or ten of the ſame ſpecies, and ſometimes intermingled with other flocks of the ſame genus, or even of a different genus, ſuch as the Cayenne warblers, &c. It is commonly in the morning that they are found thus aſſembled, and then ſeem to be joyous, and warble their delicate little notes. The freſhneſs of the air ſeems to inſpire the ſong, for they are ſilent during the burning heat of the day, and diſperſe and retire to the ſhade of the thickeſt parts of the foreſt. This habit is obſerved, indeed, in many kinds of birds, and even in thoſe of the woods of France, where they collect to ſing in the morning and evening; but the manakins never aſſemble in the evening, and continue together only from ſun-riſe to nine or ten o'clock in the forenoon, and remain ſeparate during the reſt of the day and the ſucceeding night. In general they prefer a cool humid ſituation, though they never frequent marſhes or the margins of lakes."

1. The *pipra rupicola*, or creſted manakin, is about the ſize of a ſmall pigeon, being about 10 or 12 inches long. The bill is about an inch and a quarter long, and of a yellowiſh colour. The head is furniſhed with a double round creſt; the general colour of the plumage is orange, inclining to ſaffron; the wing coverts are looſe and fringed; the quills are partly white and partly brown; the tail feathers are in number 12; the baſe half of the ten middle ones is of an orange colour, from thence to the ends they are brown; the outer feathers are brown, and the baſe half of the inner web is orange; all of them are ſimilarly fringed; the upper tail coverts are very long, looſely webbed, and ſquare at the ends; the legs and claws are yellow. The female is altogether brown, except the under wing coverts, which are of a rufous orange; the creſt is neither ſo complete nor rounded as that of the male. Both males and females are at firſt grey, or of a very pale yellow, inclining to brown. The male does not acquire the orange colour till the ſecond year, neither does the female the full brown.

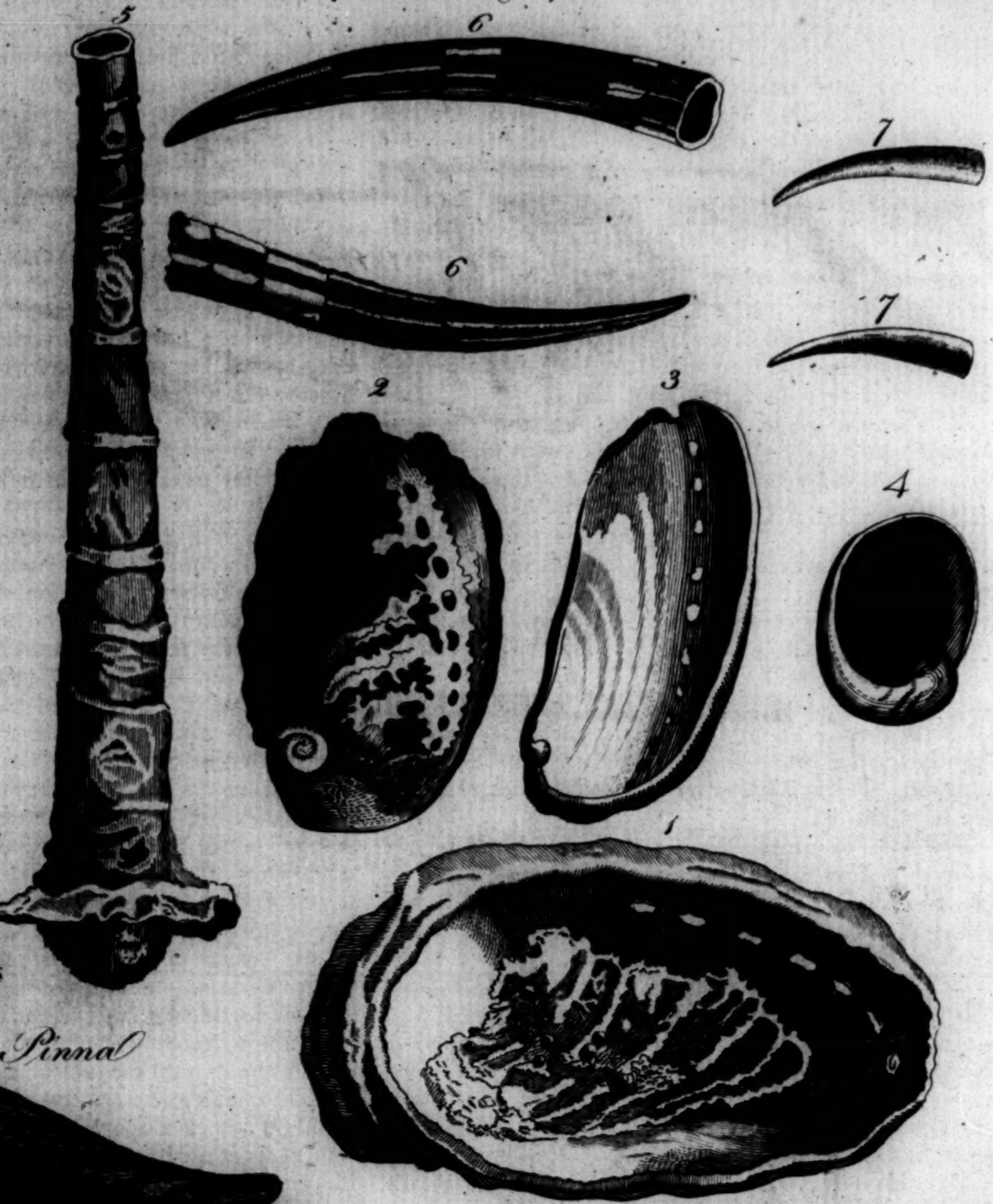
"This beautiful ſpecies (ſays Latham), inhabits various parts of Surinam, Cayenne, and Guiana, in rocky ſituations; but is nowhere ſo frequent as in the mountain Luca, near the river Oyapoc, and in the mountain Courouaye, near the river Aprouack, where they build in the cavernous hollows, and the darkeſt receſſes. They lay two round white eggs, the ſize of thoſe of a pigeon, and make the neſt of a few dry bits of ſticks. They are in general very ſhy, but have been frequently tamed, inſomuch as to run at large among the poultry. It is ſaid that the female, after ſhe has laid eggs for ſome years, and ceaſes ſo to do more, becomes at the enſuing moult of the ſame colour as the male, and may be miſtaken for him; in this imitating the females of various kinds of poultry, ſuch as the peacock, pheaſant, &c. (See PAVO, &c.) A moſt complete pair is in the Leverian Muſeum." Our author deſcribes a variety of this ſpecies, which he calls the *Peruvian manakin*. It is longer than the preceding, eſpecially in the tail, and the upper coverts of it are not truncated at the ends; the wing coverts are not fringed, as in the rock manakin, and the creſt is not ſo well defined as in that bird; the general colour of the plumage inclines much to red; the ſe-

Plate CCCXCII

Phœnicopterus Ruber
The Flamingo

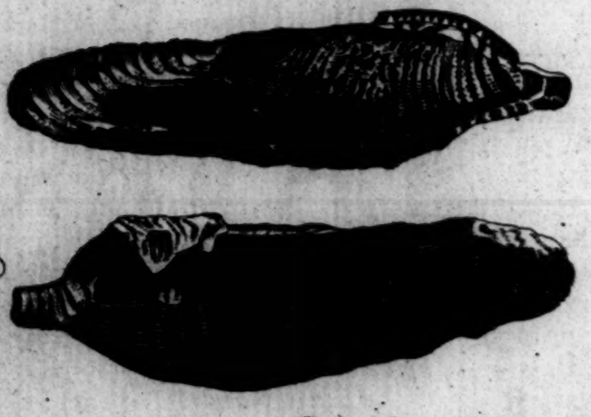


Sea ears & Pipes

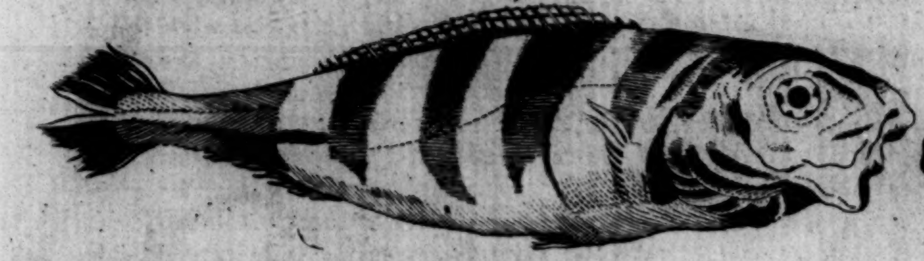


Pinna

Pholas



Pilot fish



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m

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Machine for boring wooden PIPES

Plate CCCXCIII

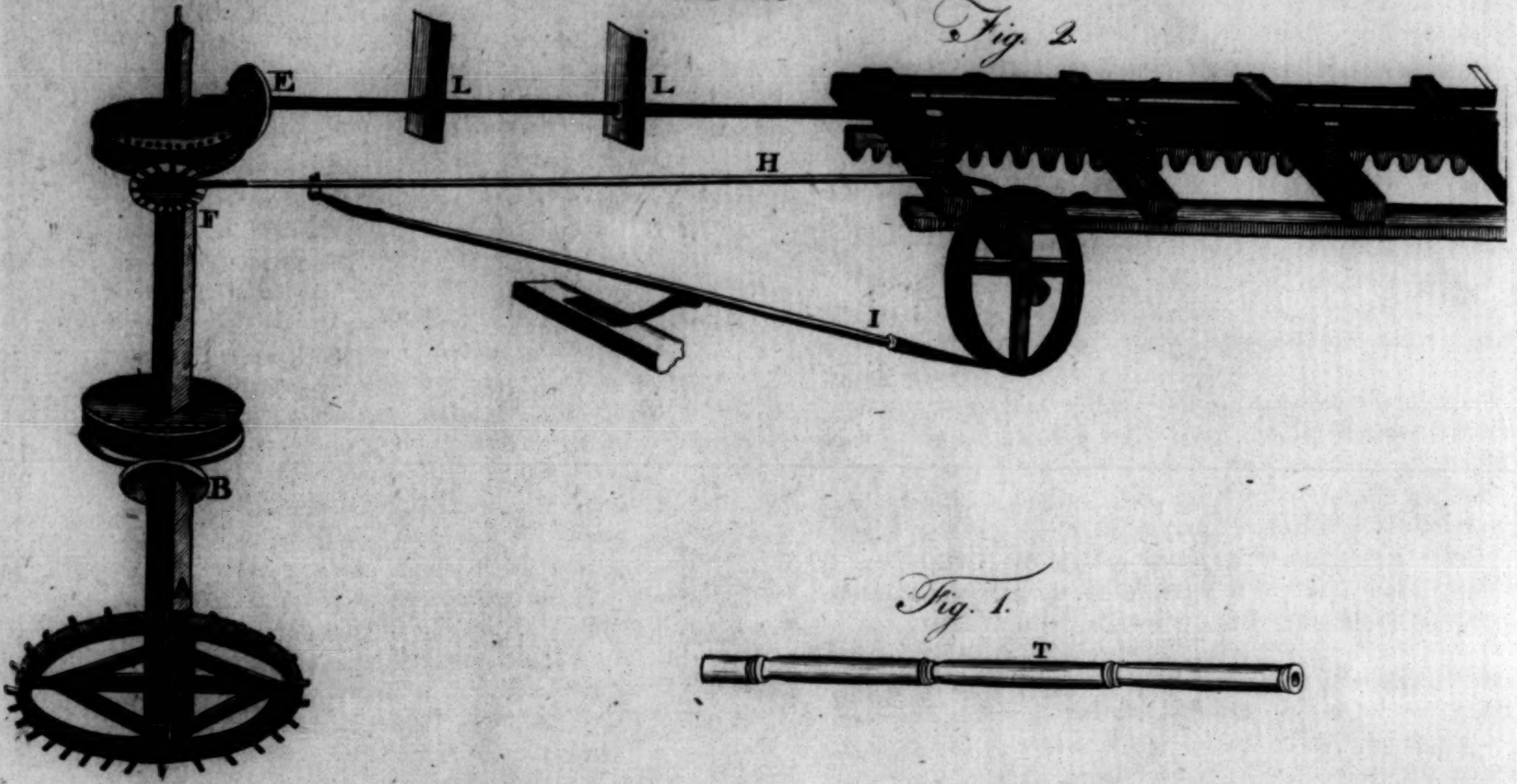
Fig. 2.

Fig. 1.

Bunce's PILE Engine.

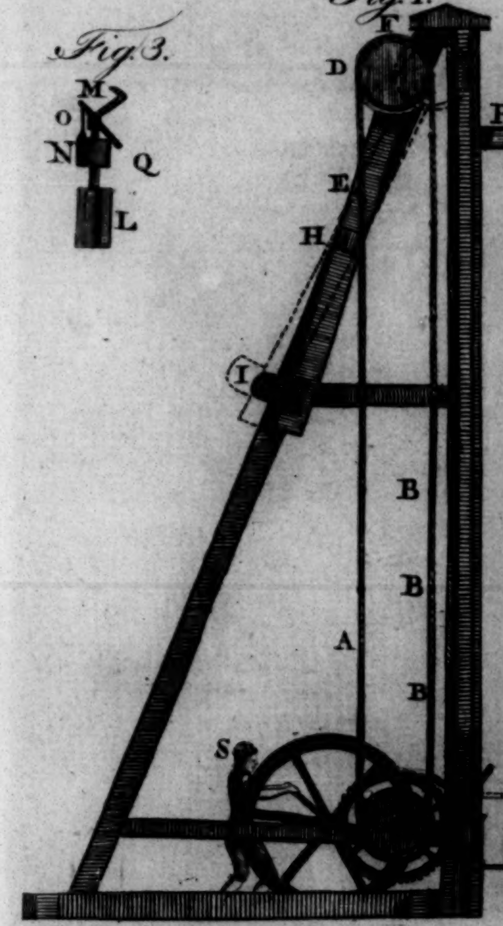
Fig. 3.

M
O
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L

Fig. 1.

F
D
R
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A
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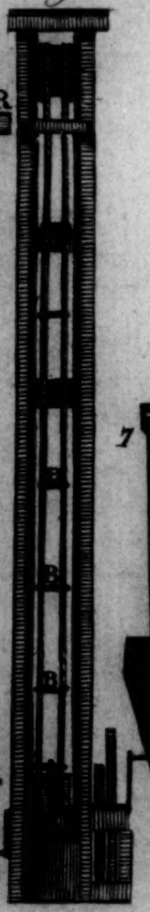
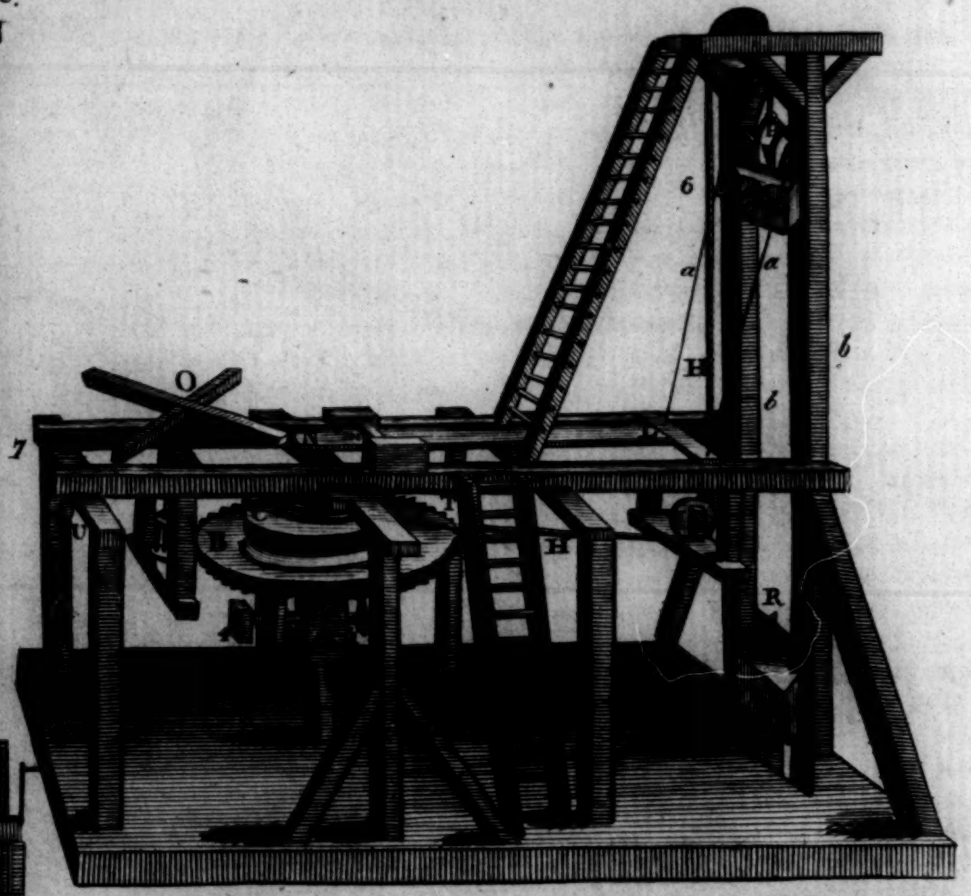
S

Fig. 2.



Vaulone's PILE Engine


6
a
a
b
H
b
O
7
U
H
R

R. Scot & S. Allardice.

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cond coverts and rumps are of an aſh colour; the wings and tail are black; the bill and legs are as in the laſt deſcribed. It is an inhabitant of Peru, from whence its name.

2. The next and laſt ſpecies which we ſhall deſcribe (for it would be impoſſible to enumerate them all), Mr Latham calls the *tuneful manakin*. Its length is four inches; the bill is duſky, the forehead yellow, and the crown and nape blue; the chin, ſides of the head below the eyes, and the throat, are black; the upper part of the back, the wings, and the tail, are duſky black; the tail is very ſhort; the lower part of the back and rump, the breaſt, belly, vent, and thighs, are orange coloured; the legs are duſky. It is a native of St Domingo, where it has gained the name of *organiſte* from its note, forming the complete octave in the moſt agreeable manner, one note ſucceſſively after another. It is ſaid not to be uncommon, but not eaſy to be ſhot, as, like the creeper, it perpetually ſhifts to the oppoſite part of the branch from the ſpectator's eye, ſo as to elude his vigilance. It is moſt likely the very bird mentioned by Du Pratz, above quoted, whoſe notes, he ſays, are ſo varied and ſweet, and which warbles ſo tenderly, that thoſe who have heard it value much leſs the ſong of the nightingale. It is ſaid to ſing for near two hours without ſcarce taking breath, and after a reſpite of about the ſame time begins again. Du Pratz, who himſelf has heard it, ſays that it ſung perched on an oak, near the houſe he was then in.

PIQUET, or PICKET, a celebrated game at cards, much in uſe throughout the polite world.

It is played between two perſons, with only 32 cards; all the duces, threes, fours, fives and ſixes, being ſet aſide.

In reckoning at this game, every card goes for the number it bears, as a ten for ten; only all court cards go for ten, and the ace for eleven: and the uſual game is one hundred up. In playing, the ace wins the king, the king the queen, and ſo down.

Twelve cards are dealt round, uſually by two and two; which done, the remainder are laid in the middle: if one of the gameſters finds he has not a court-card in his hand he is to declare he has *carte-blanche*, and tell how many cards he will lay out, and deſire the other to diſcard, that he may ſhow his game, and ſatiſfy his antagoniſt that the carte-blanche is real; for which he reckons ten.

Each perſon diſcards, *i. e.* lays aſide a certain number of his cards, and takes in a like number from the ſtock. The firſt of the eight cards may take three, four, or five; the dealer all the remainder, if he pleaſes.

After diſcarding, the eldeſt hand examines what ſuit he has moſt cards of; and reckoning how many points he has in that ſuit, if the other have not ſo many in that or any other ſuit, he tells one for every ten of that ſuit. He who thus reckons moſt is ſaid to win the point.

The point being over, each examines what *ſequences* he has of the ſame ſuit, *viz.* how many tierces, or ſequences of three, quartes or fours, quintes or fives, ſixieme, or ſix's, &c. For a tierce they reckon three points, for a quarte four; for a quinte 15, for a ſixieme 16, &c. And the ſeveral ſequences are diſtinguiſhed in dignity by the cards they begin from: thus ace, king, and queen, are called *tierce major*; king, queen, and knave, *tierce to a king*; knave, ten, and nine, *tierce to a knave, &c.* and the beſt tierce, quarte, or quinte, *i. e.* that which takes is deſcent from the beſt card, prevails, ſo as to make all the others in that hand good, and deſtroy all thoſe in the other hand. In like manner, a quarte in one hand ſets aſide a tierce in the other.

The ſequences over, they proceed to examine how many aces, kings, queens, knaves, and tens, each holds; reckoning for every three of any ſort, three: but here too, as in ſequences, he that with the ſame number of threes has one that is higher than any the other has; *e. gr.* three aces, has all his others made good hereby, and his adverſary's all ſet aſide. But four of any ſort, which is called a *quatorze*, always ſets aſide three.

All the game in hand being thus reckoned, the eldeſt proceeds to play reckoning one for every card he plays above a nine, and the other follows him in the ſuit; and the higheſt card of the ſuit wins the trick. Note, unleſs a trick be won with a card above a nine (except the laſt trick), nothing is reckoned for it: though the trick ſerves afterwards towards winning the cards; and that he who plays laſt does not reckon for his cards unleſs he wins the trick.

The cards being played out, he that has moſt tricks reckons ten for winning the cards. If they have tricks alike, neither reckons any thing. The deal being finiſhed, and each having marked up his game, they proceed to deal again as before cutting afreſh each time for the deal.

If both parties be within a few points of being up, the carte-blanche is the firſt thing that reckons, then the point, then the ſequences, then the quatorzes or threes, then the tenth cards.

He that can reckon 30 in hand by carte-blanche, points, quintes, &c. without playing, ere the other has reckoned any thing, reckons 90 for them; and this is called a *repique*. If he reckons above 30, he reckons ſo many above 90. If he can make up 30, part in hand and part play, ere the other has told any thing, he reckons for them 60. And this is called a *pique*. Whence the name of the game. He that wins all the tricks, inſtead of ten, which is his right for winning the cards, reckons 40. And this is called a *capot*.

Mr de Moivre, who has made this game the object of mathematical inveſtigations, has propoſed and ſolved the following problems: 1. To find at piquet the probability which the dealer has for taking one ace or more in three cards, he having none in his hand. He concludes from his computation, that it is 29 to 28 that the dealer takes one ace or more. 2. To find at piquet the probability which the eldeſt has of taking an ace or more in five cards, he having no ace in his hand. Anſwer; 232 to 91, or 5 to 2, nearly. 3. To find at piquet the probability which the eldeſt hand has of taking an ace and a king in five cards, he having none in his hand. Anſwer; the odds againſt the eldeſt hand taking an ace and a king are 331 to 315, or 21 to 20 nearly. 4. To find at piquet the probability of having 12 cards dealt to, without king, queen, or knave, which caſe is commonly called *cartes-blanches*. Anſwer; the odds againſt cartes-blanches are 1791 to 1 nearly. 5. To find how many different ſets, eſſentially different from one another, one may have at piquet before taking in. Anſwer; 28,967,278. This number falls ſhort of the ſum of all the diſtinct combinations, whereby 12 cards may be taken out of 32, this number being 225,792,840; but it muſt be conſidered that in that number ſeveral ſets of the ſame import, but differing in ſuit, might be taken, which would not introduce an eſſential difference among the ſets. The ſame author gives alſo ſome obſervations on this game, which he had from an experienced player. See *Doctrine of chances*, n. 179, &c. M. de Monmort has treated of piquet in his *Analyſe des Jeux de Hazard*, p. 162.

PIRA, is a name by which a variety of foreign fiſhes are diſtinguiſhed. The *pira-aca* is a little horned fiſh of the Weſt Indies, called by Cluſius and others the *monoceros* or *unicorn fiſh*. The *pira acangata* is the name of a Braſilian fiſh, which reſembles the perch both in ſize and ſhape. It ſeldom exceeds four or five inches in length; its mouth is ſmall; its tail forked. On the back it has only one long fin, which is ſupported by rigid and prickly ſpines. This fin it can depreſs at pleaſure, and ſink within a cavity made for it in the back. Its ſcales are of a ſilvery white colour; it is wholeſome and well taſted. *Pira bebe* is the name of the milvus, or kite-fiſh. *Pira cooba* is an American fiſh of the truttaceous kind, of a very delicate flavour. It grows to the length of 12 inches; its noſe is pointed, and its mouth large, but without teeth; the upper jaw is longer than the under one, and hangs over like a cartilaginous prominence; its eyes are very large, and its tail is forked; under each of the gill fins there is a beard made of ſix white filaments, and covered with ſilvery ſcales. *Pira jurumenbeca* is a Braſilian fiſh, otherwiſe called *bocca molle*. It lives in the muddy bottom of the American ſeas, and is a long bodied not flatted fiſh. It grows to a great ſize, being found nine, and ſometimes even ten and eleven, feet long and two feet and a half thick. It has one long fin on the back, the anterior part of which is thin and pellucid. There is alſo a cavity on the back, as in the pira acangata, into which the fin can be depreſſed at pleaſure; the tail is not forked, and the ſcales are all of a ſilvery colour and brightneſs. The fiſh is very well taſted; the *pira pixanga* is another Braſilian fiſh of the turdus or wraſſe kind, and called by ſome the *gatwiſch*. It is generally about four or five inches long; its mouth is pretty large, and furniſhed with very ſmall and very ſharp teeth; its head is ſmall, but its eyes are large and prominent, the pupil being of a fine turquoiſe colour, and the iris yellow and red in a variety of ſhades. The coverings of the gills end in a triangular figure, and are terminated by a ſhort ſpine or prickle; its ſcales are very ſmall, and ſo evenly arranged, and cloſely laid on the fleſh, that it is very ſmooth to the touch; its tail is rounded at the end, its whole body, head, tail, and fins, are of a pale yellow colour, variegated all over with very beautiful blood-coloured ſpots; theſe are round, and of the bigneſs of hemp-ſeed on the back and ſides, and ſomething larger on the belly; the fins are all ſpotted in the ſame manner, and are all marked with an edge of red. It is caught among the rocks, and about the ſhores, and is a very well taſted fiſh. *Pirauba* is an American fiſh, more generally known by the name *piraya*. *Pyraquiba*, or *Ipiraquiba*, is the name of a fiſh originally Braſilian, which ſome writers apply to the *remora* or *ſucking fiſh*.

PIRÆUS PORTUS, (anc. geog.), a celebrated port to the weſt of Athens, conſiſting naturally of three harbours or baſons, (Thucydides); which lay neglected, till Themiſtocles put the Athenians on making it a commodious port, (Nepos); the Phalerus, a ſmall port, and not far from the city, being what they uſed before that time, (Pauſanias, Nepos). Piræus was originally a village of Attica, (Pauſanias); an iſland, (Strabo); and though diſtant 40 ſtadia from Athens, was joined to it by two long walls, (Thucydides), and itſelf locked or walled round, (Nepos); A very commodious and ſafe harbour. The whole of its compaſs was 60 ſtadia, including the Munichia. Not far from the Piræus ſtood the ſepulchre of Themiſtocles; whither his friends conveyed his bones from Magneſia, into the Hither Aſia, (Cicero, Plutarch, Pauſanias). The entrance of the Piræus is narrow, and formed by two rocky points, one belonging to the promontory of Eetion, the other to that of Alcimus. Within were three ſtations for ſhipping; Kantharus, ſo named from a hero; Aphrodiſium, from a temple of Venus; and Zea, the reſort of veſſels laden with grain. By it was a demos or borough town of the ſame name before the time of Themiſtocles, who recommended the exchanging its triple harbour for the ſingle one of Phalerum, both as more capacious and as better ſituated for navigators. The wall was begun by him when archon, in the ſecond year of the 75th Olympiad, 477 years before Chriſt; and afterwards he urged the Athenians to complete it as the importance of the place deſerved. This whole fortification was of hewn ſtone, without cement or other material, except lead and iron, which were uſed to hold together the exterior ranges or facings. It was ſo wide that the loaded carts could paſs on it in different directions, and it was 40 cubits high, which was about half what he had deſigned.

Chandler's Travels in Greece, p. 29, &c.

The Piræus, as Athens flouriſhed, became the common emporium of all Greece. Hippodamus an architect, celebrated, beſides other monuments of his genius, as the inventor of many improvements in houſe building, was employed to lay out the ground. Five porticoes, which uniting formed the *Long Portico*, were erected by the ports. Here was an *agora* or market-place, and, farther from the ſea, another called *Hippodamia*. By the veſſels were dwellings for the mariners. A theatre was opened, temples were raiſed, and the Piræus, which ſurpaſſed the city in utility, began to equal it in dignity. The cavities and windings of Munychia, natural and artificial, were filled with houſes; and the whole ſettlement, comprehending Phalerum and the ports of the Piræus, with the arſenals, the ſtorehouſes, the famous armoury of which Philo was the architect, and the ſheds for 300, and afterwards 400, triremes, reſembled the city of Rhodes, which had been planned by the ſame Hippodamus. The ports, on the commencement of the Peloponneſian war, were ſecured with chains. Centinals were ſtationed, and the Piræus was carefully guarded.

The Piræus was reduced with great difficulty by Sylla, who demoliſhed the walls, and ſet fire to the armoury and arſenals. In the civil war it was in a defenceleſs condition. Calenus, lieutenant to Cæſar, ſeized it, inveſted Athens, and ravaged the territory. Strabo, who lived under the emperors Auguſtus and Tiberius, obſerves, that the many wars had deſtroyed the long walls, with the fortreſs of Munychia, and had contracted the Piræus into a ſmall ſettlement by the ports and the temple of Jupiter Saviour. This fabric was then adorned with wonderful pictures, the works of illuſtrious artiſts, and on the outſide with ſtatues. In the ſecond century, beſides houſes for triremes, the temple of Jupiter and Minerva remained, with their images in braſs, and a temple of Venus, a portico, and the tomb of Themiſtocles.

The port of the Piræus has been named *Porto Lione* from the marble lion ſeen in the chart, and alſo *Porto Draco*. The lion has been deſcribed as a piece of admirable ſculpture, 10 feet high, and as repoſing on its hinder parts. It was pierced, and, as ſome have conjectured, had belonged to a fountain. Near Athens, in the way to Eleuſis, was another, the poſture couchant; probably its companion. Both theſe were removed to Venice by the famous general Moroſini, and are to be ſeen there before the arſenal. At the mouth of the port are two ruined piers. A few veſſels, moſtly ſmall craft, frequent it. Some low land at the head ſeems an incroachment on the water. The buildings are a mean cuſtomhouſe, with a few ſheds; and by the ſhore on the eaſt ſide, a warehouſe belonging to the French; and a Greek monaſtery dedicated to St Spiridion. On the oppoſite ſide is a rocky ridge, on which are remnants of the ancient wall, and of a gateway towards Athens. By the water edge are veſtiges of building; and going from the cuſtomhouſe to the city on the right hand, traces of a ſmall theatre in the ſide of the hill of Munychia.

PIRACY, the crime of robbery and depredation upon the high ſeas.

By the ancient common law, piracy, if committed by a ſubject, was held to be a ſpecies of treaſon, being contrary to his natural allegiance; and by an alien, to be felony only: but now, ſince the ſtatute of treaſons, 25 Edw. III. c. 2. it is held to be only felony in a ſubject. Formerly it was only cognizable by the admiralty courts, which proceed by the rules of the civil law. But, it being inconſiſtent with the liberties of the nation, that any man's life ſhould be taken away, unleſs by the judgment of his peers, or the common law of the land, the ſtatute 28 Hen. VIII. c. 15. eſtabliſhed a new juriſdiction for this purpoſe; which proceeds according to the courſe of the common law.

The offence of piracy, by common law, conſiſts in committing thoſe acts of robbery and depredation upon the high ſeas, which, if committed upon land, would have amounted to felony there. But, by ſtatute, ſome other offences are made piracy alſo; as, by ſtatute 11 and 12 W. III. c. 7. if any natural born ſubject commits any act of hoſtility upon the high ſeas, againſt others of his majeſty's ſubjects, under colour of a commiſſion from any foreign power; this, though it would only be an act of war in an alien, ſhall be conſtrued piracy in a ſubject. And farther any commander, or other ſeafaring perſon, betraying his truſt, and running away with any ſhip, boat, ordnance, ammunition, or goods; or yielding them up voluntarily to a pirate; or conſpiring to do theſe acts; or any perſon aſſaulting the commander of a veſſel, to hinder him for fighting in defence of his ſhip; or confining him, or cauſing or endeavouring to cauſe a revolt on board; ſhall for each of theſe offences, be adjudged a pirate, felon, and robber, and ſhall ſuffer death, whether he be principal, or merely acceſſory by ſetting forth ſuch pirates, or abbetting them before the fact, or receiving or concealing them or their goods after it. And the ſtatute 4 Geo. I. c. 11. expreſsly excludes the principals from the benefit of clergy. By the ſtatute 8 Geo. I. c. 24. the trading with known pirates, or furniſhing them with ammunition, or fitting out any veſſel for that purpoſe, or in any wiſe conſulting, combining, confederating, or correſponding with them, or the forcibly boarding any merchant veſſel, though without ſeizing or carrying her off, and deſtroying or throwing any of the goods overboard; ſhall be deemed piracy; and ſuch acceſſories to piracy as are deſcribed by the ſtatute of king William are declared to be principal pirates; and all pirates convicted by virtue of this act are made felons without benefit of clergy. By the ſame ſtatutes alſo, (to encourage the defence of merchant veſſels againſt pirates), the commanders or ſeamen wounded, and the widows of ſuch ſeamen as are ſlain, in any piratical engagement, ſhall be entitled to a bounty to be divided among them, not exceeding one fiftieth part of the value of the cargo on board: and ſuch wounded ſeamen ſhall be entitled to the penſion of Greenwich hoſpital; which no other ſeamen are, except only ſuch as have ſerved in a ſhip of war. And if the commander ſhall behave cowardly, by not defending the ſhip, if ſhe carries guns or arms; or ſhall diſcharge the mariners from fighting, ſo that the ſhip falls into the hands of pirates; ſuch commander ſhall forfeit all his wages and ſuffer ſix months impriſonment. Laſtly, by ſtatute 18 Geo. II. c. 50. any natural born ſubject or denizen, who in time of war ſhall commit hoſtilities at ſea againſt any of this fellow-ſubjects, or ſhall aſſiſt an enemy on that element, is liable to be tried and convicted as a pirate

PIRATE, (πειρατης, Gr.); a ſea-robber, or an armed ſhip that roams the ſeas without any legal commiſſion, and ſeizes or plunders every veſſel ſhe meets indiſcriminantely, whether friends or enemies.

The colours uſually diſplayed by pirates are ſaid to be a black field, with a death's head, a battle-axe, and hour glaſs. The laſt inſtrument is generally ſuppoſed to determine the time allowed to the priſoners, whom they take, to conſider whether they will join the pirates in their felonious combination, or be put to death, which is often perpetrated in the moſt cruel manner.

Amongſt the moſt celebrated pirates of the north is recorded Alvilda, daughter of a king of the Goths named *Sypardus*. She embraced this occupation to deliver herſelf from the violence impoſed on her inclination, by a marriage with Alf, ſon of Sigarus king of Denmark. She dreſſed herſelf as a man; and compoſed her band of rowers, and the reſt of her crew, of a number of young women attired, in the ſame, manner. Amongſt the firſt of her cruizes, ſhe touched at a place where a company of pirates bewailed the

Pirene
‖
Piron.

death of their captain. The ſtrangers were captivated with the agreeable manners of Alvilda, and choſe her for their chief. By this reinforcement ſhe became ſo formidable upon the ſea, that prince Alf came to engage her. She ſuſtained his attacks for a conſiderable time; but, in a vigorous action, Alf boarded her veſſel, and having killed the greateſt part of her crew, ſeized the captain, namely herſelf; whom nevertheleſs he knew not, becauſe the princeſs had a caſque which covered her viſage. Being maſter of her perſon, he removed the caſque; and in ſpite of her diſguiſe, inſtantly recognized her, and offered her his hand in wedlock.

PIRENE, (Pliny); a fountain ſacred to the muſes, ſpringing below the top of the Acrocorinthus, a high and ſteep mountain which hangs over Corinth. Its waters were agreeable to drink, (Pauſanias); extremely clear, (Strabo); very light, (Athenæus); and pale, (Perſius); having relation either to the grief of Pirene, mother of Cenchrea, from whoſe tears this fountain aroſe, (Pauſanias); or to the paleneſs brought on by the too eager purſuits of the muſes.

PIROMALLI (Paul), a dominican of Calabria was ſent a miſſionary into the eaſt. He remained a long time in Armenia, where he had the happineſs to bring back to the church many ſchiſmatics and Eutycheans, and the patriarch himſelf, who had before thrown every obſtacle in his way. He afterwards paſſed into Georgia and Perſia, then into Poland, in quality of Pope Urban VIII.'s nuncio, in order to appeaſe the diſturbances which had been occaſioned there by the diſputes of the Armenians, who were very numerous in that country. Piromalli reunited them in the profeſſion of the ſame faith, and obſervance of the ſame ceremonies. In his return to Italy, he was taken by ſome Corſairs who carried him priſoner to Tunis. As ſoon as he was ranſomed, he went to Rome, and gave an account of his miſſion to the pope, who conferred upon him ſome ſignal marks of of his eſteem. His holineſs intruſted him with the reviſal of an Armenian Bible, and ſent him again into the eaſt, where he was promoted, in 1655, to the biſhopric of Naſſivan. After having governed that church for nine years, he returned to Italy, and took the charge of the church of Baſignano, where he died three years after in 1667. His charity, his zeal, and other virtues did honour to the Epiſcopal office. There are extant of his writings, 1. Some works of Controverſy and Theology. 2. Two Dictionaries; the one a Latin-Perſian, and the other an Armenian-Latin. 3. An Armenian Grammar. 4. A Directory, which is of great uſe in correcting Armenian books. All theſe works equally diſtinguiſh him for virtue and for learning.

PIRON (Alexis), whoſe father was an apothecary, was born at Dijon the 9th of July, 1689 where he paſſed more than 30 years in the idle and deſtructive diſſipation too common to young men. He was at length obliged to quit the place of his nativity, in order to avoid the reproaches of his fellow-citizens, on account of an ode which he had written, and which gave great offence. His relations not being able to give him much aſſiſtance, he ſupported himſelf at Paris by means of his pen, the ſtrokes of which were as beautiful and fair as thoſe of an engraver. He lived in the houſe of M. de Belliſle as his ſecretary, and afterwards with a financier, who did not know that he had a man of genius under his roof. His reputation as a writer commenced with ſome pieces which he publiſhed for the entertainment of the populace, and which ſhowed ſtrong marks of original invention, but what fully eſtabliſhed his character in this way was his comedy intitled *Metromany*, which was the beſt that had appeared in France ſince Regnard's Gameſter. This performance, in five acts, well conducted, replete with genius, wit, and humour, was acted with the greateſt ſucceſs upon the French ſtage in 1738. The author met with every attention in the capital which was due to a man of real genius, and whoſe flaſhes of wit were inexhauſtible. We ſhall inſert a few anecdotes of him, which will ſerve to ſhow his character and turn of mind. In Burgundy the inhabitants of Beauſe are called the *Aſſes of Beaune*. Piron often indulged his ſatirical diſpoſition at their expence. One day as he was taking a walk in the neighbourhood of that city, he diverted himſelf with cutting down all the thiſtles which he met with. When a friend aſked him his reaſon for doing ſo, he replied, *J'ai à me plaindre des Beaunois; je leur coupe les vivres*, i. e. "I am ſorry indeed for the Beaunians; for I am cutting down their food." Being told again that theſe people would certainly be revenged of him,

Allez, (ſays he) *Allez : je ne crains point leur impuiſſant*
courroux ;
Et, quand je ſerois ſeul, je les batterois tous.

"Get you gone, get you gone: I fear not their feeble revenge; for tho' alone, I ſhould beat them all." Going into a theatre one time where a play was acting, he aſked what it was? The Cheats of Scapin, gravely replied a young Beaunian. "Ah! Sir, (ſays Piron, after thanking him), I took it to be the Cheats of Oreſtes." In the time of the play, ſome body addreſſes the company with "Silence there gentlemen, we dont hear." "It is not at leaſt (cried Piron) for want of ears." A biſhop one day aſked Piron, during the diſputes about Janſeniſm, "Did you read my mandate, Mr Piron?" "No, my lord; and you——The converſation turning very warm, the biſhop reminded him of the diſtance which birth and rank had put between them. "Sir (ſays Piron), I have plainly the ſuperiority over you at this moment; for I am in the right and you are in the wrong."—Voltaire's Semiramis did not meet with a very favourable reception the firſt time it was acted. The author finding Piron behind the ſcenes aſked him what he thought of his performance? "I think (replied he) you would have been pleaſed that I had been the author it." The performer of the character Ferdinand Cortez (the title of one of Piron's Tragedies) having requeſted ſome corrections to be made on the play the firſt time it was acted, Piron fired at the word *corrections*. The player, who was deputed to wait upon the author with this requeſt, cited the example of Voltaire, who corrected ſome of his pieces in order to gratify the taſte of the public. "The caſes are widely different (replied Piron); Voltaire works in chequer-work, and I caſt in braſs." If this anſwer be not very modeſt, we muſt allow that it does not want wit. He thought himſelf if not ſuperior, at leaſt equal to Voltaire. Some perſon congratulating him on having compoſed the beſt comedy of this age; he anſwered, with more frankneſs than modeſty, "Add too, and the beſt tragedy." The following verſes are well known, in which he ſays:

Piron.

En deux mots voulez-vous diſtinguer & connoitre
Le rimeur Dijonnois & le Pariſien?
Le premier ne ſut rien, & ne voulut rien etre;
L'autre voulut tout etre, & ne ſut preſque rien.

We ſee by theſe different traits that Piron had a ſufficient ſtock of ſelf-conceit. What helped to increaſe it, and make him fancy himſelf ſuperior to the moſt celebrated of his contemporaries, was, that his company, on account of his original humour, of which he had an uncommon ſhare, was more courted than that of Voltaire, who was otherwiſe too lively, too captious, and crabbed. But thoſe who have favoured us with an account of his many witticiſms in converſation, would have done more honour to his memory if they had paſſed over ſuch as were either indecent or inſipid. A thing often pleaſes over a glaſs of wine, which will not give the ſame ſatisfaction, when it is rerepeated, eſpecially if in repeating it, you want to make it appear of ſome importance. Be that as it may, Piron's miſchievous ingenuity was partly the cauſe which excluded him from the French Academy.—"I could not (ſaid he) make thirty-nine people think as I do, and I could ſtill leſs think as thirty-nine do." He called that celebrated ſociety very unjuſtly *les invalides du bel-eſprit,* "the invalids of wit;" and yet he often endeavoured to be one of thoſe invalids. His death was haſtened by a fall which he got a little before. He died the 21ſt of January 1773, at the age of 83. He had prepared for himſelf the following epitaph, in the way of an epigram:

Ci gît Piron, qui ne fut rien,
Pas même académicien.

"Here lies Piron, who was nothing, not even an academician."

His wife Maria Tereſa Quenandon, who died in 1751, he deſcribes as a ſweet and moſt agreeable companion. They lived together for ſeveral years; and no huſband ever diſcharged his duty with more fidelity and attention.

A collection of his works appeared in 1776, in 7 vol. 8vo, and 9 vol. 12mo. The principal pieces are, The School of Fathers; a comedy, acted in 1728 under the title of Ungrateful Sons. Caliſthenes; a tragedy, the ſubject of which is taken from Juſtin. The Myſterious Lover, a comedy. Guſtavus and Ferdinand Cortez, two tragedies; ſome ſcenes of which diſcover an original genius, but the verſification neither pleaſes the ear nor affects the heart. Metromany, a comedy. The Courſes of Tempe, an ingenious paſtoral, in which the manners both of the town and country are pleaſantly drawn. Some odes, poems, fables, and epigrams. In this laſt kind of poetry he was very ſucceſsful, and he may be placed after Marot and Rouſſeau. There was no occaſion for loading the public with 7 vols of his works; the half of that number might have ſufficed. For, excepting Metromany, Guſtavus, the Courſes of Tempe, ſome odes, about 20 epigrams, three or four fables, and ſome epiſtles, the reſt are but indifferent, and have no claim to any extraordinary merit.

PISA, a large town of Tuſcany in Italy, ſituated on the river Arno, 52 miles from Florence. It was a famous republic, till ſubdued, firſt by the duke of Milan, and then by the Florentines in the year 1406. Before it loſt its freedom, it is ſaid to have contained near 150,000 inhabitants, but now it has not above 16,000 or 17,000. It was founded, we are told, by the Piſans of Peloponneſus, and afterwards became one of the 12 municipia of Tuſcany. Its neighbourhood to Leghorn, which is now the chief port in the Mediterranean, though formerly of little or no note for trade, has contributed greatly to the decay of Piſa, which, however, begins to lift up its head again, under the auſpices of the preſent grand duke, who has made it his winter reſidence. Between Piſa and Leghorn is a canal 16 Italian miles in length.—Its territory is very fruitful; abounding in corn, wine, and fruit, and fine cattle. The houſes are well built, and the ſtreets even, broad, and well paved; but in many places overrun with graſs. The univerſity is well endowed, and has able profeſſors, but is not in a very flouriſhing condition. The exchange is a ſtately ſtructure, but little frequented. The grand duke's galleys are built and commonly ſtationed here. This city is alſo the principal reſidence of the order of St Stephen, and the ſee of an archbiſhop. The cathedral, a large Gothic pile, contains a great number of excellent paintings and other curioſities. This church is dedicated to St Mary; is very advantageouſly ſituated in the middle of a large piazza, and built out of a great heap of wrought marble, ſuch as pillars, pedeſtals, capitals, cornices, and architraves, part of the ſpoils which the Piſans took in their eaſtern expeditions, when the republic was in a flouriſhing condition. The roof is ſupported by 76 high marble pillars of different colours, and finely gilt. Both the church and the cupola are covered with lead. The choir is painted by good hands, and the floor is Moſaic work. The brazen doors are curiouſly wrought with the hiſtory of the Old and New Teſtament, by Bonanno, an ancient ſtatuary. The chapel of St Rainerius is richly adorned with gilt metals, columns of porphyry, and fine paintings. In the middle of the nave of the church you ſee two brazen tombs raiſed upon pillars. The marble pulpit was carved by John Piſano, and the choir by Julian da Majana. Joining thereto is the altar, over which is preſerved a hollow globe or veſſel of marble, wherein they kept the ſacrament for the new baptized, according to the opinion of Father Mabillon. In the ſquare before the church, you ſee a pillar upon which is the meaſure of the ancient Roman talent. In the ſame ſquare with the dome, ſtands the baptiſtry, a round fabric ſupported by ſtately pillars, and remarkable for a very extraordinary echo.

On the north ſide of the cathedral is the burying place called *Campo Santo,* being covered with earth, brought from the Holy Land. This burying-place is incloſed with a broad portico well painted, and paved with grave ſtones. Here are a great many ancient tombs, among the reſt that of Beatrix, mother of the counteſs Mathilda, with marble baſſo relievos, which the Piſans brought from Greece, where you ſee the hunt of Meleager, which aſſiſted Nicholas of Piſa in the reſtoration of ſculpture. The walls of the Campo Santo are painted by the beſt maſters of their times. Giotto has drawn ſix hiſtorical pieces of Job; and Andrea Orgagna has given a fine piece of the laſt judgment. Under the portico there is a decree of the city, ordering the inhabitants to wear mourning a year for the death of Cæſar. Near the church you ſee a ſteeple in the form of a cylinder, to which you aſcend by 153 ſteps; it inclines 15 feet on one ſide, which ſome aſcribe to art, but others to the ſinking of the foundation. Its inclination is ſo great that a plumb-line let fall from the top touches the ground at the diſtance of almoſt 15 feet from the bottom. It was built by John of Inſpruck and Bonanno of Piſa, in 1174. Near this ſteeple is a fine hoſpital, dependent on that of St Maria Nuova in Florence.

The ſteeple of the church of the Auguſtinians is alſo very fine, being an octagon, adorned with pillars, and built by Nicholas of Piſa. In the great market place there is a ſtatue of Plenty, by Pierino da Vinci. In the church of St Matthew, the painting of the cieling by the brothers Melani, natives of this city, is an admired performance. The church of the knights of St Stephen, decorated with the trophies taken from the Saracens, is all of marble, with marble ſteps, and a front adorned with marble ſtatues. In the ſquare there is a ſtatue of Coſmo I. upon a very fine pedeſtal. Contiguous to the church is the convent or palace of the knights, which is worth ſeeing, as alſo the churches Della Madonna and Della Spina; the laſt of which was built by a beggar, whoſe figure you may ſee on the outſide of the wall. It is pretended that one of the thorns of the crown which was placed on our Saviour's head is preſerved here. Belonging to the univerſity there is a great number of colleges, the chief of which is the Sapienza, where the profeſſors read their public lectures; next to which are the colleges Puteano, Ferdinando, Ricci, and others. Beſides the public palace, and that of the grand duke, there are ſeveral others with marble fronts, the fineſt of which is that of Lanfranchi, which, with the reſt along the banks of the Arno, makes a very fine appearance. There is here a good dock, where they build the galleys, which are conveyed by the Arno to Leghorn. They have a famous aqueduct in this town, conſiſting of 5000 arches, which conveys the water from the hills at five miles diſtance. This water is eſteemed the beſt in Italy, and is carried in flaſks to Florence and Leghorn. The neighbouring country produces great ſtore of corn and wine, but the latter is not much eſteemed. They have very good butter in this neighbourhood, which is a ſcarce commodity in Italy. The city for its defence has a moat, walls, a caſtle, fort, and citadel; the laſt of which is a modern work. The Arno is of a conſiderable breadth here, and has three bridges over it, one of them of marble: two leagues below the town it falls into the ſea. The phyſic-garden is very ſpacious, contains a great number of plants, and is decorated with water-works: over the door leading into it are theſe words, *Hic Argus ſed non Briareus eſto*: i. e. Employ the Eyes of Argus, but not the hands of Briareus. The air is ſaid to be unwholeſome here in ſummer, on account of the neighbouring moraſſes. Many buffaloes are bred in the neighbouring country, and their fleſh is commonly eaten. Between Piſa and Lucca are hot baths. E. Long. 10. 17. N. Lat. 43. 43.

PISCARY, in the ancient Britiſh ſtatutes, the liberty of fiſhing in another man's waters.

PISCES, in aſtronomy, the 12th ſign or conſtellation of the zodiac.

PISCIDIA, a genus of the decandria order, belonging to the diadelphia claſs of plants. There are two ſpecies, *viz*. 1. The erythrina, or dog-wood tree. This grows plentifully in Jamaica, where it riſes to the height of 25 feet or more; the ſtem is almoſt as large as a man's body, covered with a light-coloured ſmooth bark, and ſending out ſeveral branches at the top without order; the leaves are about two inches long, winged, with oval lobes. The flowers are of the butterfly kind, and of a dirty white colour; they are ſucceeded by oblong pods, with four longitudinal wings, and jointed between the cells which contain the ſeeds. 2. The Carthaginenſis, with oblong oval leaves, is alſo a native of the Weſt Indies. It differs from the former only in the ſhape and conſiſtence of the leaves which are more oblong and ſtiffer; but in other reſpects they are very ſimilar. Both ſpecies are eaſily propagated by ſeeds; but require artificial heat to preſerve them in Britain.—The negroes in the Weſt Indies make uſe of the bark of the firſt ſpecies to intoxicate fiſh. When any number of gentlemen have an inclination to divert themſelves with fiſhing, or more properly ſpeaking, with fiſh-hunting, they ſend each of them a negro ſlave to the woods, in order to fetch ſome of the bark of the dog-wood tree. This bark is next morning pounded very ſmall with ſtones, put into old ſacks, carried into rocky parts of the ſea, ſteeped till thoroughly ſoaked with ſalt water, and then well ſqueezed by the negroes to expreſs the juice. This juice immediately colours the ſea with a reddiſh hue; and, being of a poiſonous nature, will in an hour's time make the fiſhes, ſuch as groopers, rock-fiſh, old wives, Welchmen, &c. ſo drunk or intoxicated, as to ſwim on the ſurface of the water, quite heedleſs of the danger; the gentlemen then ſend in their negroes, who purſue, both ſwimming and diving, the poor inebriated fiſhes, till they catch them with their hands; their maſters in mean time ſtanding by, on high rocks, to ſee the paſtime.

It is remarkable, that though this poiſon kills millions of the ſmall fry, it has never been known to impart any bad quality to the fiſh which have been caught in conſequence of the intoxication.

The wood of this tree, although pretty hard, is only fit for fuel; and even for this purpoſe the negroes very ſeldom, if ever, employ it, on account of its ſingular quality juſt mentioned. The bark is rough, brown, and thick; the tree ſends forth a conſiderable number of branches, and is well clothed with leaves which reſemble thoſe of the pea, are thick, cottony, and of a deep green. The bark uſed for the abovementioned purpoſe is chiefly that of the roots.

PISCINA, in antiquity, a large baſon in a public place or ſquare, where the Roman youth learned to ſwim; and which was ſurrounded with a high wall, to prevent filth from being thrown into it.—This word is alſo uſed for a lavatory among the Turks, placed in the middle court of a moſque or temple, where the Muſſulmen waſh themſelves before they offer their prayers.

Bibliotheca Claſſica by Lempriere.

PISISTRATUS, an Athenian who early diſtinguiſhed himſelf by his valour in the field, and by his addreſs and eloquence at home. After he had rendered himſelf the favourite of the populace by his liberality and by the intrepidity with which he had fought their battles, particularly near Salamis, he reſolved to make himſelf maſter of his country. Every thing ſeemed ed favourable to his ambitious views; but Solon alone, who was then at the head of affairs, and who had lately enforced his celebrated laws, oppoſed him, and diſcovered his duplicity and artful behaviour, before the public aſſembly. Piſiſtratus was not diſheartened by the meaſures of his relation Solon, but he had recourſe to artifice. In returning from his country-houſe, he cut himſelf in various places; and after he had expoſed his mangled body to the eyes of the populace, deplored his misfortunes, and accuſed his enemies of attempts upon his life, becauſe he was the friend of the people, the guardian of the poor, and the reliever of the oppreſſed, he claimed a choſen body of 50 men from the populace to defend his perſon in future from the malevolence and the cruelty of his enemies. The unſuſpecting people unanimouſly granted his requeſt, though Solon oppoſed it with all his influence; and Piſiſtratus had no ſooner received an armed band on whoſe fidelity and attachment he could rely, than he ſeized the citadel of Athens, and made himſelf abſolute. The people too late perceived their credulity; yet though the tyrant was popular, two of the citizens, Megacles, and Lycurgus, conſpired together againſt him, and by their means he was forcibly ejected from the city. His houſe and all his effects were expoſed to ſale, but there was found in Athens only one man who would buy them. The private diſſenſions of the friends of liberty proved favourable to the expelled tyrant; and Megacles, who was jealous of Lycurgus, ſecretly promiſed to reſtore Piſiſtratus to all his rights and privileges in Athens, if he would marry his daughter. Piſiſtratus conſented; and by the aſſiſtance of his father-in-law, he was ſoon enabled to expel Lycurgus and to re-eſtabliſh himſelf. By means of a woman called *Phya*, whoſe ſhape was tall, whoſe features were noble and commanding, he impoſed upon the people and created himſelf adherents even among his enemies. Phya was conducted through the ſtreets of the city, and ſhowing herſelf ſubſervient to the artifice of Piſiſtratus, ſhe was announced as Minerva, the goddeſs of wiſdom, and the patroneſs of Athens, who was come down from heaven to re eſtabliſh her favourite Piſiſtratus in a power which was ſanctioned by the will of Heaven, and favoured by the affection of the people. In the midſt of his triumph, however, Piſiſtratus found himſelf unſupported; and ſome time after, when he repudiated the daughter of Megacles, he found that not only the citizens, but even his very troops, were alienated from him by the influence, the intrigues, and the bribery of his father-law-law. He fled from Athens where he no longer could maintain his power, and retired to Eubœa. Eleven years after he was drawn from his obſcure retreat, by means of his ſon Hippias, and he was a third time received by the people of Athens as their maſter and ſovereign. Upon this he ſacrificed to his reſentment the friends of Megacles, but he did not loſe ſight of the public good, and while he ſought the aggrandizement of his family, he did not neglect the dignity and the honour of the Athenian name. He died about 528 years before the Chriſtian era, after he had enjoyed the ſovereign power at Athens for 33 years, and he was ſucceeded by his ſon Hipparchus. Piſiſtratus claims our admiration for his juſtice, his liberality, and his moderation. If he was dreaded and deteſted as a tyrant, the Athenians loved and reſpected his private virtues and his patriotiſm as a fellow-citizen; and the opprobrium which generally falls on his head may be attributed not to the ſeverity of his adminiſtration, but to the republican principles of the Athenians, who hated and exclaimed againſt the moderation and equity of the mildeſt ſovereign, while they flattered the pride and gratified the guilty deſires of the moſt tyrannical of their fellow ſubjects. Piſiſtratus often refuſed to puniſh the inſolence of his enemies; and when he had one day been virulently accuſed of murder, rather than inflict immediate puniſhment upon the man who had criminated him, he went to the areopagus, and there convinced the Athenians that the accuſations of his enemies were groundleſs, and that his life was irreproachable. It is to his labours that we are indebted for the preſervation of the poems of Homer; and he was the firſt, according to Cicero, who introduced them at Athens in the order in which they now ſtand. He alſo eſtabliſhed a public library at Athens; and the valuable books which he had diligently collected were carried into Perſia when Xerxes made himſelf maſter of the capital of Attica. Hipparchus and Hippias the ſons of Piſiſtratus, who have received the name of *Piſiſtratidæ*, rendered themſelves as illuſtrious as their father; but the flames of liberty were too powerful to be extinguiſhed. The Piſiſtratidæ governed with great moderation, but the name of tyrant or ſovereign was inſupportable to the Athenians. Two of the moſt reſpectable of the citizens, called *Harmodius* and *Ariſtogiton*, conſpired againſt them, and Hipparchus was diſpatched in a public aſſembly. This murder was not, however, attended with any advantages; and though the two leaders of the conſpiracy, who have been celebrated through every age for their patriotiſm, were ſupported by the people, yet Hippias quelled the tumult by his uncommon firmneſs and prudence, and for a while preſerved that peace in Athens which his father had often been unable to command. This was not long to continue. Hippias was at laſt expelled by the united efforts of the Athenians and of their allies, and he left Attica, when he found himſelf unable to maintain his power and independence. The reſt of the family of Piſiſtratus followed him in his baniſhment; and after they had refuſed to accept the liberal offers of the princes of Theſſaly, and the king of Macedonia, who wiſhed them to ſettle in their reſpective territories, the Piſiſtratidæ retired to Sigæum, which their father had in the ſummit of his power conquered and bequeathed to his poſterity. After the baniſhment of the Piſiſtratidæ, the Athenians became more than commonly jealous of their liberty, and often ſacrificed the moſt powerful of their citizens, apprehenſive of the influence which popularity and a well-directed liberality might gain among a fickle and unſettled populace. The Piſiſtratidæ were baniſhed from Athens about 18 years after the death of Piſiſtratus.

PISMIRES, are a kind of inſect very common in Africa; of which there is ſo great a variety, and ſuch innumerable ſwarms, that they deſtroy not only the fruits of the ground but even men and beaſts in ſo little a time as one ſingle night; and would, without all doubt, prove more fatally deſtructive to the inhabitants were they not ſo happily deſtroyed by a proportionable number of monkeys, who greedily ferret and devour them.

Piſo.

them. For a further account of theſe, and ſome other grievous plagues with which the far greater part of the vaſt continent of Africa is afflicted particularly that moſt horrid viſitation of locuſts, which ſeldom fail a year of laying waſte ſome of the provinces, ſee GRYLLUS, p. 161.

PISO (Lucius Calpurnius), ſurnamed *Frugi* on account of his frugality, was deſcended of the illuſtrious family of the Piſos, which gave ſo many great men to the Roman republic. He was tribune of the people in the year 149 before Chriſt, and afterwards conſul. During his tribuneſhip, he publiſhed a law againſt the crime of concuſſion or extortion, intitled *Lex Calpurnia de pecuniis repetundis*. He happily ended the war in Sicily. To reward the ſervices of one of his ſons, who had diſtinguiſhed himſelf in that expedition, he left him by his will a golden crown, weighing 20 pounds. Piſo joined to the qualities of a good citizen the talents of a lawyer, an orator, and hiſtorian.

PISO (Caius Calpurnius, a Roman conſul in the year 67 before Chriſt, was author of the law which forbid canvaſſing for public offices, intitled *Lex Calpurnia de ambitu*. He diſplayed all the firmneſs worthy a conſul in one of the moſt ſtormy periods of the republic. The Roman people, deceived by the flattery of Marcus Palicanus, a turbulent and ſeditious fellow, were on the eve of loading themſelves with the greateſt diſgrace, by putting the ſupreme authority into the hands of this man, who deſerved puniſhment rather than honours. The tribunes of the people, by their harangues, inflamed the blind fury of the multitude, already ſufficiently mutinous of themſelves. In this ſituation, Piſo mounted the roſtrum, and being aſked if he would declare Palicanus conſul in caſe the ſuffrages of the people ſhould concur in the nomination, he inſtantly replied, that "he did not think the republic was yet involved in ſuch darkneſs and deſpair as to be capble of committing ſo infamous an action." Being afterwards ſtrongly and repeatedly called upon to ſay, "what he would do, if the thing ſhould happen?" his anſwer was, "No, I would not name him." By this firm and laconic anſwer he deprived Palicanus of the dignity to which he aſpired. Piſo, according to Cicero, was not poſſeſſed of a quick conception, but he thought maturely, and with judgment, and by a proper firmneſs, he appeared to be an abler man than he really was.

PISO (Cneius Calpurnius), was conſul in the reign of Auguſtus, and governor of Syria under Tiberius, whoſe confident he was. It is ſaid, that by the order of this emperor he cauſed Germanicus to be poiſoned. Being accuſed of that crime, and ſeeing himſelf abandoned by every body, he laid violent hands on himſelf in the 20th year of our Lord. He was a man of inſupportable pride and exceſſive violence. Some inſtances of his wicked cruelty have been handed down to us. Having given orders in the heat of his paſſion to conduct to puniſhment a ſoldier, as guilty of the death of one of his companions, becauſe he had gone out of the camp with him and returned without him, no prayers or intreaty could prevail with Piſo to ſuſpend the execution of this ſentence until the affair ſhould be properly inveſtigated. The ſoldier was led without the entrenchments, and had already preſented his head to receive the fatal ſtroke, when his companion whom he was accuſed of having killed made his appearance again. Whereupon the centurion, whoſe office it was to ſee the ſentence executed, ordered the executioner to put up his ſword into the ſcabbard. Thoſe two companions, after embracing each other, are conducted to Piſo, amidſt the acclamations of the whole army, and a prodigious crowd of people. Piſo, foaming with rage, aſcends his tribune, and pronounces the ſame ſentence of death againſt the whole three, without excepting the centurion who had brought back the condemned ſoldier, in theſe terms; "You I order to be put to death becauſe you have been already condemned; you, becauſe you have been the cauſe of the condemnation of your comrade; and you, becauſe having got orders to put that ſoldier to death, you have not obeyed your prince."

Piſſaſphaltum.

PISSASPHALTUM, EARTH-PITCH; a fluid, opaque, mineral body, of a thick conſiſtence, ſtrong ſmell, readily inflammable, but leaving a reſiduum of greyiſh aſhes after burning. It ariſes out of the cracks of the rocks, in ſeveral places in the Iſland of Sumatra, and ſome other places in the Eaſt Indies, where it is much eſteemed in paralytic diſorders. There is a remarkable mine of it in the iſland of Bua, (ſee BUA), of which the following curious deſcription is given us by the Abbé Fortis. "The iſland is divided into two promontories between the north and weſt, croſſing over the top of the latter, which is not half a mile broad, and deſcending in a right line towards the ſea, one is conducted to a hole well known to the inhabitants. This hole extends not much above 12 feet, and from its bottom above 25 feet perpendicular, ariſe the marble ſtrata which ſuſtain the irregular maſſes that ſurround the top of the mountain.

"The place ſeemed to me (continues our author), ſo worthy of obſervation, that I cauſed a drawing of it to be taken. The hole AAA is dug out of an irregular ſtratum of argillaceous ſandy earth, in ſome parts whitiſh, and in others of a greeniſh colour; part of it is half petrified, and full of numiſmales of the largeſt kind, lenticulares, and fragments, with here and there a ſmall branch of madreporites, and frequently of thoſe other foſſil bodies called by Geſner *cornua ammonis candida, minima*, &c. The maſs B is fallen from the height of the rock, and lies iſolated. The excavation, made by ſome poor man in the ſofter matter, reaches a little below the extremity CC of the ſtratum DD. This is ſeparated by the line EE from the ſtratum FF, which is of hard common marble, with marine bodies without flints. The upper part *aa* is of hard lenticular ſtone, interſperſed with flints full of lenticulares. The maſs H does not diſcover the diviſions of its ſtrata on the outſide, and tranſpires very ſmall drops of piſſaſphaltum, ſcarcely diſcernible; but the tears III of the ſame matter, which flow from the fiſſures and chinks of the whitiſh ſtratum DD, are very obſervable. They come out moſt abundantly when the ſun falls on the marble rock in the heat of the day. This piſſaſphaltum is of the moſt perfect quality, black and ſhining like the *bitumen Judaicum*; very pure, odorous, and coheſive. It comes out almoſt liquid, but hardens in large drops when the ſun ſets. On breaking many of theſe drops on the ſpot, I found that almoſt every one of them had an inner cavity full of very clear water.

Plate CCCXCVII.

"The greateſt breadth of the tears that I ſaw was two inches, and the common breadth is half an inch. The chinks and fiſſures of the marble, from whence this bituminous pitch tranſudes, are not more than the thickneſs of a thread; and for the moſt part are ſo imperceptible, that were it not for the pitch itſelf, whereby they are blackened, they could not by any means be diſtinguiſhed by the naked eye. To the narrowneſs of theſe paſſages is, no doubt, in part owing the ſmall quantity of piſſaſphaltum that tranſpires."

After ſome conjectures about the origin of this mine, our author proceeds to inform us that the piſſaſphaltum of Bua is correſpondent to that foſſil production which by Haſſelquiſt, in his Travels, is called *mumia minerale*, and *mumia nativa Perſiana* by Kepfer, which the Egyptians made uſe of to embalm their kings (A). It is found in a cave of mount Caucaſus, which is kept ſhut, and carefully guarded by order of the king of Perſia. One of the qualities aſſigned by M. Linnæus to the fineſt bitumen is to ſmoke when laid on the fire, emitting a ſmell of pitch not diſagreeable. He believes it would be very good for wounds, as the oriental mumia is, and like the pitch of Caſtro, which is frequently uſed by the Roman chirurgeons for fractures, contuſions, and in many external applications. See MINERALOGY.

PISSELÆUM INDICUM, *Barbadoes Tar*; a mineral fluid of the nature of the thicker bitumens, and of all others the moſt approaching, in appearance, colour, and conſiſtence, to the true piſſaſphaltum, but differing from it in other reſpects. It is very frequent in many parts of America, where it is found trickling down the ſides of mountains in large quantities, and ſometimes floating on the ſurface of the waters. It has been greatly recommended internally in coughs and other diſorders of the breaſt and lungs.

PISTACIA, TURPENTINE-TREE, *Piſtachia nut* and *Maſtich-tree*; a genus of the pentandria order, belonging to the dioecia claſs of plants. There are nine ſpecies; of which the moſt remarkable are, 1. The terebinthus, or piſtachia-tree. This grows naturally in Arabia, Perſia, and Syria, whence the nuts are annually brought to Europe. In thoſe countries it grows to the height of 25 or 30 feet: the bark of the ſtem and old branches is of a dark ruſſet colour, but that of the young branches is of a light brown. Theſe are garniſhed with winged leaves, compoſed ſometimes of two, at other times of three, pair of lobes, terminated by an odd one: theſe lobes approach towards an oval ſhape, and their edges are turned backward; and theſe, when bruiſed, emit a ſmell ſimilar to that of the ſhell of the nut. Some of theſe trees produce male and others female flowers, and ſome have both male and female on the ſame tree. The male flowers come out from the ſides of the branches in looſe bunches or catkins. They have no petals, but five ſmall ſtamina crowned by large four cornered ſummits filled with farina; and when this is diſcharged, the flowers fall off. The female flowers come out in cluſters from the ſides of the branches: they have no petals, but a large oval germen ſupporting three reflexed ſtyles, and are ſucceeded by oval nuts. 2. The lentiſcus, or common maſtich-tree, grows naturally in Portugal, Spain, and Italy. Being an evergreen, it has been preſerved in Britain in order to adorn the green-houſes. In the countries where it is a native, it riſes to the height of 18 or 20 feet, covered with a grey bark on the ſtem: but the branches, which are very numerous, are covered with a reddiſh-brown bark, and are garniſhed with winged leaves, compoſed of three or four pair of ſmall ſpear-ſhaped lobes, without an odd one at the end. 3. The orientalis, or true maſtich-tree of the Levant, from which the maſtich is gathered, has been confounded by moſt botanical writers with the lentiſcus, or common maſtich tree, above deſcribed, though there are conſiderable differences between them. The bark of the tree is brown; the leaves are compoſed of two or three pair of ſpear-ſhaped lobes, terminated by an odd one: the outer lobes are the largeſt; the others gradually diminiſh, the innermoſt being the leaſt. Theſe turn of a browniſh colour towards the autumn, when the plants are expoſed to the open air; but if they are under glaſſes, they keep green. The leaves continue all the year, but are not ſo thick as thoſe of the common ſort, nor are the plants ſo hardy.

Culture. The firſt ſpecies is propagated by its nuts; which ſhould be planted in pots filled with light kitchen-garden earth, and plunged into a moderate hot-bed to bring up the plants: when theſe appear, they ſhould have a large ſhare of air admitted to them, and by degrees they ſhould be expoſed to the open air, which at laſt they will bear in all ſeaſons, though not without great danger of being deſtroyed in ſevere winters. The ſecond ſort is commonly propagated by laying down the branches, though it may alſo be raiſed from the ſeed in the manner already directed for the piſtachia-nut tree: and in this manner alſo may the true maſtich-tree be raiſed. But this being more tender than any of the other ſorts, requires to be conſtantly ſheltered in winter, and to have a warm ſituation in ſummer.

(A) "Mumiahi, or native Perſian mummy. It proceeds from a hard rock in very ſmall quantity. It is a bituminous juice, that tranſudes from the ſtony ſuperficies of the hill, reſembling in appearance coarſe ſhoemakers, wax, as well in its colour as in its denſity and ductility. While adherent to the rock it is leſs ſolid, but is formed by the warmth of the hands. It is eaſily united with oil, but repels water; it is quite void of ſmell, and very like in ſubſtance to the Egyptian mummy. When laid on burning coals, it has the ſmell of ſulphur tempered a little with that of naphtha, not diſagreeable. There are two kinds of this mummy; the one is valuable for its ſcarcity and great activity. The native place of the beſt mummy is far from the acceſs of men, from habitations, and from ſprings of water, in the province of Daraab. It is found in a narrow cave, not above two fathoms deep, cut like a well out of the maſs, at the foot of the ragged mountain Caucaſus."—— *Kempfer. Amæn. Perſ.*

This deſcription agrees perfectly with the piſſaſphaltum or foſſil mummy of Bua, differing only in the privation of ſmell, which it is difficult to imagine is totally wanting in the Perſian mummy.

Piſtachia nuts are moderately large, containing a kernel of a pale greeniſh colour, covered with a reddiſh ſkin. They have a pleaſant, ſweet, unctuous taſte, reſembling that of almonds; and they abound with a ſweet and well-taſted oil, which they yield in great abundance on being preſſed after bruiſing them: they are reckoned amongſt the analeptics, and are wholeſome and nutritive, and are by ſome eſteemed very proper to be preſcribed by way of reſtoratives, eaten in ſmall quantity, to people emaciated by long illneſs.

PISTIL, among botaniſts, the little upright column which is generally found in the centre of every flower. According to the Linnæan ſyſtem, it is the female part of generation, whoſe office is to receive and ſecrete the pollen, and produce the fruit. It conſiſts of three parts, viz. germen, ſtylus, and ſtigma. See BOTANY, p. 434, and p. 454, 2d columns.

PISTOIA is a city of Italy, in the duchy of Tuſcany, ſituated on the river Stella, in a beautiful plain near the foot of the Apennine mountains. By Pliny it is called *Piſtorium*, and is ſaid to have been once a Roman colony. At preſent it is a biſhop's ſee, ſuffragan of Florence. The ſtreets are broad and regular, the houſes tolerably well built, but poorly inhabited for want of trade. Formerly it was an independent republic, but ſince it was ſubdued by the Florentines in 1200, it has been in a declining condition. The cathedral has a very handſome cupola, and a magnificent ſtaircaſe to aſcend to it. In the chapel dedicated to St James, where his relics are preſerved, the walls are almoſt covered with plates of ſilver. Here are four marble ſtatues of very good workmanſhip. The marble pulpit, the baſſo-relievos, the veſſel that holds the holy water, and the ſquare ſteeple, are the work of John Piſano. The Jeſuits have a very fine college, and the Franciſcans, Dominicans, and Auguſtinians, good churches. In the church of Madonna dell' Umilta there are two ſtatues, one of Leo X. and the other of Clement VII. The public palace, ſituated in a large ſquare, is a handſome building; ſeveral of the nobility have alſo very good houſes. In the neighbouring mountains, called by the name of Piſtoia, there are many large villages, the chief of which is that of S. Marcello, belonging to the family of Cartoli. Theſe mountains are a part of the Apennines, and border on the territory of Bologna and the county of Vernio; higher up is the ſource of the river Reno. The country about Piſtoia, eſpecially towards Florence, is exceeding fertile and delightful, covered with all ſorts of fruits, corn, wine, &c. and containing a vaſt number of little towns, wealthy villages, and country ſeats, ſo as to be reckoned the richeſt and moſt beautiful in all Tuſcany. It is about 20 miles N. W. of Florence, and 30 N. E. of Piſa. E. Long. 11. 29. N. Lat. 43. 55.

PISTOL, the ſmalleſt piece of fire-arms, borne at the ſaddle-bow, on the girdle, and in the pocket.

PISTOLE, a gold coin, ſtruck in Spain and in ſeveral parts of Italy, Switzerland, &c.—The piſtole has its augmentations and diminutions, which are quadruple piſtoles, double piſtoles, and half piſtoles. See *Money-Table*.

PISTON, in pump work, is a ſhort cylinder of metal or other ſolid ſubſtance, fitted exactly to the cavity of the barrel or body of the pump. See HYDROSTATICS, ſect. v.

PISTORIUS (John), born at Nidda in 1546, applied himſelf at firſt to the ſtudy of medicine, and was admitted a doctor with applauſe; but his preſcriptions not being attended with all the ſucceſs which he expected, he quitted that profeſſion, and ſtudied the law. His merit procured him the appointment of counſellor to Earneſt Frederick margrave of Bade-Dourlach. He had embraced the Proteſtant religion; but ſome time after he changed his opinion, and returned to the communion of the church of Rome. He became afterwards a doctor of divinity, one of the emperor's counſellors, provoſt of the cathedral of Breſlaw, and domeſtic prelate to the abbot of Fulda. We have of his writings, 1. Several Controverſial Tracts againſt the Lutherans. 2. *Artis Cabaliſticæ Scriptores*, printed at Bale 1587; a ſcarce and curious collection. 3. *Scriptores rerum Polonicarum*. 4. *Scriptores de rebus Germanicis*, in 3 vols. folio, from 1603 to 1613. This is a curious and ſcarce performance, but might have been better digeſted. The author died in 1608, at the age of 52.

PISUM, PEASE; a genus of the decandria order, belonging to the diadelphia claſs of plants. The ſpecies are, 1. The ſativum, or greater garden-pea, whoſe lower ſtipulæ are roundiſh, indented, with taper foot-ſtalks, and many flowers on a foot-ſtalk. 2. The humile, or dwarf pea, with an erect branching ſtalk, and leaves having two pair of round lobes. 3. The umbellatum, roſe, or crown pea, with four pointed acute ſtipulæ, and foot-ſtalks bearing many flowers, which terminate the ſtalks. 4. The maritimum, or ſea-pea, with foot-ſtalks which are plain on their upper ſide, an angular ſtalk, arrow-pointed ſtipulæ, and foot-ſtalks bearing many flowers. 5. The Americanum, commonly called *Cape Horn pea*, with an angular trailing ſtalk, whoſe lower leaves are ſpear-ſhaped, ſharply indented, and thoſe at the top arrow-pointed. 6 The ochrus, with membranaceous running foot-ſtalks, having two leaves and one flower upon a foot-ſtalk.

There is a great variety of garden-peaſe now cultivated in Britain, which are diſtinguiſhed by the gardeners and ſeedſmen, and have their different titles; but as great part of theſe have been ſeminal variations, ſo if they are not very carefully managed, by taking away all thoſe plants which have a tendency to alter before the ſeeds are formed, they will degenerate into their original ſtate: therefore all thoſe perſons who are curious in the choice of their ſeeds, look carefully over thoſe which they deſign for ſeeds at the time when they begin to flower, and draw out all the plants which they diſlike from the other. This is what they call *roguing their peaſe;* meaning hereby the taking out all the bad plants from the good, that the farina of the former may not impregnate the latter; to prevent which, they always do it before the flowers open. By thus diligently drawing out the bad, reſerving thoſe which come earlieſt to flower, they have greatly improved their peaſe of late years, and are conſtantly endeavouring to get forwarder varieties; ſo that it would be to little purpoſe in this place to attempt giving a particular account of all the varieties now cultivated: therefore we ſhall only mention the names by which they are commonly known, placing them according to their time of coming to the table, or gathering for uſe.

The golden hotſpur.
The Charlton.
The Reading hotſpur.
Maſter's hotſpur.
Eſſex hotſpur.
The dwarf pea.
The ſugar pea.
Spaniſh Morotto.
Nonpareil.
Sugar dwarf.
Sickle pea.
Marrowfat.
Roſe or crown pea.
Rouncival pea.
Gray pea.
Pig pea; with ſome others.

The Engliſh ſea-pea is found wild upon the ſhore in Suſſex and ſeveral other countries in England, and is undoubtedly a different ſpecies from the common pea.

The fifth ſpecies hath a biennial root, which continues two years. This was brought from Cape Horn by Lord Anſon's cook, when he paſſed that Cape, where theſe peaſe were a great relief to the ſailors. It is kept as a curioſity, but the peaſe are not ſo good for eating as the worſt ſort now cultivated in Britain. It is a low trailing plant; the leaves have two lobes on each foot-ſtalk: thoſe below are ſpear ſhaped, and ſharply indented on their edges; but the upper leaves are ſmall, and arrow pointed. The flowers are blue, each foot-ſtalk ſuſtaining four or five flowers; the pods are taper, near three inches long; and the ſeeds are round, about the ſize of tares.

The ſixth ſort is annual. This grows naturally among the corn in Sicily and ſome parts of Italy, but is in England preſerved in botanic gardens for the ſake of variety. It hath an angular ſtalk, riſing near three feet high; the leaves ſtand upon winged foot-ſtalks, each ſuſtaining two oblong lobes. The flowers are of a pale yellow colour, ſhaped like thoſe of the other ſort of pea, but are ſmall, each foot-ſtalk ſuſtaining one flower; theſe are ſucceeded by pods about two inches long, containing five or ſix roundiſh ſeeds, which are a little compreſſed on their ſides. Theſe are by ſome perſons eaten green; but unleſs they are gathered very young, they are coarſe, and at beſt not ſo good as the common pea. It may be ſown and managed in the ſame way as the garden pea.

We ſhall now proceed to ſet down the method of cultivating the ſeveral ſorts of garden peaſe, ſo as to continue them throughout the ſeaſon.

It is a common practice with the gardeners near London to raiſe peaſe upon hot-beds, to have them very early in the ſpring; in order to which they ſow their peaſe upon warm borders, under walls or hedges, about the middle of October; and when the plants come up, they draw the earth up gently to their ſtems with a hoe, the better to protect them from froſt. In theſe places they let them remain until the latter end of January, or the beginning of February, obſerving to earth them up from time to time as the plants advance in height (for the reaſons before given); as alſo to cover them in very hard froſt with peaſe-haulm, ſtraw, or ſome other light covering, to preſerve them from being deſtroyed; they then make a hot-bed (in proportion to the quantity of peaſe intended), which muſt be made of good hot dung, well prepared and properly mixed together, that the heat may not be too great. The dung ſhould be laid for two or three feet thick, according as the beds are made earlier or later in the ſeaſon; when the dung is equally levelled, then the earth (which ſhould be light and freſh, but not over rich) muſt be laid thereon about ſix or eight inches thick, laying it equally all over the bed. This being done, the frames (which ſhould be two feet high on the back ſide, and about 14 inches in front) muſt be put on, and covered with glaſſes; after which it ſhould remain for three or four days, to let the ſteam of the bed paſs off before you put the plants therein, obſerving every day to raiſe the glaſſes to give vent for the riſing ſteam to paſs off; then, when you find the bed of a moderate temperature for heat, you ſhould, with a trowel, or ſome other inſtrument, take up the plants as carefully as poſſible to preſerve the earth to their roots, and plant them into the hot bed in rows about two feet aſunder, and the plants about an inch diſtant from each other in the rows, obſerving to water and ſhade them until they have taken root; after which you muſt be careful to give them air at all times when the ſeaſon is favourable, otherwiſe they will draw up very weak, and be ſubject to grow mouldy and decay. You ſhould alſo draw the earth up to the ſhanks of the plants as they advance in height, and keep them always clear from weeds. The water they ſhould have muſt be given them ſparingly; for if they are too much watered, it will cauſe them to grow too rank, and ſometimes rot off the plants at their ſhanks juſt above ground. When the weather is very hot, you ſhould cover the glaſſes with mats in the heat of the day, to ſcreen them from the violence of the heat of the ſun, which is then too great for them: but when the plants begin to fruit, they ſhould be watered oftener, and in greater plenty than before; for by that time the plants will have nearly done growing, and the often refreſhing them will occaſion their producing a greater plenty of fruit.

The ſort of pea which is generally uſed for this purpoſe is the dwarf; for all the other ſorts ramble too much to be kept in frames: the reaſon for ſowing them in the common ground, and afterwards tranſplanting them on a hot-bed, is to check their growth, and cauſe them to bear in leſs compaſs; for if the ſeeds were ſown upon a hot-bed, and the plants continued thereon, they would produce ſuch luxuriant plants as could not be contained in the frames, and would bear but little fruit.

The next ſort of pea which is ſown to ſucceed thoſe on the hot-bed is the hotſpur; of which there are reckoned ſeveral varieties, as the golden hotſpur, the Charlton hotſpur, the Maſter's hotſpur, the Reading hotſpur, and ſome others; which are very little differing from each other, except in their early bearing, for which the golden and Charlton hotſpurs are chiefly preferred; though if either of theſe ſorts are cultivated in the ſame place for three or four years, they are apt to degenerate, and be later in fruiting; for which reaſon, moſt curious perſons procure their ſeeds annually from ſome diſtant place; and in the choice of theſe ſeeds, if they could be obtained from a colder ſituation and a poorer ſoil than that in which they are to be ſown, it will be much better than on the contrary, and they will come earlier in the ſpring.

Theſe muſt alſo be ſown on warm borders, towards the latter end of October; and when the plants are come up, you ſhould draw the earth up to their thanks, and treat them in every other reſpect as above directed.

In the ſpring you muſt carefully clear them from weeds, and draw ſome freſh earth up to their ſtems; but do not raiſe it too high up to the plants, leſt by burying their leaves you ſhould rot their ſtems, as is ſometimes the caſe, eſpecially in wet ſeaſons. You ſhould alſo obſerve to keep them free from vermin, which, if permitted to remain amongſt the plants, will increaſe ſo plentifully as to devour the greateſt part of them. The chief of the vermin which infeſt peaſe are ſlugs, which lie all the day in the ſmall hollows of the earth, near the ſtems of the plants, and in the night-time come out and make terrible deſtruction of the peaſe; and theſe chiefly abound in wet ſoils, or where a garden is neglected and over-run with weeds: therefore you ſhould make the ground clear every way round the peaſe to deſtroy their harbours; and afterwards in a fine mild morning very early, when theſe vermin are got abroad from their holes, you ſhould ſlake a quantity of lime, which ſhould be ſtrewed over the ground pretty thick, which will deſtroy the vermin wherever it happens to fall upon them, but will do very little injury to the peaſe, provided it be not ſcattered too thick upon them.

If this crop of peaſe ſucceeds, it will immediately follow thoſe on the hot-bed; but for fear this ſhould miſcarry, it will be proper to ſow two more crops at about a fortnight or three weeks diſtance from each other, ſo that there may be the more chances to ſucceed. This will be ſufficient till the ſpring of the year, when you may ſow ſeveral more crops of theſe peaſe at a fortnight diſtance from each other. The late ſowings will be ſufficient to continue the early ſort of peaſe through the ſeaſon; but it will be proper to have ſome of the large ſort to ſucceed them for the uſe of the family: in order to which, you ſhould ſow ſome of the Spaniſh Morotto, which is a great bearer and a hardy ſort of pea, about the middle of February, upon a clear open ſpot of ground. Theſe muſt be ſown in rows about four feet aſunder, and the peaſe ſhould be dropped in the drills about an inch diſtance, covering them about two inches deep with earth, being very careful that none of them lie uncovered, which will draw the mice, pigeons, or rooks, to attack the whole ſpot; and it often happens, by this neglect, that a whole plantation is devoured by theſe creatures; whereas, when there are none of the peaſe left in ſight, they do not eaſily find them out.

About a fortnight after this you ſhould ſow another ſpot, either of this ſort or any other large ſort of pea, to ſucceed theſe; and then continue to repeat ſowing once a fortnight, till the middle or latter end of May; only obſerving to allow the marrowfats, and other very large ſorts of peaſe, at leaſt four feet and a half between row and row; and the roſe-pea ſhould be allowed at leaſt eight or ten inches diſtance plant from plant in the rows; for theſe grow very large, and if they have not room allowed them, they will ſpoil each other by drawing them up very tall, and will produce no fruit.

When the plants come up, the earth ſhould be drawn up to their ſhanks (as was before directed), and the ground kept entirely clear from weeds; and when the plants are grown eight or ten inches high, you ſhould ſtick ſome bruſhwood into the ground cloſe to the peaſe for them to ramp upon, which will ſupport them from trailing upon the ground, which is very apt to rot the growing ſorts of peaſe, eſpecially in wet ſeaſons; beſides, by thus ſupporting them, the air can freely paſs between them, which will preſerve the bloſſoms from falling off before their time, and occaſion them to bear much better than if permitted to lie upon the ground, and there will be room to paſs between the rows to gather the peaſe when they are ripe.

The dwarf ſorts of peaſe may be ſown much cloſer together than thoſe before-mentioned; for theſe ſeldom riſe above a foot high, and rarely ſpread above half a foot in width, ſo that theſe need not have more room than two feet row from row, and not above an inch aſunder in the rows. Theſe will produce a good quantity of peaſe, provided the ſeaſon be not over dry; but they ſeldom continue long in bearing, ſo that they are not ſo proper to ſow for the main crop, when a quantity of peaſe is expected for the table, their chief excellency being for hot-beds, where they will produce a greater quantity of peaſe (provided they are well-managed) than if expoſed to the open air, where the heat of the ſun ſoon dries them up.

The large growing ſorts may be cultivated for the common uſe of the family, becauſe theſe will produce in greater quantities than the other, and will endure the drought better; but the early kind are by far the ſweeter-taſted peaſe.

The beſt of all the large kinds is the marrowfat, which, if gathered young, is a well-taſted pea; and this will continue good through the month of Auguſt, if planted on a ſtrong ſoil.

The gray and other large winter-peaſe are ſeldom cultivated in gardens, becauſe they require a great deal of room, but are uſually ſown in fields. For the proper method of managing them, ſee Agriculture, n° 150.

In the *Muſeum Ruſticum*, Vol. I. p. 109. we find the following method of preparing peaſe for hog-meat, which we ſhall give in the words of the ingenious farmer who communicated it.

"A few years ago (ſays he), I had a plentiful crop of peaſe on a ten acre piece, which lies near my houſe: when they were full podded and nearly ripe, I had them hooked in the uſual manner; but before I could get them in, there came a heavy ſhower of rain which wetted them through and through; and the dull heavy weather, with frequent ſhowers which followed, prevented their drying for a conſiderable time.

"I cauſed the wads to be from time to time turned, to prevent the haulm from rotting; and at length a few days ſunſhine dried them enough to be inned; for as they lay hollow, the wind was greatly aſſiſtant to the operation.

"Before I got them in, on examining ſome of the pods, I found that the peaſe were all ſprouted to a conſiderable length: this was what I had expected, as I gave my crop over for loſt, till after a little recollection, as the weather ſtill continued fine, I determined to threſh them in the field.

"This was accordingly done; and the corn, after it was caſt and riddled to ſeparate it from the rubbiſh, was dried on my malt kiln.

"When this operation was over, I began to reflect in what manner I ſhould diſpoſe of my peaſe, being ſenſible that they could not be proper for ſeed, and ſtanding no chance of diſpoſing of them to any advantage in the market.

"At length, as it was then a time of war, and of courſe there was a great demand for pork for the uſe of the navy, I determined to buy a conſiderable number

Piſum,
Pit-coal.

ber of lean hogs, that I might by their means conſume this crop on my own premiſes, and in that manner make the moſt of it.

"My expectations were more than anſwered; for I found, by repeated experience, that three buſhels of the peaſe I have mentioned went nearly as far in fattening the hogs I bought as four buſhels got in dry and hard in the manner uſually practiſed.

"This diſcovery I made ſeveral years ago, and it has turned out to my advantage; for ſince that time I have been quite indifferent as to the weather in which my peaſe are hooked, being rather better pleaſed, as far as relates to them, with wet than dry weather; but if the weather happens to be dry at the time they are ripe, I always cauſe as many as I want for feeding my hogs, which are not a few in a year, to be regularly malted in the ſame manner nearly as my barley: this management has of late ſucceeded very well with me, and I therefore intend to continue it.

"Beſides feeding my hogs with theſe malted peaſe, I have often given them to my horſes, with which they agree very well, and are heartening food.

"Turkeys will fatten apace on them alſo, and be fine meat.

"I have applied my malted peaſe to many other uſes, which I have not at preſent time to enumerate: but were they only uſed for feeding hogs and horſes, it is ſtill worth while to prepare ſome in this manner every year."

PIT-COAL, or STONE-COAL. See COAL and LITHANTHRAX.

Mr Bertrand, in his *Oryctologic Dictionary*, reduces all kinds of coals to ſix general claſſes, *viz.* 1. Lithanthrax ligneus; 2. Petroſſus; 3. Terreſtris; 4. Piceus; 5. Fiſſilis; 6. Mineraliſatus. He ſays, that the Scots coals are heavier, and burn not ſo well as thoſe of Newcaſtle; that thoſe of Liege burn quicker; and thoſe from Braſſac in Auvergne, and from La Foſſe, burn with a more agreeable flame, &c. But Mr Morand, in his *Nomenclature Raiſonnée*, diſtributes all ſorts of pit-coals into four claſſes: In the firſt he places nine varieties, beginning with the *gagas* or *ſuccinum nigrum*, to the variegated lithanthrax; in the ſecond he reckons ſeven varieties, beginning with the *lithanthrax eleganti ſtructura*, to that *facie granulata:* and he forms the fourth claſs with the earthy and poorer kinds of foſſil coals. He ſeems, however, to have been puzzled with the ſlaty coals, as he ranges them in a ſeparate claſs, perhaps to ſhelter himſelf from the critical objections of thoſe numerous ſuperficial naturaliſts, who only look for the apparent configuration, without almoſt any regard to the component parts of foſſils.

The coal-trade is of infinite importance to Great Britain, which never could have arrived at its preſent commercial eminence without it; and this eminence it will be impoſſible to retain if coal ſhould ever become ſcarce. This we truſt is not likely to be the caſe, though Mr Williams expreſſes great fears for it, and informs us that at Newcaſtle and in many parts of Scotland the mines near the ſea are already waſted, the firſt conſequence of which muſt be an enormous riſe in the price. See his obſervations on this ſubject in his *Natural Hiſtory of the Mineral Kingdom*, p. 156, &c. This author ſays, that coal was not diſcovered till between the middle of the 12th and beginning of the 13th centuries: it is therefore, according to him, 400 years ſince it was firſt diſcovered in Britain, but they have not been in common uſe for more than 200 years. The ſame author gives us many pertinent obſervations on the appearances and indications of coal, inſtructions about ſearching for it, remarks on falſe and doubtful ſymptoms of coal; for all which, together with his obſervations on the different kinds of Scots coal, we ſhall refer our readers to the work itſelf; the firſt part of which, occupying the largeſt proportion of the firſt volume, is upon the *ſtrata of coal*, and on the *concomitant ſtrata*. See alſo our article COALERY.

Pitahaya,
Pitcairne.

PITAHAYA (*Cactus Pitajaya*, Lin. *Syſt. Vegetabilium.* *Jacquin Amer.* 151. ed. 2. p. 75. M. *E. Carthagena*), a ſhrub peculiar to California, is a kind of beech, the fruit of which forms the greateſt harveſt of the natives. Its branches are finely fluted, and riſe vertically from the ſtem, ſo as to form a very beautiful top. The fruit is like a horſe-cheſnut. In ſome white, in others yellow, and in others red, but always exquiſitely delicious, being a rich ſweet, tempered with a grateful acid. See CACTUS.

PITCAIRNE (Dr Archibald), a moſt eminent phyſician and ingenious poet, was deſcended from the ancient family of the Pitcairnes of Pitcairne in Fifeſhire, and was born at Edinburgh on the 25th of December 1652. He commenced his ſtudies at the ſchool of Dalkeith; and from thence he was removed to the univerſity of Edinburgh, where he improved himſelf in claſſical learning, and completed a regular courſe of philoſophy. His friends, according to the authors of the *Biographia Britannica*, were deſirous that he ſhould follow the profeſſion of theology. The unpleaſant gloom, however, which at that time hung over religion and its profeſſors in Scotland, could not but very ill ſuit with that native cheerfulneſs of temper and liberality of mind which made him, long after, a mark for the arrows of preciſeneſs and grimace. The law ſeems to have been his own choice, and to this ſcience he turned his attention. With an ardour peculiar to himſelf, and an ambition to excel in whatever he undertook, he purſued it with ſo much intenſeneſs, that his health began to be impaired. On this account, his phyſicians adviſed him to ſet out for the ſouth of France. By the time he reached Paris, he was happily ſo far recovered, that he determined to renew his ſtudies; but being informed that there was no able profeſſor of law in that city, and finding ſeveral gentlemen of his acquaintance engaged in the ſtudy of phyſic, he went with them to the lectures and hoſpitals, and employed himſelf in this manner for ſeveral months till his affairs called him home.

On his return, he applied himſelf chiefly to the mathematics. It is not uſual to ſee the briars of this ſcience and the flowers of poetry growing in the ſame ſoil. Here, however, they were happily united; and to this union perhaps was owing that ſingular command of judgment, over one of the livelieſt of fancies, which appears in every part of his works. His intimacy with Dr David Gregory, the celebrated mathematical profeſſor, began about the ſame time; and probably conduced to cheriſh his natural aptitude for this ſtudy. It was then, in a great meaſure, new to him; it ſoon became his principal delight; his progreſs in it was rapid, and correſpondent to his progreſs in other purſuits. His improvements on the method of infinite ſeries then adopted, which Dr Wallis of Oxford afterwards

wards publiſhed, were a conſpicuous and early proof of his abilities in this ſcience.

Had Dr Pitcairne continued to proſecute the ſtudy of the law, and could he have moulded his principles to the times, the firſt offices and honours of the ſtate might have been looked for without preſumption as the probable reward of ſuch talents as he poſſeſſed. Struck, however, with the charms of mathematical truth which had been lately introduced into the philoſophy of medicine, and hoping to reduce the healing art to geometrical method, he unalterably determined on this leſs aſpiring profeſſion. At the period when he formed this reſolution, the ideas of the medical world, already ſufficiently confuſed, were ſtill farther jumbled by the diſcovery of the circulation of the blood, which had as yet produced nothing but doubt, uncertainty, and aſtoniſhment. In Edinburgh at that time there was no ſchool, no hoſpital, no opportunity of improvement but the chamber and the ſhop. He therefore ſoon after returned to Paris. Genius and induſtry are unhappily not often united in the ſame character: of ſuch an union, however, Dr Pitcairne is a celebrated inſtance. During his reſidence in France, he cultivated the object of his purſuit with his natural enthuſiaſm, and with a ſteadineſs from which he could not be diverted by the allurements of that joy which, in his hours of ſocial and feſtive intercourſe, he always felt and always gave. Among his various occupations, the ſtudy of the ancient phyſicians ſeems to have had a principal ſhare. This appears from a treatiſe which he publiſhed ſome time after his return; and it ſhows, that he wiſely determined to know the progreſs of medicine from its earlieſt periods, before he attempted to reform and improve that ſcience.

On the 13th of Auguſt 1680, he received, from the faculty of Rheims the degree of Doctor; which, on the 7th of Auguſt 1699, was likewiſe conferred on him by the univerſity of Aberdeen; both being attended with marks of peculiar diſtinction. Other medical honours are ſaid to have been conferred on him in France and elſewhere; but nothing affords a more unequivocal teſtimony to his abilities than that which the ſurgeons of Edinburgh gave, in admitting him, freely and unſolicited, a member of their college. None had ſuch opportunities of judging of his merit as a practitioner, and on no phyſician did they ever beſtow the ſame public mark of reſpect. Soon after his graduation at Rheims, he returned to Edinburgh; where, on the 29th of November 1681, the Royal College of Phyſicians was inſtituted; and his name, among others, graced the original patent from the crown.

In his *Solutio Problematis de Inventoribus*, the treatiſe above alluded to, he diſcovers a wonderful degree of medical literature, and makes uſe of it in a manner that does great honour both to his head and his heart. His object is to vindicate Dr Harvey's claim to the diſcovery of the circulation of the blood. The diſcovery was, at firſt, controverted by envy, and reprobated by ignorance. When at length its truth was fully eſtabliſhed, many invidiouſly attempted to tear the laurels from the illuſtrious Engliſhman, and to plant them on the brows of Hippocrates and others. Had the attempt been directed againſt himſelf, the generous ſoul of Pitcairne could not have exerted more zeal in a defence; and his arguments remain unanſwered.

During his reſidence in Scotland, his reputation became ſo conſiderable, that, in the year 1691, the univerſity of Leyden ſolicited him to fill the medical chair, at that time vacant. Such an honourable teſtimony of reſpect, from a foreign nation, and from ſuch an univerſity, cannot perhaps be produced in the medical biography of Great Britain. The luſtre of ſuch characters reflects honour on their profeſſion, and on the country which has the good fortune of giving them birth; and ſerves to give the individuals of that country not only a uſeful eſtimation in their own eyes, but in thoſe alſo of the reſt of the world. Dr Pitcairne's well known political principles excluded him from public honours and promotion at home: he therefore accepted the invitation from abroad; and, on the 26th of April 1692, delivered, at Leyden, his elegant and maſterly inaugural oration: *Oratio qua oſtenditur medicinam ab omni philoſophorum ſecta eſſe liberam.* In this he clears medicine from the rubbiſh of the old philoſophy; ſeparates it from the influence of the different ſects; places it on the broad and only ſure foundation of experience; ſhows how little good inquiries into the manner how medicines operate have done to the art; and demonſtrates the neceſſity of a ſedulous attention to their effects, and to the various appearances of diſeaſe.

Nothing (ſays an elegant panegyriſt[*] of our author) marks a ſuperiority of intellect ſo much as the courage requiſite to ſtem a torrent of obſtinately prevailing and groundleſs opinions. For this the genius and talents of Pitcairne were admirably adapted; and, in his oration, he diſplays them to the utmoſt. It was received with the higheſt commendations; and the adminiſtrators, to teſtify their ſenſe of ſuch an acquiſition to their univerſity, greatly augmented the ordinary appointment of his chair.

He diſcharged the duties of his office at Leyden ſo as to anſwer the moſt ſanguine expectations. He taught with a perſpicuity and eloquence which met with univerſal applauſe. Independently of the encomiums of Boerhaave and Mead, who were his pupils, the numerous manuſcript copies of his lectures, and the mutilated ſpecimen of them[†] which found its way into the world without his knowledge, ſhow how juſtly it was beſtowed. At the ſame time, he was not more celebrated as a profeſſor than as a practical phyſician; and notwithſtanding the multiplicity of his buſineſs in both theſe characters, he found leiſure to publiſh ſeveral treatiſes on the circulation, and ſome other of the moſt important parts of the animal economy (A).

At the cloſe of the ſeſſion he ſet out for Scotland, with an intention of returning in time for the ſucceeding one. On his marrying (B) the daughter of Sir Archibald

[*] Dr Charles Webſter, in the Harveian Oration at Edinburgh for the year 1781; from which performance the preſent article is chiefly extracted.

[†] Elementæ Medicinæ.

(A) Dr Boerhaave gives the following character of theſe and ſome other of Dr Pitcairne's diſſertations, which were collected and publiſhed at Rotterdam, anno 1701: "Hæc ſcripta optima ſunt et perfecta, ſive legas Diſſertationem de Motu Sanguinis per Pulmones, ſive alia opuſcula, ſive ultimum tractatum de Opio." *Methodus ſtudii, ab Hallero edita*, p. 569.

(B) He had been married before to a daughter of Colonel James Hay of Pitfour, by whom he had a ſon and daughter, who both died young.

Archibald Stevenſon, the object of his jonrney, her relations would on no account conſent to part with him again. He was therefore reluctantly obliged to remain; and he wrote the univerſity a polite apology, which was received with the utmoſt regret. He even declined the moſt flattering ſolicitations and tempting offers to ſettle in London. Indeed he ſoon came into that extenſive practice to which his abilities intitled him, and was alſo appointed titular profeſſor of medicine in the univerſity of Edinburgh.

The uniformity of a profeſſional life is ſeldom interrupted by incidents worthy of record. Specimens, however, of that brilliant wit with which he delighted his friends in the hours of his leiſure, continue to entertain us (c); and the effects of that eminent ſkill which he exerted in the cure of diſeaſe, ſtill operate to the good of poſterity.

The diſcovery of the circulation, while in ſome meaſure it exploded the chemical and Galenical doctrines, tended to introduce mathematical and mechanical reaſoning in their ſtead. Of this theory (d) Dr Pitcairne was the principal ſupport, and the firſt who introduced it into Britain. A mathematical turn of mind, and a wiſh for mathematical certainty in medicine, biaſſed him in its favour, and he puſhed it to its utmoſt extent One is at a loſs whether moſt to admire or regret ſuch a waſte of talents in propping a theory which, though ſubverſive of former ones, was to fall before others but a little more ſatisfactory than itſelf. Mechanical phyſicians expected more from geometry than that ſcience could grant. They made it the foundation inſtead of an auxiliary to their inquiries, and applied it to parts of nature not admitting mathematical calculations. By paying more attention afterwards to the ſupreme influence of the living principle, the ſource of all the motions and functions of the body, it was found that theſe could not be explained by any laws of chemiſtry or mechaniſm. They are ſtill, however, involved in obſcurity; and notwithſtanding the numberleſs improvements which have taken place in the ſciences connected with medicine, will perhaps remain inſcrutable while man continues in his preſent ſtage of exiſtence.

In a ſcience ſo ſlowly progreſſive as that of medicine, Dr Pitcairne did a great deal. By labouring in vain for truth in one road, he ſaved many the ſame drudgery, and thereby ſhowed the neceſſity of another. He not only exploded many falſe notions of the chemiſts and Galeniſts which prevailed in this time, but many of thoſe too of his own ſect. In particular, he ſhowed the abſurdity of referring all diſeaſes and their cures to an alkali or an acid (e). He refuted the idea of ſecretion being performed by pores differently ſhaped (f), Bellini's opinion of efferveſcences in the animal ſpirits with the blood, and Borelli's of air entering the blood by reſpiration (G). He proved the continuity of the arteries and veins (H); and ſeems to have been the firſt who ſhowed that the blood flows from a ſmaller capacity into a larger; that the aorta, with reſpect to the arterial ſyſtem, is the apex of a cone (I). In this therefore he may be conſidered as the latent ſpring of the diſcoveries reſpecting the powers moving the blood. He introduced a ſimplicity of preſcription unknown in pharmacy before his time (K); and ſuch was the ſtate of medicine in his country, that ſcarcely have the works of any cotemporary or preceeding author been thought worthy even of preſervation (L). As to the errors of his philoſophy, let it be remembered, that no theory has as yet ſtood to the teſt of many years in an enlightened period. His own hung very looſely about him (M); and the preſent generally received practice differs from his very little in reality. He treated inflammatory and hemorrhagic diſeaſes by bleeding, purging, and bliſtering, as has been done uniformly and ſolely on the different theories ſince. His method of adminiſtering mercury and the bark is obſerved at this day; and with reſpect to febrile, nervous, glandular, and dropſical affections, they ſeem to be as often the opprobriums of the art now as they were then.

(c) Vide *Pitcarnii Poemata*.—Several of his poems, however, are obſcure, and ſome of them totally unintelligible without a key. In thoſe of them which are of a political kind, he wiſhed not to expreſs himſelf too clearly; and in others, he alludes to private occurrences which were not known beyond the circle of his companions. His poem (*Ad Lindeſium*), addreſſed to his friend Lindſey, is commented on by the authors of the *Biographia Britannica*; and it is to be regretted that it is the only one on which they have been ſolicitous to throw light. "Some parts (ſay they) of this poem, are hardly intelligible, without knowing a circumſtance in the Doctor's life, which he often told, and never without ſome emotion. It is a well known ſtory of the two Platonic philoſophers, who promiſed one another, that whichever died firſt ſhould make a viſit to his ſurviving companion. This ſtory being read by Mr Lindſey and our author together, they, being both then very young, entered into the ſame engagement. Soon after, Pitcairne, at his father's houſe in Fife, dreamed one morning that Lindſey, who was then at Paris, came to him, and told him he was not dead, as was commonly reported, but ſtill alive, and lived in a very agreeable place, to which he could not yet carry him. By the courſe of the poſt news came of Lindſey's death, which happened very ſuddenly the morning of the dream. When this is known, the poem is eaſily underſtood, and ſhines with no common degree of beauty.

"Lyndeſi! Stygias jamdudum vecte per undas,
"Stagnaque Cocyti non adeunda mihi;
"Excute pauliſper Lethæi vincula ſomni,
"Ut feriant animum carmina noſtra tuum.
"Te nobis, te redde tuis, promiſſa daturus
"Gaudia; ſed proavo ſis comitante redux:
"Namque novos viros mutataque regna videbis,
"Paſſaque Teutonicas ſceptra Britanna manus*.

* Written in 1689,

"He then proceeds to exclaim againſt the principles and practices which produced this Teutonic violence upon the Britiſh ſceptre; and concludes with a wiſh, that Lindſey might bring Rhadamanthus with him to puniſh them.

"Unus abeſt ſcelerum vindex Rhadamanthus; amice,
"Dii faciant reditus ſit comes ille tui!

"Every one ſees how much keener an edge is given to the ſatire upon the revolution, by making it an additional reaſon for his friend's keeping his promiſe to return him a viſit after his death."

(d) See the article Physiology, n° 7—14.

(e) *Pitcarnii Diſſertationes*, Edin. edit. 1713. De opera quam præſtant corpora acida vel alkalica in curatione morborum.

(f) De circulatione ſanguinis per vaſa minima.

Dr Pitcairne was univerſally conſidered as the firſt phyſician of his time. No one appears ever to have had ſo much practice in his country, or ſo many conſultations from abroad; and no one, from all accounts, ever practiſed with greater ſagacity and ſucceſs. The higheſt thought themſelves honoured by his acquaintance, and the loweſt were never denied his aſſiſtance and advice. The emoluments of his profeſſion muſt have been great; but his charities are known to have been correſpondent. The poſſeſſion of money he poſtponed to more liberal objects: he collected one of the fineſt private libraries in the world; which was purchaſed, after his death, by the Czar of Muſcovy. Notwithſtanding the fatigues he underwent in the exerciſe of his profeſſion, his conſtitution was naturally delicate. About the beginning of October 1713, he became affected with his laſt illneſs; and on the 23d he died, regretted by ſcience as its ornament, by his country as its boaſt, and by humanity as its friend. He left a ſon and four daughters: of whom only one of the latter now ſurvives. The preſent noble family of Kelly are his grandchildren.

Some anonymous publications are attributed to Dr Pitcairne, particularly a treatiſe *De Legibus Hiſtoriæ Naturalis*, &c.; but the only ones he thought proper to legitimate are his *Diſſertationes Medicæ*, and a ſhort eſſay *De Salute*.

PITCAITHLY. See Pitkeathly.

PITCH, a tenacious oily ſubſtance drawn chiefly from pines and firs, and uſed in ſhipping, medicine, and various arts: or it is more properly tar inſpiſſated by boiling it over a ſlow fire. See Tar.

Foſſil Pitch. See Petroleum.

PITCHING, in ſea-affairs, may be defined the vertical vibration which the length of a ſhip makes about her centre of gravity; or the movement by which ſhe plunges her head and after-part alternately into the hollow of the ſea. This motion may proceed from two cauſes: the waves which agitate the veſſel; and the wind upon the ſails, which makes her ſtoop to every blaſt thereof. The firſt abſolutely depends upon the agitation of the ſea, and is not ſuſceptible of inquiry; and the ſecond is occaſioned by the inclination of the maſts, and may be ſubmitted to certain eſtabliſhed maxims.

When the wind acts upon the ſails, the maſt yields to its effort, with an inclination which increaſes in proportion to the length of the maſt, to the augmentation of the wind, and to the comparative weight and diſtribution of the ſhip's lading.

The repulſion of the water, to the effort of gravity, oppoſes itſelf to this inclination, or at leaſt ſuſtains it, by as much as the repulſion exceeds the momentum, or abſolute effort of the maſt, upon which the wind operates. At the end of each blaſt, when the wind ſuſpends its action, this repulſion lifts the veſſel; and theſe ſucceſſive inclinations and repulſions produce the movement of pitching, which is very inconvenient; and, when it is conſiderable, will greatly retard the courſe, as well as endanger the maſt, and ſtrain the veſſel.

PITH, in vegetation, the ſoft ſpongy ſubſtance contained in the central parts of plants and trees*.

* See Plant.

PITHO, (fab. hiſt.) the goddeſs of perſuaſion among the Romans. She was ſuppoſed to be the daughter of Mercury and Venus, and was repreſented with a diadem on her head, to intimate her influence over the hearts of man. One of her arms appeared raiſed as in the attitude of on orator haranguing in a public aſſembly; and with the other ſhe holds a thunderbolt and fetters, made with flowers, to ſignify the powers of reaſoning and the attractions of eloquence. A caduceus, as a ſymbol of perſuaſion, appears at her feet, with the writings of Demoſthenes and Cicero, the two moſt celebrated among the ancients, who underſtood how to command the attention of their audience, and to rouſe and animate their various paſſions.—A Roman courtezan. She received this name on account of the allurements which her charms poſſeſſed, and of her winning expreſſions.

(G) De diverſa mole qua ſanguis fluit per pulmones.

(H) De circulatione ſanguinis per vaſa minima.

(I) De circulatione ſanguinis in animalibus genitis et non genitis.

(K) *Elementa Medicinæ*, lib. i. cap. 21. et paſſim.

(L) The firſt medical publication which diſtinguiſhed Scotland, after Dr Pitcairne's was that of the *Edinburgh Medical Eſſays*, in the year 1732. Vid. the article Monro.

(M) Patet (*ſays he*) medicinam eſſe memoriam eorum quæ cuilibet morbo uſus oſtendit fuiſſe utilia. Nam notas non eſſe corporum intra venas fluentium aut conſiſtentium naturas, adeoque ſola obſervatione innoteſcere quid cuique morbo conveniat, poſtquam ſæpius eadem eidem morbo profuiſſe comperimus. *De Div. Morb.*

PITHOM, one of the cities that the children of Iſrael built for Pharaoh in Egypt (Exod. i. 11.) during the time of their ſervitude. This is probably the ſame city with Pathumos mentioned by Herodotus, which he places upon the canal made by the kings Necho and Darius to join the Red ſea with the Nile, and by that means with the Mediterranean. We find alſo in the ancient geographers, that there was an arm of the Nile called *Pathmeticus*, *Phatmicus*, *Phatnicus*, or *Phatniticus*. Bochart ſays, that Pithom and Raamſes are about five leagues above the diviſion of the Nile, and beyond this river: but this aſſertion has no proof from antiquity. This author contents himſelf with relating what was ſaid of Egypt in his own time. Marſham will have Pithom to be the ſame as Peluſium or Damietta.

PITHOU or Pithoeus (Peter), a Frenchman of great literary eminence, was deſcended from an ancient and noble family in Normandy, and born at Troyes in 1539. His taſte for literature appeared very early, and his father cultivated it to the utmoſt. He firſt ſtudied at Troyes, and was afterwards ſent to Paris, where he became firſt the ſcholar, and then the friend, of Turnebus. Having finiſhed his purſuits in languages and the belles lettres, he was removed to Bourges, and placed under Cujacius in order to ſtudy civil law. His father was well ſkilled in this profeſſion, and has left no inconſiderable ſpecimen of his judgment in the advice he gave his ſon with regard to acquiring a knowledge of it; which was, not to ſpend his time and pains upon voluminous and barren commentators, but to confine his reading chiefly to original writers. He made ſo rapid a progreſs, that at ſeventeen he was able to ſpeak extempore upon the moſt difficult queſtions; and his maſter was not aſhamed to own, that even himſelf had learned ſome things of him. Cujacius afterwards removed to Valence; and Pithœus followed him, and continued to profit by his lectures till the year 1560. He then returned to Paris, and frequented the bar of the parliament there, in order to join practical forms and uſages to his theoretic knowledge.

In 1563, being then 24, he publiſhed *Adverſaria Subſeciva*, a work highly applauded by Turnebus, Lipſius, and other learned men; and which laid the foundation of that great and extenſive fame he afterwards acquired. Soon after this, Henry III. advanced him to ſome conſiderable poſts; in which, as well as at the bar, he acquitted himſelf moſt honourably. Pithœus being a Proteſtant, it was next to a miracle that he was not involved in the terrible maſſacre of St Bartholomew in 1572; for he was at Paris where it was committed, and in the ſame lodgings with ſeveral Huguenots, who were all killed. It ſeems indeed to have frightened him out of his religion; which having, according to the cuſtom of converts, examined and found to be erroneous, he ſoon abjured, and openly embraced the Catholic faith. He afterwards attended the duke of Montmorency into England; and on his return, from his great wiſdom, good nature, and amiable manners, he became a kind of oracle to his countrymen, and even to foreigners, who conſulted him on all important occaſions: an inſtance of which we have in Ferdinand the Grand Duke of Tuſcany, who not only conſulted him, but even ſubmitted to his determination in a point contrary to his intereſts. Henry III. and IV. were greatly obliged to him for combating the League in the moſt intrepid manner, and for many other ſervices, in which he had recourſe to his pen as well as to other means.

Pithœus died upon his birth-day in 1596, leaving behind him a wife whom he had married in 1579, and ſome children. Thuanus ſays he was the moſt excellent and accompliſhed man of the age in which he lived; and all the learned have agreed to ſpeak well of him. He collected a very valuable library, containing a variety of rare manuſcripts, as well as printed books; and he took many precautions to hinder its being diſperſed after his death, but in vain. He publiſhed a great number of works upon law, hiſtory, and claſſical literature; and he gave ſeveral new and correct editions of ancient writers. He was the firſt who made the world acquainted with the Fables of Phædrus: which, together with the name of their author, were utterly unknown and unheard of, till publiſhed from a manuſcript of his.

PITISCUS (Samuel), a learned antiquary, born at Zutphen, was rector of the college of that city, and afterwards of St Jerome at Utrecht, where he died on the firſt of February 1717, aged 90. He wrote, 1. *Lexicon Antiquitatum Romanorum*, in two volumes folio; a work which is eſteemed. 2. Editions of many Latin authors, with notes; and other works.

PITKEATHLY, or Pitcaithly, is the name of an eſtate in Strathern in Scotland, famous for a mineral ſpring. An intelligent traveller * gives the following account of it. "The ſituation of the mineral ſpring at Pitcaithly, the efficacy with which its waters are ſaid to operate in the cure of the diſeaſes for which they are uſed, and the accommodations which the neighbourhood affords, are all of a nature to invite equally the ſick and the healthy. Two or three houſes are kept in the ſtyle of hotels for the reception of ſtrangers. There is no long-room at the well; but there are pleaſing walks through the adjoining fields. Good roads afford eaſy acceſs to all the circumjacent country. This delightful tract of Lower Strathern is filled with houſes and gardens, and ſtations from which wide and delightful proſpects may be enjoyed; all of which offer agreeable points to which the company at the well may direct their forenoon excurſions; converſation, muſic, dances, whiſt, and that beſt friend to elegant, lively, and ſocial converſe, the tea-table, are ſufficient to prevent the afternoons from becoming languid: and in the evenings nothing can be ſo delightful as a walk when the ſetting ſun ſheds a ſoft ſlanting light, and the dew has juſt not begun to moiſten the graſs.—Thus is Pitcaithly truly a rural watering-place. The company cannot be at any one time more in number than two or three families. The amuſements of the place are ſimply ſuch as a ſingle family might enjoy in an agreeable ſituation in the country; only the ſociety is more diverſified by the continual change and fluctuation of the company." See *Mineral Waters*, p. 55.

PITOT (Henry), of a noble family in Languedoc, was born at Aramont in the dioceſe of Uſez, on the 29th of May 1695, and died there on the 27th of December 1771, aged 76. He learned the mathematics without a maſter, and went to Paris in 1718, where he formed a cloſe friendſhip with the illuſtrious

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* Heron's Journey through the Weſtern counties of Scotland.

Reaumur. In 1724, he was admitted a member of the Royal Academy of Sciences at Paris, and in a few years roſe to the degree of a penſioner. Beſides a vaſt number of Memoirs printed in the collection of that ſociety, he publiſhed in 1731 the Theory of the Working of Ships, in one volume 4to; a work of conſiderable merit, which was tranſlated into Engliſh, and made the author be admitted into the Royal Society of London. In 1740, the ſtates general of Languedoc made choice of him for their chief engineer, and gave him at the ſame time the appointment of inſpector general of the canal which unites the two ſeas. That province is indebted to him for ſeveral monuments of his genius, which will tranſmit his name with luſtre to poſterity. The city of Montpellier being in want of water, Pitot brought from the diſtance of three leagues two ſprings which furniſh a plentiful ſupply of that neceſſary article. They are brought to the magnificent Place du Peyron, and thence are diſtributed through the city. This aſtoniſhing work is the admiration of all ſtrangers. The illuſtrious marſhal de Saxe was the great patron and friend of Pitot, who had taught this hero the mathematics. In 1754 he was honoured with the order of St Michael. In 1735 he had married Maria-Leonina Pharambier de Sabballoua, deſcended of a very ancient noble family of Navarre. By this marriage he had only one ſon, who was firſt advocate-general of the Court of Accounts, Aids, and Finances of Montpellier. Pitot was a practical philoſopher, and a man of uncommon probity and candour. He was alſo a member of the Royal Society of Sciences of Montpellier; and his eulogium was pronounced in 1772 by M. de Ratte perpetual ſecretary, in preſence of the ſtates of Languedoc; as it likewiſe was at the Royal Academy of Sciences of Paris by Abbé de Fouchi, who was then ſecretary.

PITS (John), the biographer, was born in 1560, at Aulton in Hampſhire, and educated at Wykeham's ſchool, near Wincheſter, till he was about 18 years of age; when he was ſent to New-college in Oxford, and admitted probationer fellow. Having continued in that univerſity not quite two years, he left the kingdom as a voluntary Romiſh exile, and retired to Douay; thence he went to the Engliſh college at Rheims, where he remained about a year; and then proceeded to Rome, where he continued a member of the Engliſh college near ſeven years, and was made a prieſt. In 1589 he returned to Rheims; and there, during two years, taught rhetoric and the Greek language. He now quitted Rheims on account of the civil war in France; and retired to Pont à Mouſſon in Lorrain, where he took the degrees of maſter of arts and bachelor in divinity. Hence he travelled into Germany, and reſided a year and a half at Triers, where he commenced licentiate in his faculty. From Triers he viſited ſeveral of the principal cities in Germany; and continuing three years an Ingoldſtadt in Bavaria, took the degree of doctor in divinity. Thence having made the tour of Italy, he returned once more to Lorrain; where he was patroniſed by the cardinal of that duchy, who preferred him to a canonry of Verdun; and about two years after he became confeſſor to the ducheſs of Cleves, daughter to the duke of Lorrain. During the leiſure he enjoyed in this employment, he wrote in Latin the lives of the kings, biſhops, apoſtolical men, and writers of England. The laſt of theſe, commonly known and quoted by this title, *De illuſtribus Angliæ ſcriptoribus*, was publiſhed after his death. The three firſt remain ſtill in manuſcript among the archives of the collegiate church of Liverdun. The duke of Cleves dying after Pits had been about twelve years confeſſor to the ducheſs, ſhe returned to Lorrain, attended by our author, who was promoted to the deanery of Liverdun, which, with a canonry and officialſhip, he enjoyed to the end of his life. He died in 1616, and was buried in the collegiate church. Pits was undoubtedly a ſcholar, and not an inelegant writer; but he is juſtly accuſed of ingratitude to Bale, from whom he borrowed his materials, without acknowledgment. He quotes Leland with great familiarity, without ever having ſeen his book: his errors are innumerable, and his partiality to the Romiſh writers moſt obvious; nevertheleſs we are obliged to him for his account of ſeveral popiſh authors, who lived abroad at the beginning of the Reformation.

PITT (Christopher), an eminent Engliſh poet, celebrated for his excellent tranſlation of Virgil's Æneid, was born in the year 1699. Having ſtudied four years at New-college, Oxford, he was preſented to the living of Pimperne in Dorſetſhire, which he held during the remainder of his life. He had ſo poetical a turn, that while he was a ſchool-boy he wrote two large folios of manuſcript poems, one of which contained an entire tranſlation of Lucan. He was much eſteemed while at the univerſity; particularly by the celebrated Dr Young, who uſed familiarly to call him his *ſon*. Next to his fine tranſlation of Virgil, Mr Pitt gained the greateſt reputation by his excellent Engliſh tranſlarion of Vida's art of poetry. This amiable poet died in the year 1648, without leaving, it is ſaid, one enemy behind him.

Pitt (William) earl of Chatham, a moſt celebrated Britiſh ſtateſman and patriot, was born in November 1708. He was the youngeſt ſon of Robert Pitt, Eſq; of Boconnock in Cornwall; and grandſon of Thomas Pitt, Eſq; governor of Fort St George in the Eaſt Indies, in the reign of queen Anne, who ſold an extraordinary fine diamond to the king of France for 135,000 l. and thus obtained the name of *Diamond Pitt*. His intellectual faculties and powers of elocution very ſoon made a diſtinguiſhed appearance; but at the age of 16 he felt the attacks of an hereditary and incurable gout, by which he was tormented at times during the reſt of his life.

His lordſhip entered early into the army, and ſerved in a regiment of dragoons. Through the intereſt of the ducheſs of Marlborough he obtained a ſeat in parliament before he was 21 years of age. His firſt appearance in the houſe was as repreſentative of the borough of Old Sarum, in the ninth parliament of Great Britain. In the 10th he repreſented Seaford, Aldborough in the 11th, and the city of Bath in the 12th; where he continued till he was called up to the houſe of peers in 1766. The intention of the ducheſs in bringing him thus early into parliament was to oppoſe Sir Robert Walpole, whom he kept in awe by the force of his eloquence. At her death the ducheſs left him 10,000 l. on condition, as was then reported, that he never ſhould receive a place in adminiſtration.

However, if any ſuch condition was made, it certainly was not kept on his lordſhip's part. In 1746 he was appointed vice-treaſurer of Ireland, and ſoon after paymaſter general of the forces, and ſworn a privy-counſellor. He diſcharged the office of paymaſter with ſuch honour and inflexible integrity, refuſing even many of the perquiſites of his office, that his bittereſt enemies could lay nothing to his charge, and he ſoon became the darling of the people. In 1755 he reſigned the office of paymaſter, on ſeeing Mr Fox preferred to him. The people were alarmed at this reſignation; and being diſguſted with the unſucceſsful beginning of the war, complained ſo loudly, that, on the 4th of December 1756, Mr Pitt was appointed ſecretary of ſtate in the room of Mr Fox afterwards Lord Holland; and other promotions were made in order to ſecond his plans. He then took ſuch meaſures as were neceſſary for the honour and intereſt of the nation; but in the month of February 1757, having refuſed to aſſent to the carrying on a war in Germany for the ſake of his majeſty's dominions on the continent, he was deprived of the ſeals on the 5th of April following. Upon this the complaints of the people again became ſo violent, that on the 29th of June he was again appointed ſecretary, and his friends filled other important offices. The ſucceſs with which the war was now conducted is univerſally known; yet on the 5th of October 1761, Mr Pitt, to the aſtoniſhment of almoſt the whole kingdom, reſigned the ſeals into his majeſty's own hands. The reaſon of this was, that Mr Pitt, having received certain intelligence that the family-compact was ſigned between France and Spain, and that the latter was about to join France againſt them, thought it neceſſary to prevent her by commencing hoſtilities firſt. Having communicated this opinion in the privy-council, the other miniſters urged that they would think twice before they declared war againſt that kingdom. “I will not give them leave to think (replied Mr Pitt); this is the time, let us cruſh the whole houſe of Bourbon. But if the members of this board are of a different opinion, this is the laſt time I ſhall ever mix in its councils. I was called into the miniſtry by the voice of the people, and to them I hold myſelf anſwerable for my conduct. I am to thank the miniſters of the late king for their ſupport; I have ſerved my country with ſucceſs; but I will not be reſponſible for the conduct of the war any longer than while I have the direction of it.” To this bold declaration, the lord who then preſided in council made the following reply. “I find the gentleman is determined to leave us; nor can I ſay that I am ſorry for it, ſince he would otherwiſe have certainly compelled us to leave him. But if he is reſolved to aſſume the right of adviſing his majeſty, and directing the operations of the war, to what purpoſe are we called to this council? When he talks of being reſponſible to the people, he talks the language of the houſe of commons, and forgets that at this board he is reſponſible only to the king. However, though he may poſſibly have convinced himſelf of his infallibility, ſtill it remains that we ſhould be equally convinced before we can reſign our underſtandings to his direction, or join with him in the meaſure he propoſes.”.

This converſation, which was followed by Mr Pitt's reſignation, is ſufficient to ſhow the haughtineſs and imperious temper of this miniſter. However, theſe very qualities were ſometimes productive of great and good conſequences, as appears from the following anecdote. —Preparatory to one of the ſecret expeditions during the war which ended in 1763 the miniſter had given orders to the different preſiding officers in the military, navy, and ordnance departments, to prepare a large body of forces, a certain number of ſhips, and a proportionable quantity of ſtores, &c. and to have them all ready againſt a certain day. To theſe orders he received an anſwer from each of the officers, declaring the total impoſſibility of a compliance with them. Notwithſtanding it was then at a very late hour, he ſent immediately for his ſecretary; and after expreſſing his reſentment at the ignorance or negligence of his majeſty's ſervants, he gave the following commands: —“I deſire, Mr Wood, that you will immediately go to Lord Anſon; you need not trouble yourſelf to ſearch the admiralty, he is not to be found there; you muſt purſue him to the gaming houſe, and tell him from me, that if he does not obey the orders of government which he has received at my hands, that I will moſt aſſuredly impeach him. Proceed from him to Lord Ligonier; and though he ſhould be bolſtered with harlots, undraw his curtains, and repeat the ſame meſſage. Then direct your courſe to Sir Charles Frederick, and aſſure him, that if his majeſty's orders are not obeyed, they ſhall be the laſt which he ſhall receive from me.” In conſequence of theſe commands, Mr Wood proceeded to White's, and told his errand to the firſt lord of the admiralty; who inſiſted that the ſecretary of ſtate was out of his ſenſes, and it was impoſſible to comply with his wiſhes: “however, (added he), as madmen muſt be anſwered, tell him that I will do my utmoſt to ſatiſfy him.” From thence he went to the commander in chief of the forces, and delivered the ſame meſſage. He alſo ſaid that it was an impoſſible buſineſs; “and the ſecretary knows it, (added the old lord): nevertheleſs, he is in the right to make us do what we can; and what is poſſible to do, inform him, ſhall be done.” The ſurveyor general of the ordnance was next informed of Mr Pitt's reſolution; and, after ſome little conſideration, he began to think that the orders might be complied with in the time preſcribed. The conſequence at laſt was, that every thing, in ſpite of impoſſibilities themſelves, was ready at the time appointed.

After his reſignation in 1761, Mr Pitt never had any ſhare in adminiſtration. He received a penſion of 3000l. a year, to be continued after his deceaſe, during the ſurvivancy of his lady and ſon; and this gratuity was dignified with the title of *Baroneſs of Chatham* to his lady, and that of *Baron* to her heirs male. Mr Pitt at that time declined a title of nobility; but in 1766 accepted of a peerage under the title of *Baron Pynſent and Earl of Chatham*, and at the ſame time he was appointed lord privy-ſeal.

This acceptance of a peerage proved very prejudicial to his lordſhip's character. However, he continued ſtedfaſt in his oppoſition to the meaſures of adminiſtration. His laſt appearance in the Houſe of Lords was on the 2d of April 1778. He was then very ill and much debilitated: but the queſtion was important, being a motion of the duke of Richmond to addreſs his majeſty to remove the miniſters, and make peace with America on any terms. His lordſhip

ſhip made a long ſpeech, which had certainly overcome his ſpirits: for, attempting to riſe a ſecond time, he fell down in a convulſive fit; and though he recovered for that time, his diſorder continued to increaſe till the 11th of May, when he died at his ſeat at Hayes. His death was lamented as a national loſs. As ſoon as the news reached the houſe of commons, which was then ſitting, Colonel Barré made a motion, that an addreſs ſhould be preſented to his majeſty, requeſting that the Earl of Chatham ſhould be buried at the public expence. But Mr Rigby having propoſed the erecting of a ſtatue to his memory, as more likely to perpetuate the ſenſe of his great merits entertained by the public, this was unanimouſly carried. A bill was ſoon after paſſed, by which 4000 l. a-year was ſettled upon John, now earl of Chatham, and the heirs of the late earl to whom that title may deſcend.—His lordſhip was married in 1754 to Lady Heſten, ſiſter to the earl of Temple; by whom he had three ſons and two daughters.

Never perhaps was any life ſo multifarious as that of Lord Chatham; never did any compriſe ſuch a number of intereſting ſituations. To bring the ſcattered features of ſuch a character into one point of view, is an arduous taſk. The author of the hiſtory of his life* has attempted to do it; and with the outlines of what he has ſaid in ſumming up his character, we ſhall finiſh our biographical ſketch of this wonderful man.

* Hiſtory of the Life of William Pitt, Earl of Chatham.

“ One of the firſt things that ſtrikes us, in the recollection of Chatham's life, is the ſuperior figure he makes among his cotemporaries. Men of genius and attraction, a Carteret, a Townſhend, and I had almoſt ſaid a Manſfield, however pleaſing in a limited view, appear evidently in this compariſon to ſhrink into narrower dimenſions, and walk a humbler circle. All that deſerves to arreſt the attention, in taking a general ſurvey of the age in which he lived, is compriſed in the hiſtory of Chatham. No character ever bore the more undiſputed ſtamp of originality. Unreſembled and himſelf, he was not born to accommodate to the genius of his age. While all around him were depreſſed by the uniformity of faſhion, or the contagion of venality, he ſtood aloof. He conſulted no judgment but his own; and he acted from the untainted dictates of a comprehenſive ſoul.

“ The native royality of his mind is eminently conſpicuous. He felt himſelf born to command; and the free ſons of Brirain implicitly obeyed him. In him was realiſed the fable of Orpheus; and his genius, his ſpirit, his eloquence, led millions in his train, ſubdued the rugged ſavage, and diſarmed the fangs of malignity and envy. Nothing is in its nature ſo inconſiſtent as the breath of popular applauſe: and yet that breath was eminently his during the greater part of his life. Want of ſucceſs could not divert it; inconſiſtency of conduct could not change its tenor. The aſtoniſhing extent of his views, and the myſterious comprehenſion of his plans, did not in one reſpect ſet him above little things: nothing that was neceſſary to the execution of his deſigns was beneath him. In another reſpect, however, he was infinitely eſtranged to little things: ſwallowed up in the buſineſs of his country, he did not think of the derangement of his own private affairs; for, though indiſpoſed to all the modes of diſſipated expence, his affairs, even when his circumſtances were much improved, were always deranged. But the features that ſeem moſt eminently to have characteriſed him, were ſpirit and intrepidity: they are conſpicuous in every action and in every turn of his life; nor did this ſpirit and intrepidity leave him even at the laſt.

“ The manners of lord Chatham were eaſy and bland, his converſation was ſpirited and gay, and he readily adapted himſelf to the complexion of thoſe with whom he aſſociated. That artificial reſerve, which is the never-failing refuge of ſelf-diffidence and cowardice, was not made for him. He was unconſtrained as artleſs infancy, and generous as the noon-day ſun: yet had he ſomething impenetrable that hung about him. By an irreſiſtible energy of ſoul, he was haughty and imperious. He was incapable of aſſociating councils, and he was not formed for the ſweeteſt bands of ſociety. He was a pleaſing companion, but an unpliant friend.

“ The ambition of our hero, however generous in its ſtrain, was the ſource of repeated errors in his conduct. To the reſignation of lord Carteret, and again, from the commencement of the year 1770, his proceedings were bold and uniform. In the intermediate period they were marked with a verſatility, incident only in general to the moſt flexible minds. We may occaſionally trace in them the indeciſion of a candidate, and the ſuppleneſs of a courtier. In a word, he aimed at the impoſſible taſk of flattering at once the prejudices of a monarch, and purſuing unremittedly the intereſts of the people.

“ A feature, too, ſufficiently prominent in his character, was vanity, or perhaps pride and conſcious ſuperiority. He dealt ſurely ſomewhat too freely with invective. He did not pretend to an ignorance of his talents, or to manage the diſplay of his important ſervices. Himſelf was too often the hero of his tale; and the ſucceſſes of the laſt war the burden of his ſong ‡.

‡ Ending in 1763.

“ Patriotiſm was alſo the ſource of ſome of his imperfections. He loved his country too well; or, if that may ſound abſurd, the benevolence at leaſt, that embraces the ſpecies, had not ſufficient ſcope in his mind. He once ſtyled himſelf *a lover of honourable war*; and in ſo doing he let us into one trait of his character. The friend of human kind will be an enemy to all war. He indulged too much a puerile antipathy to the houſe of Bourbon: and it was ſurely the want of expanſive affections that led him to ſo unqualified a condemnation of American independency.

“ But the eloquence of lord Chatham was one of his moſt ſtriking characteriſtics. He far outſtripped his competitors, and ſtood alone the rival of antiquity.

“ His eloquence was of every kind. No man excelled him in cloſe argument and methodical deduction: but this was not the ſtyle into which he naturally fell. His oratory was unlaboured and ſpontaneous: he ruſhed at once upon the ſubject; and uſually illuſtrated it rather by glowing language and original conception, than by cool reaſoning. His perſon was tall and dignified; his face was the face of an eagle; his piercing eye withered the nerves, and looked through the ſouls of his opponents; his countenance was ſtern, and the voice of thunder ſat upon his lips: anon, however, he could deſcend to the eaſy and the playful. His voice ſeemed ſcarcely more adapted to energy and to terror, Pittacus.

than it did to the melodious, the inſinuating, and the ſportive. If, however, in the enthuſiaſm of admiration, we can find room for the frigidity of criticiſm, his action ſeemed the moſt open to objection. It was forcible, uniform, and ungraceful. In a word, the moſt celebrated orators of antiquity were in a great meaſure the children of labour and cultivation. Lord Chatham was always natural and himſelf."

To the misfortune of the republic of letters, and of poſterity, his lordſhip never ſought the preſs. Lord Cheſterfield ſays, "that he had a moſt happy turn for poetry: but it is more than probable that Cheſterfield was deceived; for we are told by his biographer that his verſes to Garrick were very meagre, and Lord Chatham himſelf ſaid that he ſeldom indulged and ſeldom avowed it. It ſhould ſeem, then, that he himſelf ſet no great value upon it. Perhaps a proper confidence in one's ſelf is eſſential to all extraordinary merit. Why ſhould we ambitiouſly aſcribe to one mind every ſpecies of human excellence? But though he was no poet, it is more than probable, that he would have excelled as much in writing proſe as he did in ſpeaking it.

PITTACUS, a native of Mitylene in Leſbos, was one of the ſeven wiſe men of Greece: his father's name was Hyrradius. With the aſſiſtance of the ſons of Alcæus, he delivered his country from the oppreſſion of the tyrant Melanchrus; and in the war which the Athenians waged againſt Leſbos, he appeared at the head of his countrymen, and challenged to ſingle combat Phrynon the enemy's general. As the event of the war ſeemed to depend upon this combat, Pittacus had recourſe to artifice; and when he engaged, he entangled his adverſary in a net which he had concealed under his ſhield, and eaſily diſpatched him. He was amply rewarded for this victory; and his countrymen, ſenſible of his merit, unanimouſly appointed him governor of their city with unlimited authority. In this capacity Pittacus behaved with great moderation and prudence; and after he had governed his fellow-citizens with the ſtricteſt juſtice, and after he had eſtabliſhed and enforced the moſt ſalutary laws, he voluntarily reſigned the ſovereign power after having enjoyed it for 10 years, obſerving that the virtues and innocence of private life were incompatible with the power and influence of a ſovereign. His diſintereſtedneſs gained him many admirers; and when the Mityleneans wiſhed to reward his public ſervices by preſenting him with an immenſe tract of territory, he refuſed to accept more land than what ſhould be contained in the diſtance to which he could throw a javelin. He died in the 70th year of his age, about 579 years before Chriſt, after he had ſpent the laſt 10 years of his life in literary eaſe and peaceful retirement.

The following maxims and precepts are aſcribed to Pittacus: The firſt office of prudence is to foreſee threatening misfortunes, and prevent them. Power diſcovers the man. Never talk of your ſchemes before they are executed; leſt, if you fail to accompliſh them, you be expoſed to the double mortification of diſappointment and ridicule. Whatever you do, do it well. Do not that to your neighbour which you would take ill from him. Be watchful for opportunities.

Many of his maxims were inſcribed on the walls of Apollo's temple at Delphi, to ſhow to the world how great an opinion the Mityleneans entertained of his abilities as a philoſopher, a moraliſt, and a man. By one of his laws, every fault committed by a man when intoxicated deſerved double puniſhment.

Pittenween.

PITTENWEEM, a ſmall town ſituated on the Frith of Forth, towards the eaſtern extremity of the county of Fife in North Britain. It takes its name from a ſmall cave in the middle of it anciently called a *weem*, and is remarkable for nothing but the ruins of a religious houſe, which is ſometimes called an *abbey* and ſometimes a *priory*. Which of theſe is the proper denomination it is hardly worth while to inquire; but it appears from the arms of the monaſtery, ſtill preſerved over the principal gate, that the ſuperior, by whatever title he was called, had the privilege of wearing a mitre. This edifice, which ſeems never to have been large, was, with other monuments of miſtaken piety, alienated from the church at the Reformation; and what parts of it now remain are put to very different uſes. Some of the cells of the monks furniſh habitations tolerably convenient for the ſervants of him who, in the ceaſeleſs change of property, has got poſſeſſion of the lands which formerly belonged to them. That which ſeems to have been the granary is a decent pariſh church. The porch of the chapel, the only part of that building which exiſts, has been alternately employed as a ſtable and a ſlaughter-houſe; and the meat killed there has been commonly expoſed to ſale in the lower part of the ſteeple of that edifice which is now dedicated to the offices of parochial devotion. Had the moralizing traveller *, who compoſed the beautiful and pathetic meditation on the ruins of *Iona*, condeſcended to viſit Pittenween, he would not have viewed the abbey without emotion. Inſignificant as the place at preſent is, it ſeems to have been of ſome conſequence in the laſt century; and we are led to infer, from the following extract from the records, that the inhabitants were opulent, and that the town was fortified.

* Johnſton.

"Pittenween, decimo-quarto Feb. 1651. The bailies and council being convened, and having received information that his majeſty is to be in progreſs with his court along the coaſt to-morrow, and to ſtay at Anſtruther houſe that night, have thought it expedient, according to their bounden duty, with all reverence and due reſpect, and with all the ſame ſolemnity they can, to wait upon his majeſty, as he comes through this his majeſty's burgh, and invite his majeſty to eat and drink as he paſſes; and for that effect hath ordained, that the morn afternoon the town's colours be put upon the bertiſene of the ſteeple, and that at three o'clock the bells begin to ring, and ring on ſtill till his majeſty comes hither, and paſſes to Anſtruther: And ſicklike, that the miniſter be ſpoken to, to be with the bailies and council, who are to be in their beſt apparel, and with them a guard of 24 of the ableſt men, with partizans, and other 24 with muſkets, all in their beſt apparel, William Sutherland commanding as captain of the guard; and to wait upon his majeſty, and to receive his highneſs at the Weſt Port, bringing his majeſty and court through the town, until they come to Robert Smith's yeet, where an table is to be covered with my Lord's † beſt carpet: and that George Hetherwick have in readineſs, of fine flour, ſome great bunns, and other wheat-bread of the beſt order, baken

† The Earl of Kelly.

with ſugar, cannell, and other ſpices fitting; and that James Richardſon and Walter Airth have care to have ready eight or ten gallons of good ſtrong ale, with Canary, ſack, Rheniſh wine, tent, white and claret wines, that his majeſty and his court may eat and drink; and that in the mean time, when his majeſty is preſent, the guard do diligently attend about the court; and ſo ſoon as his majeſty is to go away, that a ſign be made to Andrew Tod, who is appointed to attend the colours on the ſteeple head, to the effect he may give ſign to thoſe who attend the cannon of his majeſty's departure, and then the *haill thirty-ſix cannons to be all ſhot at once*. It is alſo thought fitting, that the miniſter, and James Richardſon the oldeſt bailie, when his majeſty comes to the table, ſhow the great joy and ſenſe this burgh has of his majeſtey's condeſcendence to viſit the ſame, with ſome other expreſſions of loyalty. All which was acted." N. Lat. 56. 11. W. Long. 2. 49.

PITTOSPORUM, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants. The calyx is pentaphyllous, inſerus and deciduous. The petals are five in number; the ſtyle thread ſhaped; the capſule ſomewhat angular, trilocular, and contains three or four angulated ſeeds, adhering to the capſule by means of a liquid reſin in the loculaments. Of this there are three ſpecies, *viz.* 1. *Tenuifolium*. 2. *Umbellatum*. 3. *Coriaceum*. The firſt and ſecond are natives of the Cape of Good Hope; the third grows in Madeira, and flowers in May and June.

PITUITARY GLAND. See ANATOMY, p. 758.

PITYOCAMPASIS, in entomology, the caterpillar of the pine-tree, received its compound name from that ſubſtance. It was conſidered as a poiſon, and as a remedy, according to its different employment; but our chief information is derived from M. Reaumur, who has attentively obſerved its manner of life. The animal cannot bear much cold, and is therefore never found in the higher latitudes. It is ſtyled proceſſionary, becauſe it never leaves its hold, where many families reſide, till the evening when it feeds in trains, led on by two or three, and this train leaves a ribband of ſilk in its way for thoſe behind follow exactly the ſteps of thoſe which preceded, and each leaves its fibre of ſilk. Their neſts are found in autumn; they are born the middle of September, become torpid in December, and recover their ſtrength again in ſpring. They then deſcend from the trees, plunge into the earth, and undergo their laſt change. It is the bombix pityocampa of Fabricius, (*Mantiſſa Inſector*. tom. ii. p. 114. n° 66.), and greatly reſembled the proceſſionary caterpillar of the oak. The ancients uſed it as a veſicatory, and the acrimony ſeems to reſide chiefly in a duſt which is concealed in receptacles on its back. This is its offenſive weapon, for it is thrown out at will, and produces very troubleſome effects, though the hair of the animal and every part of its body ſeem to have a ſimilar, but weaker power. The effect is alſo weaker in winter; but this may depend on the diminiſhed irritability of the human body, as well as on the torpid ſtate of the inſect. Their ſilk is not ſufficiently ſtrong for the loom, and in hot water melts almoſt to a paſte. In the earth it forms neſts of ſtronger ſilk, but it is then found with difficulty: in boxes its ſilk is extremely tender. Adding to all theſe inconveniencies, handling the cones produces all the bad effects of the duſt. Matthiolus recommends them as a ſtyptic, and perhaps they may ſerve for burning on the ſkin inſtead of moxa, the downy ſilk of a ſpecies of artemiſia. The ancients, afraid of its hurtful qualities, uſed them with caution, and enacted laws againſt their being ſold promiſcuouſly: the modern planter is chiefly afraid of them becauſe they deſtroy the beauty of his trees, and he endeavours to collect the eggs by cutting off the branches, which are burnt immediately.

PIVAT, or PIVOT, a foot or ſhoe of iron or other metal, uſually conical or terminating in a point, whereby a body, intended to turn round, bears on another fixed at reſt, and performs its revolutions. The pivot uſually bears or turns round in a ſole, or piece of iron or braſs hollowed to receive it.

PIUS II. (Æneas-Sylvius Piccolomini), was born on the 18th of October 1405 at Corſigni in Sieneſe, the name of which he afterwards changed into that of *Pienza*. His mother Victoria Forteguerra, when ſhe was with child of him, dreamed that ſhe ſhould be delivered of a mitred infant; and as the way of degrading clergymen at that time was by crowning them with a paper mitre, ſhe believed that Æneas would be a diſgrace to his family. But what to her had the appearance of being a diſgrace, was a preſage of the greateſt honours. Æneas was carefully educated, and made conſiderable proficiency in the belles lettres. After having finiſhed his ſtudies at Sienna, he went in 1431 to the council of Bale with Cardinal Capranica, ſurnamed *De Fermo*, becauſe he was entruſted with the government of that church. Æneas was his ſecretary, and was then only 26 years of age. He afterwards acted in the ſame capacity to ſome other prelates, and to Cardinal Albergati. The council of Bale honoured him with different commiſſions, in order to recompenſe him for the zeal with which he defended that aſſembly againſt Pope Eugene IV. He was afterwards ſecretary to Frederic III. who decreed to him the poetic crown, and ſent him Ambaſſador to Rome, Milan, Naples, Bohemia, and other places. Nicolas V. advanced him to the biſhopric of Trieſte, which he quitted ſome time after for that of Sienna. At laſt, after having diſtinguiſhed himſelf in various nunciatures, he was inveſted with the Roman purple by Calixtus III. whom he ſucceeded two years after on the 27th of Auguſt 1458. Pius II. now advanced to the holy ſee, made good the proverb, *Honores mutant mores*. From the commencement of his pontificate, he appearead jealous of the papal prerogatives. In 1460 he iſſued a bull, "declaring appeals from the pope to a council to be null, erroneous, deteſtable, and contrary to the ſacred canons." That bull, however, did not prevent the procurator-general of the parliament of Paris from appealing to a council in defence of the Pragmatic ſanction, which the pope had ſtrenuouſly oppoſed. Pius was then at Mantua, whither he had gone in order to engage the Catholic princes to unite in a war againſt the Turks. The greater part of them agreed to furniſh either troops or money; others refuſed both, particularly the French, who from that moment incurred his holineſs's averſion. That averſion abated under Louis XI. whom he perſuaded in 1461 to aboliſh the Pragmatic ſanction, which the parliament of Paris had ſupported with ſo much vigour.

The following year, 1462, was rendered famous by a controverſy which took place between the Cordeliers and Dominicans, whether or not the blood of Jeſus Chriſt was ſeparated from his body while he lay in the grave. It was alſo made a queſtion whether it was ſeparated from his divinity. The Cordeliers affirmed that it was, but the Dominicans were of an oppoſite opinion. They called each other heretics; which obliged the pope to iſſue a bull, forbidding them under pain of cenſure to brand one another with ſuch odious epithets. The bull which his holineſs publiſhed on the 26th of April, retracting what he had written to the council of Bale when he was its ſecretary, did not redound much to his honour. "I am a man (ſays he), and as a man I have erred. I am far from denying that a great many things which I have ſaid and written may deſerve condemnation. Like Paul, I have preached through deception, and I have perſecuted the church of God through ignorance. I imitate the bleſſed Auguſtin, who having ſuffered ſome erroneous ſentiments to creep into his works, retracted them. I do the ſame thing; I frankly acknowledge my ignorances, from a fear leſt what I have written in my younger years ſhould be the occaſion of any error that might afterwards be prejudicial to the intereſts of the holy ſee. For if it be proper for any one to defend and ſupport the eminence and glory of the firſt throne of the church, it is in a peculiar manner my duty, whom God, out of his mercy and goodneſs alone, without any merit on my part, has raiſed to the dignity of *vicar of Jeſus Chriſt*. For all theſe reaſons, we exhort and admoniſh you in the Lord, not to give credit to thoſe writings of ours which tend in any degree to hurt the authority of the apoſtolic ſee, and which eſtabliſh opinions that are not received by the Roman church. If you find, then, any thing contrary to her doctrine either in our dialogues, in our letters, or in any other of our works, deſpiſe theſe opinions, reject them, and adopt our preſent ſentiments. Believe me rather now that I am an old man, than when I addreſſed you in my earlier days. Eſteem a ſovereign pontiff more than a private perſon; except againſt Æneas Sylvius, but receive Pius II." It might be objected to his holineſs, that it was his dignity alone which had made him alter his opinion. He anticipates that objection, by giving a ſhort account of his life and actions, with the whole hiſtory of the council of Bale, to which he went with Cardinal Capranica in 1431; "but (ſays he) I was then a young man, and without any experience, like a bird juſt come from its neſt." In the mean time, the Turks were threatening Chriſtendom. Pius, ever zealous in the defence of religion againſt the infidels, forms the reſolution of fitting out a fleet at the expence of the church, and of paſſing over into Aſia himſelf, in order to animate the Chriſtian princes by his example. He repaired to Ancona with a deſign to embark; but he there fell ſick with the fatigue of the journey, and died on the 16th of Auguſt 1464, aged 59 years. Pius was one of the moſt learned men of his time, and one of the moſt zealous pontiffs: but being of an ambitious and pliant diſpoſition, he ſometimes ſacrificed to that ambition. His principle works are, 1. Memoirs of the council of Bale, from the ſuſpenſion of Eugenius to the election of Felix. 2. The hiſtory of the Bohemians, from their origin to the year 1458. 3. Two books on coſmography. 4. The hiſtory of Frederic III. whoſe vice-chancellor he had been. This performance was publiſhed in 1785 in folio, and is believed to be pretty accurate and very particular. 5. A treatiſe on the education of children. 6. A poem upon the paſſion of Jeſus Chriſt. 7. A collection of 432 letters, printed at Milan, 1473, in folio, in which are found ſome curious anecdotes. 8. The memoirs of his own life, publiſhed by John Gobelin Perſonne his ſecretary, and printed at Rome in 4to in 1584. There is no doubt of this being the genuine production of that pontiff. 9. *Hiſtoria rerum ubicumque geſtarum*, of which only the firſt part was publiſhed at Venice in 1477 in folio. His works were printed at Helmſtadt in 1700, in folio, at the beginning of which we find his life. That verſe of Virgil's Æneid (lib. i. v. 382.) which begins thus,

Sum pius Æneas,———

and the end of the following verſe,

———*fama ſuper æthera natus,*

have been applied to him.

Pius IV. (John Angel Cardinal de Medicis), of a different family from that of Florence, was born at Milan in 1499. He was ſon to Bernardin Medechini, and brother of the famous Marquis de Marignan, Charles Vth's general. He raiſed himſelf by his own merit, and filled ſeveral important offices under Popes Clement VII. and Paul III. Julius III. who had entruſted him with ſeveral legations, honoured him with a cardinal's hat in 1549. After the death of Paul IV. he was advanced to St Peter's chair on the 25th of December 1559. His predeceſſor had rendered himſelf deteſtable to the Romans, who treated his memory with every mark of indignity, and Pius IV. commenced his pontificate by pardoning them. He did not, however, extend the ſame clemency to the nephews of Pope Paul IV.; for he cauſed Cardinal Caraffe to be ſtrangled in the caſtle of St Angel, and his brother, the Prince de Palliano, to be beheaded. His zeal was afterwards directed againſt the Turks and heretics. In order to ſtop if poſſible, the progreſs of theſe laſt, he renewed the Council of Trent, which had been ſuſpended. He knew well (ſays Abbé de Choiſy), that that council might make ſome regulations which would have the effect to leſſen his authority; but on the other hand, he perceived that great inconveniences might reſult from its not being aſſembled; and "*in the main* (ſaid he to his confidents) *it is better to feel evil for once than to be always in dread of it.*" In 1561 he diſpatched nuncios to all the Catholic and Proteſtant princes, to preſent them with the bull for calling that important aſſembly. An end was, however, put to it by the induſtry of his nephew, S. Charles Borromeus, in 1563; and, on the 26th of January the year following, he iſſued a bull for confirming its decrees. In 1565 a conſpiracy was formed againſt his life by Benedict Acolti, and ſome other viſionaries. Thoſe madmen had taken it into their head that Pius IV. was not a lawful Pope, and that after his death they would place another in St Peter's chair, with the title of *Pope Angelicus*, under whom errors might be reformed, and peace reſtored to the church. The conſpiracy was diſcovered, and the fanatic Benedict put to death. This pontiff died a little time after, on the 9th of December 1565, aged 66 years, carrying to the grave with him the hatred of the Romans, whom his ſeverities had exaſperated. He was a man of great addreſs, and very fruitful in his reſources. He adorned Rome with ſeveral public edifices; but theſe ornaments tended greatly to impoveriſh it. If he was the inſtrument of raiſing his relations in the world, it muſt be allowed, at leaſt, that the greater part of them did him honour.

Pius V. (S. Michael Ghiſleri), born at Boſchi or Boſco, in the dioceſe of Fortona, on the 17th of January 1504, was, according to Abbé de Choiſy, ſon to a ſenator of Milan. He turned a Dominican friar. Paul IV. informed of his merit and virtue, gave him the biſhopric of Sutri, created him cardinal in 1557, and made him inquiſitor-general of the faith among the Milaneſe and in Lombardy; but the ſeverity with which he exerciſed his office obliged him to quit that country. He was ſent to Venice, where the ardour of his zeal met with ſtill greater obſtacles. Pius IV. added to the cardinal's hat the biſhopric of Mondovi. After the death of that pontiff, he was advanced to St Peter's chair in 1566. The Romans expreſſed but little joy at his coronation: he was very ſenſible of it, and ſaid, "*I hope they will be as ſorry at my death as they are at my election*;" but he was miſtaken. Raiſed by his merit to the firſt eccleſiaſtical preferment in Chriſtendom, he could not diveſt himſelf of the ſeverity of his character; and the ſituation in which he found himſelf rendered, perhaps, that ſeverity neceſſary. One of his firſt objects was to repreſs the luxury of the clergy, the pride of the cardinals, and the licentious manners of the Romans. He cauſed the decrees of reformation enacted by the Council of Trent to be put in execution: he prohibited bull baiting in the Circus; he expelled from Rome the women of the town; and allowed the cardinals to be proſecuted for their debts. The errors which overflowed the Chriſtian world gave him great uneaſineſs. After having employed gentle and lenient meaſures in the reclaiming of heretics, he had recourſe to ſeverity, and ſome of them ended their days in the flames of the inquiſition. He particularly diſplayed his zeal for the grandeur of the Holy See in 1568, by ordaining that the bull *In cœna domini*, which was publiſhed at Rome every year on *Maunday Thurſday*, and which Clement XIV. ſuppreſſed, ſhould be publiſhed likewiſe throughout the whole church. That bull, the work of ſeveral ſovereign pontiffs, principally regards the juriſdiction of the eccleſiaſtical and civil power. It anathematizes thoſe who appeal from the decrees of popes to a general council; thoſe who favour the appellants; the univerſities which teach that the pope is ſubject to a general council; the princes who would reſtrain the eccleſiaſtical juriſdiction, or who exact contributions from the clergy. It was rejected by all the ſovereign ſtates, excepting a very few. In 1580, ſome biſhops having endeavoured to introduce it into their dioceſes, the parliament cauſed their temporalities to be ſeized upon, and declared thoſe guilty of high treaſon who ſhould imitate the fanaticiſm of thoſe prelates. Pius V. for ſome time meditated an expedition againſt the Turks. He had the courage to make war on the Ottoman empire, by forming a league with the Venetians and Philip II. king of Spain. This was the firſt time that the ſtandard of the two keys was ſeen diſplayed againſt the creſcent. The naval armies came to an engagement, on the 7th of October 1571, in Lepanto Bay, in which the confederate Chriſtian princes obtained a ſignal victory over the Turks, who loſt above 30,000 men, and near 200 galleys. This ſucceſs was principally owing to the Pope, who exhauſted both his purſe and perſon in fitting out that armament. He died of the gravel ſix months after, on the 30th of April 1572, aged 68. He repeated often, in the midſt of his ſufferings, "*O Lord! increaſe my pains and my patience.*" His name will for ever adorn the Liſt of Roman pontiffs. It is true that his bull againſt queen Eliſabeth, and his other bull in favour of the inquiſition, with his rigorous proſecution of heretics both in France and Ireland, prove that he had more zeal than ſweetneſs in his temper; but in other reſpects he poſſeſſed the virtues of a ſaint and the qualities of a king. He was the model of the famous Sixtus Quintus, to whom he gave an example of amaſſing in a few years ſuch ſavings as were ſufficient to make the Holy See be regarded as a formidable power. Sultan Selim, who had no greater enemy than this pope, cauſed public rejoicings to be made at Conſtantinople for his death during the ſpace of three days. The pontificate of Pius is alſo celebrated for the condemnation of Baius, the extinction of the order of Humilies, and the reformation of that of the Ciſtercians. He was canonized by Clement XI. in 1712. There are extant ſeveral of his letters, printed at Anvers in 1640, in 4to. Felibian, in 1672, publiſhed his *Life*, tranſlated from the Italian of Agatio di Somma; but we cannot vouch for the fidelity of the tranſlation.

PIX. See *Mint-Marks*.

PIZARRO (Francis), a celebrated Spaniſh general, the diſcoverer and conqueror of Peru, in conjunction with Diego Almagro, a Spaniſh navigator. They are both charged with horrid cruelties to the inhabitants; and they fell victims to their own ambition, jealouſy, and avarice. Almagro revolting, was defeated and beheaded by Pizarro, who was aſſaſſinated by Almagro's friends in 1541. See Peru.

PLACE, Locus, in philoſophy, a mode of ſpace, or that part of immoveable ſpace which any body poſſeſſes. See Metaphysics, n° 185.

Place in aſtronomy. The place of the ſun, a ſtar, &c. denotes the ſign and degree of the zodiac which the luminary is in; or the degree of the ecliptic, reckoning from the beginning of aries, which the planet or ſtar's circle of longitude cuts: and therefore coincides with the longitude of the ſun, planet, or ſtar. As the ſine of the ſun's greateſt declination 23° 30′: to the ſine of any preſent declination given or obſerved, for inſtance, 23° 15′:: ſo is the radius 10: to the ſine of his longitude 81° 52′; which, if the declination were north, would give 20° 52′ of gemini; if ſouth, 20° 52′ of capricorn, for the ſun's place. See Declination, &c.

The place of the moon being that part of her orbit wherein ſhe is found at any time, is of various kinds, by reaſon of the great inequalities of the lunar motions, which render a number of equations and reductions neceſſary before the juſt point be found. The moon's fictitious place is her place once equated; her place nearly true, is her place twice equated; and her true place thrice equated. See Astronomy, *paſſim*.

Place, in war, a general name for all kinds of fortreſſes where a party may defend themſelves. Thus, 1. A ſtrong or fortified place is one flanked, and covered with baſtions. 2. A regular place, one whoſe angles, ſides, baſtions, and other parts, are equal; and this is uſually denominated from the number of its angles, as a pentagon, hexagon, &c. 3. Irregular place is one whoſe ſides, and angles are unequal.—4. Place of arms is a ſtrong city or town pitched upon for the chief magazine of an army; or, in a city or garriſon, it is a large open ſpot of ground, uſually near the centre of the place where the grand guard is commonly kept, and the garriſon holds its rendezvous at reviews, and in caſes of alarm to receive orders from the governor. 5. Places of arms of an attack, in a ſiege, is a ſpacious place covered from the enemy by a parapet or epaulement, where the ſoldiers are poſted ready to ſuſtain thoſe at work in the trenches againſt the ſoldiers of the garriſon. 6. Place of arms particular, in a garriſon, a place near every baſtion, where the ſoldiers ſent from the grand place to the quarters aſſigned them relieve thoſe that are either upon the guard or in ſight. 7. Place of arms without, is a place allowed to the covert way for the planting of cannon, to oblige thoſe who advance in their approaches to retire. 8. Place of arms in a camp, a large place at the head of the camp for the army to be ranged in and drawn up in battalia. There is alſo a place for each particular body, troop, or company, to aſſemble in.

Common-Place. See *Common-Place.*

PLACENTA, in anatomy and midwifery, a ſoft roundiſh maſs, found in the womb of pregnant women which, from its reſemblance to the liver, was called by the ancients *hepar uterinum*, uterine liver.

PLACENTIA, called by the natives *Piacenza*, is a town of Italy, and capital of a duchy of the ſame name, with a biſhop's ſee. It is ſeated about 100 paces from the river Po, in a very fertile pleaſant plain, watered by a great number of rivulets, and ſurrounded with hills, abounding in all ſorts of fruits. In its territory there are ſalt-ſprings, from which they make a very white ſalt; and there are alſo mines of iron, woods, and warrens. It contains a great number of merchants, and is reckoned three miles in circumference. Its fortifications are inconſiderable, but the citadel is pretty ſtrong. The ſtreets are ſtraight, and the principal ſtreet, called *Stradone*, is 25 common paces broad and 3000 feet long, in a direct line, with 600 ſtone poſts, for ſeparating the foot from the carriage-way, and on both ſides are 11 ſpacious convents. The other buildings of the city are not very remarkable, though it contains 45 churches, 28 convents, and two alms-houſes. The cathedral is pretty much in the Gothic taſte; but the church of the Auguſtines is reckoned the moſt beautiful, and eſteemed worthy of its architect, the celebrated Vignoli. The ducal palace, though large, makes no great appearance on the outſide; but within are ſome good apartments. In the area before the town-houſe ſtand two admirable braſs ſtatues of Alexander and Renatus IV. both of the houſe of Farneſe, and dukes of Parma and Placentia. The biſhop is ſuffragan to the archbiſhop of Milan. At this city begins the Via Æmilia, which extends as far as Rimini on the Adriatic. The number of the inhabitants is about 30,000, among whom there are 2000 eccleſiaſtics. This city has been taken ſeveral times in the wars of Italy. The king of Sardinia took poſſeſſion of it in 1744, it being ceded to him by the queen of Hungary; but it was taken from him in 1746, after a bloody battle. It has a famous univerſity, and the inhabitants are much eſteemed for their politeneſs. There is a great fair here every year on the 15th of April, which is much frequented. It is about 32 miles north-weſt of Parma and 83 eaſt of Turin. E. Long. 10. 24. N. Lat. 45. 5.

PLAGIARY, in philology, the purloining another man's works, and putting them off as our own. Among the Romans, *plagiarius* was properly a perſon who bought, ſold, or retained a freeman for a ſlave; and was ſo called, becauſe, by the Flavian law, ſuch perſons were condemned *ad plagas*, "to be whipped."

Thomaſius has an expreſs treatiſe *De plagio literario*; wherein he lays down the laws and meaſures of the right which authors have to one another's writings "Dictionary-writers, at leaſt ſuch as meddle with *arts and ſciences* (as is pertinently obſerved by Mr Chambers), ſeem exempted from the common laws of *meum* and *tuum*; they do not pretend to ſet up on their own bottom, nor to treat you at their own coſt. Their works are ſuppoſed, in great meaſure, compoſitions of other people's; and what they take from, others; they do it avowedly, and in the open ſun.—In effect, their quality gives them a title to every thing that may be for their purpoſe, wherever they find it; and if they rob, they do not do it any otherwiſe than as the bee does, for the public ſervice. Their occupation is not pillaging, but collecting contributions; and if you aſk them their authority, they will produce you the practice of their predeceſſors of all ages and nations."

PLAGIUM, in law. See Kidnapping.

PLAGUE, Peſtilence, or *Peſtilential Fever*, is a very acute, malignant, and contagious diſeaſe; being a putrid fever of the worſt kind, and ſeldom failing to prove mortal. Though it is generally defined a malignant fever, Diemerbrock thinks they ought to be diſtinguiſhed, ſince the fever is not the eſſence of the diſeaſe, but merely a ſymptom or effect of it. See Medicine, nº 221.

The plague, as is generally agreed, is never bred or propagated in Britain, but always imported from abroad eſpecially from the Levant, Leſſer Aſia, Egypt, &c. where it is very common. Sydenham has remarked that it rarely infeſts this country oftener than once in 40 years, and happily we have been free of it for a much longer period.

Authors are not as yet agreed concerning the nature of this dreadful diſtemper. Some think that inſects are the cauſe of it, in the ſame way that they are the cauſe of blights, being brought in ſwarms from other climates, by the wind, when they are taken into the lungs in reſpiration; the conſequence of which is, that they mix with the blood and juices, and attack and corrode the viſcera. Mr Boyle, on the other hand, thinks it originates from the effluvia or exhalations breathed in the atmoſphere, from noxious minerals, to which may be added ſtagnant waters and putrid bodies of every kind.

Mr Gibbon thinks that the plague is derived from damp, hot, and ſtagnating air, and the putrefaction of animal ſubſtances, eſpecially locuſts. See *Gibbon's Roman Hiſtory*, 4to edit. vol. iv. p. 327—332, where there is alſo a very particular account of the plague which depopulated the earth in the time of the Emperor Juſtinian.

The Mahometans believe that the plague proceeds from certain ſpirits, or goblins, armed with bows and arrows, ſent by God to puniſh men for their ſins; and that when the wounds are given by ſpectres of a black colour, they certainly prove fatal, but not ſo when the arrows are ſhot by thoſe that appear white. They therefore take no precaution to guard themſelves againſt it. The wiſer profeſſors of this religion, however, at preſent act otherwiſe; for we find a receipt recommended by Sidy Mohammed Zerroke, one of the moſt celebrated Marabout's, prefaced with theſe remarkable words; "The lives of us all are in the hands of God, when it is we muſt die. However, it hath pleaſed him to ſave many perſons from the plague, by taking every morning while the infection rages one pill or two of the following compoſition; *viz.* of myrrh two parts, ſaffron one part, of aloes two parts, of ſyrup of myrtleberries, *q. ſ.* But this remedy is confined to the more enlightened; for the bigotry of the lower ſort is ſo extreme as to make them deſpiſe all precautions which people of other nations uſe. Of this extreme and fooliſh prejudice Dr Chandler gives an intereſting account when ſpeaking of the plague at Smyrna. This learned author is of opinion that the diſeaſe ariſes from animalcules, which he ſuppoſes to be inviſible. See *Chandler's Travels in Aſia Minor*, p. 279, &c.

It is a remarkable fact, that *plagues* are ſometimes partial, and that they only attack particular animals, or a particular deſcription of perſons, avoiding others altogether, or attacking them but ſlightly. Thus Fernelius informs us of a plague, or murrain, in 1514, which invaded only cats. Dionyſius Halicarnaſſeus mentions a plague which attacked none but maids; and that which raged in the time of Gentilis, killed ſcarce any women, and very few but luſty men. Boterus mentions another plague, which aſſaulted none but the younger ſort; and we have inſtances of the ſame kind of a later ſtanding (A). Cardon ſpeaks of a plague at Baſil, with which the Switzers were infected, and the Italians, Germans, or French, exempted: and John Utenhovius takes notice of a dreadful one at Copenhagen, which, tho' it raged among the Danes, ſpared the Germans, Dutch, and Engliſh, who went with all freedom, and without the leaſt danger, to the houſes of the infected. During the plague which ravaged Syria in 1760, it was obſerved that people of the ſoundeſt conſtitutions were the moſt liable to it, and that the weak and delicate were either ſpared or eaſy cured. It was moſt fatal to the Moors; and when it attacked them it was generally incurable.

When the plague raged in Holland in 1636, a young girl was ſeized with it, had three carbuncles, and was removed to a garden, where her lover, who was betrothed to her, attended her as a nurſe, and ſlept with her as his wife. He remained uninfected, and ſhe recovered, and was married to him. The ſtory is related by Vinc. Fabricius in the *Miſc. Cur. Ann.* II. *Obſ.* 188.

Many methods have been adopted in different countries to prevent the importation of this dreadful ſcourge of the human race, and to ſtop the progreſs of infection after it has been imported. In England, mayors, bayliffs, head officers of corporations, and juſtices, of peace, have power to tax inhabitants, houſes and lands, &c. within their precincts, for the relief of perſons infected with the plague; and juſtices of the county may tax perſons within five miles round, on a pariſh's inability; the tax to be levied by diſtreſs and ſale of goods, or in default thereof by impriſonment. Infected perſons going abroad after being commanded to keep houſe for avoiding farther infection, may be reſiſted by watchmen, &c. and puniſhed as vagrants, if they have no ſores upon them; and if they have infectious ſores on them it is felony. Juſtices of peace, &c. are to appoint ſearchers, examiners, and buriers of the dead, in places infected, and adminiſter oaths to them for the performance of their duties, &c. *ſtat.* 1. *Jac.* 1. *cap.* 31. See QUARANTINE.

The commiſſion at Moſcow having, in the year 1770, invented a fumigation-powder, which, from ſeveral leſſer experiments, had proved efficacious in preventing the infection of the plague; in order more fully to aſcertain its virtue in that reſpect, it was determined, towards the end of the year, that ten malefactors under ſentence of death ſhould, without undergoing any other precautions than the fumigations, be confined three weeks in a lazaretto, be laid upon the beds and dreſſed in the clothes, which had been uſed by perſons ſick, dying, and even dead, of the plague in the hoſpital. The experiment was accordingly tried, and none of the ten malefactors were then infected, or have been ſince ill. The fumigation-powder is prepared as follows.

Powder of the firſt ſtrength.] Take leaves of juniper, juniper-berries pounded, ears of wheat, guaiacum-wood pounded, of each ſix-pounds; common ſalt-petre pounded, eight pounds; ſulphur pounded, ſix pounds; Smyrna tar, or myrrh, two pounds; mix all the above ingredients together, which will produce a pood of the powder of fumigation of the firſt ſtrength. [*N. B.* A pood is 40 pounds Ruſſian, which, are equal to 35 pounds and a half or 36 pounds Engliſh avoirdupoiſe.]

Powder of the ſecond ſtrength.] Take ſouthernwood cut into ſmall pieces, four pounds; juniper-berries pounded, three pounds; common ſalt-petre pounded, four pounds; ſulphur pounded, two pounds and a half; Smyrna tar, or myrrh, one pound and a half: mix the above together, which will produce half a pood of the powder of fumigation of the ſecond ſtrength.

Odoriferous Powder.] Take the root called *kalmus* cut into ſmall pieces, three pounds; leaves of juniper cut into ſmall pieces, four pounds; frankincenſe pounded groſsly, one pound; ſtorax pounded, and roſe-flowers, half a pound; yellow amber pounded, one pound; common ſaltpetre pounded, one pound and a half; ſulphur, a quarter of a pound: mix all the above

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(A) See the account of the *yellow fever* under the article PHILADELPHIA; where we find that that diſeaſe was leſs fatal to ſome ſorts of perſons than to others.

above together, which will produce nine pounds and three quarters of the odoriferous powder.

Remark on the powder of fumigation.] If guaiacum cannot be had, the cones of pines or firs may be uſed in its ſtead; likewiſe the common tar of pines and firs may be uſed inſtead of the Smyrna tar, or myrrh, and mugwort may ſupply the place of ſouthern wood.

Thucydides, who was himſelf infected, lib. ii. gives us an account of a dreadful plague which happened at Athens about the year before Chriſt 430, while the Peloponneſians under the command of Archidamus waſted all her territory abroad; but of theſe two enemies the plague was by far the moſt dreadful and ſevere.

The moſt dreadful plague that ever raged at Rome was in the reign of Titus, A. D. 80. The emperor left no remedy unattempted to abate the malignity of the diſtemper, acting during its continuance like a father to his people. The ſame fatal diſeaſe raged in all the provinces of the Roman empire in the reign of M. Aurelius, A. D. 167, and was followed by a dreadful famine, by earthquakes, inundations, and other calamities. The Romans believed that Æſculapius ſometimes entered into a ſerpent, and cured the plague.

About the year 430 the plague viſited Britain, juſt after the Picts and Scots had made a formidable invaſion of the ſouthern part of the iſland. The plague raged with uncommon fury, and ſwept away moſt of thoſe whom the ſword and famine had ſpared, ſo that the living were ſcarce ſufficient to bury the dead.

About the year 1348 the plague became almoſt general over Europe. A great many authors give an account of this plague, which is ſaid to have appeared firſt in the kingdom of Kathay in the year 1346, and to have proceeded gradually weſtward to Conſtantinople and Egypt. From Conſtantinople it paſſed into Greece, Italy, France and Africa, and by degrees along the coaſts of the ocean into Britain and Ireland, and afterwards into Germany, Hungary, Poland, Denmark, and the other northern kingdoms. According to Antoninus archbiſhop of Florence the diſtemper carried off 60,000 people in that city, among whom was the hiſtorian John Villani.

In the year 1656 the plague was brought from Sardinia to Naples, being introduced into the city by a tranſport with ſoldiers on board. It raged with exceſſive violence, carrying off in leſs than ſix months 400,000 of the inhabitants. The diſtemper was at firſt called by the phyſicians a malignant fever; but one of them affirming it to be peſtilential, the viceroy, who was apprehenſive leſt ſuch a report would occaſion all communication with Naples to be broke off, was offended with this declaration, and ordered him to be impriſoned. As a favour, however, he allowed him to return and die in his own houſe. By this proceeding of the viceroy, the diſtemper being neglected, made a moſt rapid and furious progreſs, and filled the whole city with conſternation. The ſtreets were crowded with confuſed proceſſions, which ſerved to ſpread the infection through all the quarters. The terror of the people increaſed their ſuperſtition; and it being reported that a certain nun had propheſied that the peſtilence would ceaſe upon building a hermitage for her ſiſter nuns upon the hill of St Martin's, the edifice was immediately begun with the moſt ardent zeal. Perſons of the higheſt quality ſtrove who ſhould perform the meaneſt offices; ſome loading themſelves with beams, and others carrying baſkets full of lime and nails, while perſons of all ranks ſtripped themſelves of their moſt valuable effects, which they threw into empty hogſheads placed in the ſtreets to receive the charitable contributions. Their violent agitation, however, and the increaſing heats, diffuſed the malady through the whole city, and the ſtreets and the ſtairs of the churches were filled with the dead; the number of whom, for ſome time of the month of July, amounted daily to 15,000.

The viceroy now uſed all poſſible precautions to abate the fury of the diſtemper, and to prevent its ſpreading to the provinces. The infection however, deſolated the whole kingdom, excepting the provinces of Otranto and the Farther Calabria, and the cities of Gaeta, Sorrento, Paolo, and Belvedere. The general calamity was increaſed in Naples by malecontents, who inſinuated that the diſtemper had been deſignedly introduced by the Spaniards, and that there were people in diſguiſe who went through the city ſowing poiſoned duſt. This idle rumour enraged the populace, who began to inſult the Spaniſh ſoldiers, and threaten a ſedition; ſo that the viceroy, to pacify the mob, cauſed a criminal to be broke upon the wheel, under pretence that he was a diſperſer of the duſt. A violent and plentiful rain falling about the middle of Auguſt, the diſtemper began to abate; and on the eighth of December the phyſicians made a ſolemn declaration that the city was entirely free from infection.

Of the dreadful plague which raged at London in the year 1665, the reader will find an account in the article London, n° 21. In 1720 the city of Marſeilles was viſited with this deſtructive diſeaſe, brought in a ſhip from the Levant; and in ſeven months, during which time it continued, it carried off not leſs than 60,000 people. This deſolation is not yet obliterated from the minds of the inhabitants; ſome ſurvivors remained alive but a few years ago to tranſmit a traditional account of it to after ages. There are two fine pictures painted by Puget repreſenting ſome of the horrid ſcenes of that time. "They are (ſays lady Craven) only too well executed. I ſaw ſeveral ſick figures taking leave of their friends, and looking their laſt anxious, kind, and wiſhful prayers on their dying infants, that made the tears flow down my cheeks. I was told the phyſicians and noblemen who were aſſiſting the ſick and dying, were all portraits: I can eaſily conceive it; for in ſome faces there is a look of reflection and concern which could only be drawn from the life." *Letters*, p. 34, 35. This fatal event has cauſed the laws of quarantine to be very ſtrictly enforced in the Lazaretto here, which is an extenſive inſulated building.

The ravages of this diſeaſe have been dreadful wherever it has made its appearance. On the firſt arrival of the Europeans at the iſland of Gran Canaria, it contained 14,000 fighting men, ſoon after which, two thirds of the whole inhabitants fell a ſacrifice to the plague, which had doubtleſs been introduced by their new viſitors. The deſtruction it has made in Turkey in Europe, and particularly in Conſtantinople, muſt be known to every reader; and its fatal effects have been particularly heightened there by that firm belief which prevails among the people of predeſtination, &c. as has been already mentioned. It is generally brought into European Turkey from Egypt; where it is very frequent, eſpecially at *Grand Cairo*. To give even a liſt of all the plagues that have deſolated many flouriſhing countries, would extend this article beyond all bounds, which minutely to deſcribe them all would be impoſſible. For the plague at Smyrna we refer to Chandler's Travels as above. Reſpecting that which raged in Syria in 1760, we refer to the Abbé Mariti's Travels through Cyprus, Syria, and Paleſtine, vol. 1ſt, p. 278—296. This plague was one of the moſt malignant and fatal that Syria ever experienced; for it ſcarcely made its appearance in any part of the body when it carried off the patient.

PLAIN, or Plane, in general, an appellation given to whatever is ſmooth and even, or ſimple, obvious, and eaſy to be underſtood; and, conſequently, ſtands oppoſed to rough, enriched, or laboured.

A plain figure, in geometry, is an uniform ſurface; from every point of whoſe perimeter right lines may be drawn to every other point in the ſame.

A plain angle is one contained under two lines, or ſurfaces, in contradiſtinction to a ſolid angle. See Angle.

The doctrine of plain triangles, as thoſe included under three right lines, is termed *plain trigonometry*. See the article Trigonometry.

Plain Chart. See the article Chart.

Plain-Sailing. See Navigation, p. 685.

PLAISE, the Engliſh name of a ſpecies of pleuronectes. See Pleuronectes.

PLAN, in general, denotes the repreſentation of ſomething drawn on a plane; ſuch are maps, charts, ichnographies, &c. See Map, Chart, &c.

The term *plan*, however, is particularly uſed for a draught of a building, ſuch as it appears, or is intended to appear, on the ground, ſhowing the extent, diviſion, and diſtribution of its area or ground-plot into apartments, rooms, paſſages, &c.

A geometrical plan is that wherein the ſolid and vacant parts are repreſented in their natural proportions.

The raiſed plan of a building is the ſame with what is otherwiſe called an *elevation* or *orthography*. See Orthography.

A perſpective plan is that exhibited by degradations or diminutions, according to the rules of perſpective. See Perspective.

To render plans intelligible, it is uſual to diſtinguiſh the maſſives with a black waſh; the projectures on the ground are drawn in full lines, and thoſe ſuppoſed over them in dotted lines. The augmentations or alterations to be made are diſtinguiſhed by a colour different from what is already built; and the tints of each plan made lighter as the ſtories are raiſed.

In large buildings it is uſual to have three ſeveral plans for the three firſt ſtories.

PLANCUS (Francis), doctor of phyſic, born at Amiens in 1696, and who died on the 19th of September 1765, aged 69 years, is author of ſome works which do honour to his memory. 1. A complete Syſtem of Surgery, in 2 vols. in 12mo; a treatiſe much recommended by ſurgeons to their pupils. 2. A choice Library of Medicine, taken from periodical publications, both French and others: this curious collection, continued and completed by M. Goulin, makes 9 vols in 4to, or 18 vols in 12mo. 3. A Tranſlation of Vander Wiel's Obſervations on Medicine and Surgery, 1758, 2 vols in 12mo. Plancus was the editor of various editions of works on medicine and ſurgery, and enriched them with notes. He ſhut himſelf up in his ſtudy for a long time before he practiſed his profeſſion.

PLANE, in geometry, denotes a plane ſurface, or one that lies evenly between its bounding lines: and as a right line is the ſhorteſt extenſion from one point to another, ſo a plane ſurface is the ſhorteſt extenſion from one line to another.

In aſtronomy, conics, &c. the term *plane* is frequently uſed for an imaginary ſurface, ſuppoſed to cut and paſs through ſolid bodies; and on this foundation is the whole doctrine of conic ſections built. See Astronomy, Conic *Sections*, &c.

In mechanics planes are either horizontal, that is, parallel to the horizon, or inclined thereto. See Mechanics.

The determining how how far any given plane deviates from an horizontal line, makes the whole buſineſs of levelling. See the article Levelling.

In optics, the planes of reflection and refraction are thoſe drawn through the incident and reflected or refracted rays. See Optics.

In perſpective we meet with the perſpective plane, which is ſuppoſed to be pellucid, and perpendicular to the horizon; the horizontal plane, ſuppoſed to paſs through the ſpectator's eye, parallel to the horizon; the geometrical plane, likewiſe parallel to the horizon, wherein the object to be repreſented is ſuppoſed to be placed, &c. See Perspective.

The plane of projection in the ſtereographic projection of the ſphere, is that on which the projection is made, correſponding to the perſpective plane. See Projection

Plane, in joinery, an edged tool or inſtrument for parting and ſhaving of wood ſmooth.—It conſiſts of a piece of wood very ſmooth at bottom, has a ſtock or ſhaft; in the midſt of which is an aperture, through which a ſteel edge, or chiſſel, placed obliquely, paſſes; which, being very ſharp, takes off the inequalities of the wood along which it ſlides.

Plane-Tree, in botany. See Platanus.

PLANET, a celeſtial body, revolving round the ſun as a centre, and continually changing its poſition with reſpect to the fixed ſtars; whence the name *planet*, which is a Greek word, ſignifying “wanderer.”

The planets are uſually diſtinguiſhed into primary and ſecondary. The primary ones, called by way of eminence *planets*, are thoſe which revolve round the ſun as a centre; and the ſecondary planets, more uſually called *ſatellites* or *moons*, are thoſe which revolve round a primary planet as a centre, and conſtantly attend it in its revolution round the ſun.

The primary planets are again diſtinguiſhed into ſuperior and inferior. The ſuperior planets are thoſe farther from the ſun than our earth; as Mars, Jupiter, Saturn, and the Georgium Sidus; and the inferior planets are thoſe nearer the ſun than our earth, as Venus and Mercury. See Astronomy.

That the planets are opaque bodies like our earth, is thought probable for the following reaſons, 1. Since in Venus, Mercury, and Mars, only that part of the diſk illuminated by the ſun is found to ſhine: and again, Venus and Mercury, when between the earth and the ſun, appear like dark-ſpots or maculæ on the ſun's diſk; it is evident, that Mars, Venus, and Mercury, are opaque bodies, illuminated with the borrowed light of the ſun. And the ſame appears of Jupiter, from its being void of light in that part to which the ſhadow of the ſatellites reaches, as well as in that part turned from the ſun; and that his ſatellites are opaque, and reflect the ſun's light, is abundantly ſhown. Again, ſince Saturn, with his ring and ſatellites, only yield a faint light, fainter conſiderably than that of the fixed ſtars, though theſe be vaſtly more remote, and than that of the reſt of the planets; it is paſt doubt that he too with his attendants are opaque bodies. 2. Since the ſun's light is not tranſmitted through Mercury and Venus when placed againſt him, it is plain they are denſe opaque bodies; which is likewiſe evident of Jupiter, from his hiding the ſatellites in his ſhadow; and therefore, by analogy, the ſame may be concluded of Saturn. 3. From the variable ſpots of Venus, Mars, and Jupiter, it is evident theſe planets have a changeable atmoſphere; which changeable atmoſphere may, by a like argument, be inferred of the ſatellites of Jupiter; and therefore, by ſimilitude, the ſame may be concluded of the other planets. 4. In like manner, from the mountains obſerved in Venus, the ſame may be ſuppoſed in the other planets. 5. Since, then, Saturn, Jupiter, and the ſatellites of both, Mars, Venus, and Mercury, are opaque bodies ſhining with the ſun's borrowed light, are furniſhed with mountains, and encompaſſed with a changeable atmoſphere; they have, of conſequence, waters, ſeas, &c. as well as dry land, and are bodies like the moon, and therefore like the earth. *Q. E. D.* And hence it ſeems alſo highly probable, that the other planets have their animal inhabitants as well as our earth.

PLANETARIUM, an aſtronomical machine ſo called from its repreſenting the motions, orbits, &c. of the planets, agreeable to the Copernican ſyſtem. See ASTRONOMY, nº 489 and Plate LXXXVIII.

PLANETARY, ſomething that relates to the planets. Hence we ſay, planetary worlds, planetary inhabitants, &c. Huygens and Fontenelle bring ſeveral probable arguments for the reality of planetary animals, plants, men, &c. See PLANET.

PLANETARY Syſtem, is the ſyſtem or aſſemblage of the planets, primary and ſecondary, moving in their reſpective orbits, round their common centre the ſun. See ASTRONOMY.

PLANETARY Days.—Among the ancients, the week was ſhared among the ſeven planets, each planet having its day. This we learn from Dion Caſſius and Plutarch, *Sympoſ.* l. 4. q. 7. Herodotus adds, that it was the Egyptians who firſt diſcovered what god, that is, what planet, preſides over each day; for that among this people the planets were directors. And hence it is, that in moſt European languages the days of the week are ſtill denominated from the planets; Sunday, Monday, &c. See WEEK.

PLANETARY Years, the periods of time in which the ſeveral planets make their revolutions round the ſun or earth.—As from the proper revolution of the ſun, the ſolar year takes its original; ſo from the proper revolutions of the reſt of the planets about the earth, ſo many ſorts of years do ariſe, viz. the Saturnian year, which is defined by 29 Egyptian years, 174 hours, 58 minutes, equivalent in a round number to 30 ſolar years.—The Jovial year, containing 317 days, 14 hours, 59 minutes.—The Martial year, containing 321 days, 23 hours, 31 minutes.—For Venus and Mercury, as their years, when judged of with regard to the earth, are almoſt equal to the ſolar year; they are more uſually eſtimated from the ſun, the true centre of their motions: in which caſe, the former is equal to 224 days, 16 hours, 40 minutes; the latter to 87 days, 23 hours, 14 minutes.

PLANIMETRY, that part of geometry which conſiders lines and plain figures, without conſidering their height or depth. See GEOMETRY.

PLANISPHERE, ſignifies a projection of the ſphere, and its various circles on a plane; in which ſenſe, maps, whereon are exhibited the meridians and other circles of the ſphere, are planiſpheres. See MAP.

END OF THE FOURTEENTH VOLUME.

DIRECTIONS FOR PLACING THE PLATES OF VOL. XIV.

PART I.

Plate		Page
Plate CCCLXXVIII. CCCLXXIX.	to face	Page 16
CCCLXXX.		122
CCCLXXXI.		126
CCCLXXXII.		136
CCCLXXXIII.		184
CCCLXXXIV.		188
CCCLXXXV.		190
Plate CCCLXXXVI.	to face	Page 194
CCCLXXXVII.		196
CCCLXXXVIII.		248
CCCLXXXIX.		264

PART II.

Plate		Page
CCCXC.		536
CCCXCI.		680
CCCXCII. CCCXCIII.		768

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